

Enhancing Teaching and Learning through Assessment

Assessment Series

Enhancing Teaching and Learning through Assessment

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Cover designed by
Young Hill Ling, Hilly,
Student of the School of Design,
The Hong Kong Polytechnic University.

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Enhancing Teaching and Learning through Assessment

Edited by
Steve Frankland
The Hong Kong Polytechnic University
Hong Kong
China SAR

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We dedicate this book

to all university teachers, who are looking for better strategies to teach,

to all new teachers, who are not prepared to approach teaching in a trial and error manner,

to current students, who are striving to learn better,

to future students, who will be taught in a new world using constructively aligned assessment.

Assessment has a profound effect on student learning.

What students learn, and the way they learn it,
is driven by how they are going to be assessed.

What we have contributed in this book is becoming a concerted effort
for understanding how to enhance the quality of teaching and learning through
designing, implementing, and making effective use of assessment practices.

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PREFACE

This book has documented our inquiry into the notion of enhancing teaching and learning through assessment in Higher Education.

The chapter contributors have provided their work regarding the effectiveness, best practices, and policy implications in using assessment to improve students' learning. These selected studies are practical, applicable and explain how frontline teachers deal with assessment on a regular basis together with their underpinning theoretical concerns. Through reading the collected cases, we can gain an insight from the various teachers' pedagogical approaches currently being used in different contexts, different disciplines and different countries including universities in Hong Kong, Australia, the USA and the United Kingdom. Ultimately, we can benefit from a deeper understanding of a particular practice and clarify our thinking about the mechanisms of learning and teaching by continuously reviewing our own practices.

Assessment has a wide range of functions. Fundamentally it is for teaching, for learning and for the institution. It is an integral part of teaching which will affect the quality of student learning. For the institution, it is used to provide public certification stating that acceptable standards have been reached. In this book series, we particularly focus on how it can be used for learning and teaching. To be specific, the contents are about what teachers intend their students to learn, how properly designed assessment tasks inform students what they are supposed to learn and also, how teachers can see how well their students have learned.

Through the assessment practices compiled here, we make our inquiries on assessment with different focuses and in different ways, in order to

- assess student learning outcomes with regard to skills, processes, and attitudes, which are under both the cognitive and affective domains.
- offer purposeful, constructive, and timely feedback to students.
- use assessment strategies which are appropriate to student learning which are fair and equitable.
- map student progress by keeping continuous, informative records of student learning outcomes that can then be used for planning suitable teaching strategies and nurturing better learning.

In so doing, we espoused how and what pedagogical view we have chosen.

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We extend deep appreciation to all those who served on the Conference Organising Committee. We also extend special thanks to the paper reviewers who gave their unfailing support, to all our colleagues and the student assistants for compiling this book. Special thanks also goes to Joanna Lee, Project Fellow and Patrick young, Project Associate for their significant support, not only in compiling this book, but also for all the work they have done for this project. Finally, we particularly thank both Professor John Biggs for his strong support and excellent advice through all stages of the project and Dr. Catherine Tang who was originally one of the project’s initiators and has continually provided support to all the project’s initiatives.

Conference Organising Committee

Steve Frankland (Chairman)

Associate Professor, Department of Industrial and Systems Engineering
The Hong Kong Polytechnic University

Winnie Cheng

Associate Professor, Department of English
The Hong Kong Polytechnic University

Pauline Cho

Associate Professor, Department of Optometry
The Hong Kong Polytechnic University

Jakša Kivela

Associate Professor, School of Hotel and Tourism Management
The Hong Kong Polytechnic University

Martin Warren

Associate Head and Associate Professor, Department of English
The Hong Kong Polytechnic University

Cathy Wong

Assistant Professor, Department of English
The Hong Kong Polytechnic University

Joanna Lee (Administration)

Project Fellow, UGC-funded Project “Enhancing Teaching and Learning
through Assessment”, The Hong Kong Polytechnic University

Students who participated in compiling the books:

Young Hill Ling, Hilly

Year 1, major in Design Studies
The Hong Kong Polytechnic University

Au Hiu Kwan, Cherry

Year 3, major in English Studies
The Hong Kong Polytechnic University

Cheung Man Hin, Ronny

Year 2, major in Bilingual Studies
The Hong Kong Polytechnic University

Yip Wing Man, Winnie

Year 2, major in Chemical Technology
The Hong Kong Polytechnic University

CONTRIBUTORS

Linda Allal
Faculty of Psychology and Educational Sciences,
University of Geneva,
Switzerland.
linda.allal@pse.unige.ch

Larry. W. Belbeck
Department of Pathology and Medicine,
McMaster University,
Canada.
belbeckl@mcmaster.ca

Gwyn Brickell
Centre for Educational Development and Interactive
Resources,
Faculty of Education,
University of Wollongong,
Australia.
gbrickell@uow.edu.au

Carmela Briguglio
Curtin Business School,
Curtin University of Technology,
Perth,
Western Australia.
carmela.briguglio@cbs.curtin.edu.au

Christine Brown
Centre for Educational Development and Interactive
Resources,
University of Wollongong,
Australia.
cbrown@uow.edu.au

Cheryl Burton
Faculty of Technology,
University of Plymouth,
United Kingdom.
c.burton@plymouth.ac.uk

Coral Campbell
Faculty of Education,
Deakin University, Geelong,
Australia.
coral.campbell@deakin.edu.hk

Marilyn A. Campbell
Faculty of Education and Library,
Queensland University of Technology,
Australia.
ma.campbell@qut.edu.au

Suzanne Chamberlain
Institute of Clinical Education,
Peninsula Medical School,
Universities of Exeter and Plymouth,
United Kingdom.
suzanne.chamberlain@pms.ac.uk

Gipsy Chang
School of Film and Television,
The Hong Kong Academy for Performing Arts,
Hong Kong SAR,
China.
gipsychang@hkapa.edu

Winnie Cheng
Department of English,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
egwcheng@inet.polyu.edu.hk

Pauline Cho
School of Optometry,
The Hong Kong Polytechnic Universities,
Hong Kong SAR,
China.
sopaulin@inet.polyu.edu.hk

Maggie Coats
Centre for Outcomes-Based Education,
The Open University,
United Kingdom.
m.a.m.coats@open.ac.uk

Michael Collins
School of Computer and Information Science,
Edith Cowan University,
Australia.
m.collins@ecu.edu.au

Rob Cowdroy
School of Architecture and Built Environment,
The University of Newcastle,
Australia.
rob.cowdroy@newcastle.edu.au

Mary J. Cruise
Center for Teaching and Learning,
California State University,
Dominguez Hills,
United States.
outcomes@csudh.edu

Josephine Csete
Educational Development Centre,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
etjcssete@inet.polyu.edu.hk

Chris Dillion
Centre for Outcomes-Based Education,
The Open University,
United Kingdom.
c.r.dillon@open.ac.uk

Peter Donnan
Centre for Enhancement of Learning, Teaching and
Scholarship,
University of Canberra,
Australia.
pad12@uow.edu.au

Sue A. Fellwock-Schaar
College of Education,
California State University,
Dominguez Hills,
United States.
sschaar@csudh.edu

Robert Fox
Faculty of Education,
The University of Hong Kong,
Hong Kong SAR,
China.
bobfox@hku.hk

Steve Frankland
Department of Industrial and Systems Engineering,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
mfsteve@inet.polyu.edu.hk

Adrian Freeman
Institute of Clinical Education,
Peninsula Medical School,
Universities of Exeter and Plymouth,
United Kingdom.
adrian.freeman@pms.ac.uk

Denise Frost
Faculty of Education and Library,
Queensland University of Technology,
Australia.
da.frost@qut.edu.au

Frank Fursenko
Division of Information Technology, Engineering and
Environment,
University of South America,
Australia.
frank.fursenko@unisa.edu.au

Sue Gelade
Division of Education, Arts and Social Science,
University of South America,
Australia.
susan.gelade@unisa.edu.au

Barry Gibson
School of Exercise, Biomedical and Sports Science,
Edith Cowan University,
Australia.
b.gibson@ecu.edu.au

Clare Glanville
Faculty of Information Technology,
School of Information Systems,
Queensland University of Technology,
Australia.
c.glanville@qut.edu.au

Stephen Gomez
Faculty of Applied Sciences,
University of the West of England,
United Kingdom.
stephen.gomez@uwe.ac.uk

Gillian Hallam
Faculty of Information Technology,
School of Information Systems,
Queensland University of Technology,
Australia.
g.hallam@qut.edu.au

Rosario Hernandez
Hispanic and Lusophone Studies,
School of Languages, Literatures and Film,
University College Dublin,
Ireland.
charo.hernandez@ucd.ie

Linda Hodgkinson
Centre for Outcomes-Based Education,
The Open University,
United Kingdom.
l.hodgkinson@open.ac.uk

Paula Hodgson
Educational Development Centre,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
etpaula@inet.poly.edu.hk

George Hoefflin
Institute of Special Education,
University of Education,
Lausanne,
Switzerland.
george.hoefflin@edu-vd.ch

Sherria Hoskins
Department of Psychology,
University of Portsmouth,
Hampshire,
United Kingdom.
sherria.hoskins@port.ac.uk

Carolyn Jacobs
Department of Curriculum Development,
University of Portsmouth,
Hampshire,
United Kingdom.
carolyn.jacobs@port.ac.uk

Neil James
Faculty of Technology,
University of Plymouth,
United Kingdom.
m.james@plymouth.ac.uk

Shucui Jiang
Department of Pathology and Medicine,
McMaster University,
Canada.
jiangs@mcmaster.ca

Sally Kift
Faculty of Law,
Queensland University of Technology,
Australia.
s.kift@qut.edu.au

Pamela C. Krochalk
College of Health and Human Services,
California State University,
Dominguez Hills,
United States.
pkrochalk@csudh.edu

Paul Lam
Centre for Learning Enhancement and Research,
The Chinese University of Hong Kong,
Hong Kong SAR,
China.
paul.lam@cuhk.edu.hk

Leo Lau
Department of Physics,
The Chinese University of Hong Kong,
Hong Kong SAR,
China.
leol@phy.cuhk.edu.hk

Catherine Layton
School of Policing Studies,
Charles Sturt University,
Australia.
clayton@csu.edu.au

Chrisann Lee
School of Accounting,
Charles Sturt University,
NSW,
Australia.
clee@csu.edu.au

Joanna Logan
Faculty of Education and Library,
Queensland University of Technology,
Australia.
j2.logan@qut.edu.au

David Lush
Faculty of Applied Sciences,
University of the West of England,
United Kingdom.
david.lush@uwe.ac.uk

Heather MacKenzie
Department of Psychology,
University of Portsmouth,
Hampshire,
United Kingdom.
heather.mckenzie@port.ac.uk

Coralie McCormack
Centre for the Enhancement of Learning, Teaching and
Scholarship,
University of Canberra,
Australia.
coralie.mccormack@canberra.edu.au

Carmel McNaught
Centre for Learning Enhancement and Research,
The Chinese University of Hong Kong,
Hong Kong SAR,
China.
carmel.mcnaught@cuhk.edu.hk

Mike Miles
Faculty of Technology,
University of Plymouth,
United Kingdom.
mmiles@plymouth.ac.uk

Janis Moody
Faculty of Health Sciences,
School of Acute & Continuing Care Nursing,
Napier University,
Scotland,
United Kingdom.
j.moody@napier.ac.uk

Judith Mousley
Faculty of Education,
Deakin University,
Geelong,
Australia.
judym@deakin.edu.au

Nona Muldoon
Centre for Enhancing Learning and Teaching,
Charles Sturt University,
NSW,
Australia.
nmuldoon@csu.edu.au

Pippa Nelligan
Faculty of Community Services, Education and Social
Sciences
School of Education,
Edith Cowan University,
Joondalup,
Western Australia.
p.nelligan@ecu.edu.au

Nicoleta Nutiu
Department of Pathology and Medicine,
McMaster University,
Canada.
nutiu@mcmaster.ca

James Oldham
Institute of Clinical Education,
Peninsula Medical School,
Universities of Exeter and Plymouth,
United Kingdom.
james.oldham@pms.ac.uk

Daniel Ong
Department of Physics,
The Chinese University of Hong Kong,
Hong Kong SAR,
China.
hcong@phy.cuhk.edu.hk

Richard Osborne
Faculty of Applied Sciences,
University of the West of England,
United Kingdom.
richard.osborne@uwe.ac.uk

Gjyn O'Toole
Occupational Therapy School of Health Sciences,
Faculty of Health,
University of Newcastle,
Australia.
gjyn.otoole@newcastle.edu.au

Kevin O'Toole
Faculty of Arts,
Deakin University,
Warrnambool,
Australia.
otoole@deakin.edu.au

Cathering Reuben
Centre for Outcomes-Based Education,
The Open University,
United Kingdom.
c.reuben@open.ac.uk

Mary Rice
Institute of Teaching and Learning,
Deakin University,
Geelong,
Australia.
mrice@optusnet.com.au

Chris Ricketts
Institute of Clinical Education,
Peninsula Medical School,
Universities of Exeter and Plymouth,
United Kingdom.
cricketts@plymouth.ac.uk

Sundrakanthi Singh
Teaching and Learning Office,
Faculty of Computing, Health and Science,
Edith Cowan University,
Australia.
k.singh@ecu.edu.au

Lorraine Stefani
Centre for Academic Development,
University of Auckland,
New Zealand.
lorraine.stefani@auckland.ac.nz

Catherine Tang
Adjunct Associate Professor,
Centre for the Advancement of University Teaching,
The University of Hong Kong.

Mary-Jane Taylor
School of Design and Architecture,
University of Canberra,
Australia.
mary-jane.taylor@canberra.edu.au

Steve Thornton
Division of Communication and Education,
University of Canberra,
Australia.
steve.thornton@canberra.edu.au

Sue Trinidad
Faculty of Education, Languages Studies and Social
Work,
Curtin University of Technology,
Perth,
Western Australia.
s.trinidad@curtin.edu.au

Richard Tucker
School of Architecture and Building,
Deakin University,
Geelong,
Australia.
richard.tucker@deakin.edu.au

Martin Warren
Department of English,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
egwarren@inet.polyu.edu.hk

Anthony Williams
School of Architecture and Built Environment,
The University of Newcastle,
Australia.
tony.williams@newcastle.edu.au

Sue Wilson
Faculty of Education,
Australian Catholic University,
Australia.
s.wilson@signadou.acu.edu.au

Cathy S.P. Wong
Department of English,
The Hong Kong Polytechnic University,
Hong Kong SAR,
China.
egcathyw@inet.polyu.edu.hk

FOREWORD

This book arose out of papers given at the UGC-funded First International Conference “Enhancing Teaching and Learning through Assessment”, held at the Hong Kong Polytechnic University in June, 2005. Most papers came from a perspective that is new to a large majority of university teachers and administrators: assessment can be as much a tool for learning as a yardstick for measuring learning outcomes quantitatively. In this new outlook, teaching and learning take place in whole *system*, in which assessment needs to be fully integrated. In the past, assessment had too often been handled independently of that teaching system, as an after-the-event procedure conceived within a quantitative framework that reduced an outcome to a number along a scale, not a holistic structure that made sense. The consequence was that the intended outcomes of teaching and learning were not directly addressed.

I was privileged to be invited to give a keynote address at the Conference. In it, I explain that a radical change in assessment practice creates a balanced system, bringing teaching and assessment methods into line with intended learning outcomes. I call this system *constructive alignment*, which provides a framework for thinking about assessment in the context of enhancing learning and teaching. Constructive alignment is now becoming widely used, both in Hong Kong and elsewhere in the world, for designing the teaching system and the quality assurance of university teaching.

This book was one outcome of the UGC-funded Assessment Project, but there are others. The websites of the Project and of the Assessment Resource Centre display many examples in different subject areas of new approaches to assessment for learning, where it can be seen that assessment tasks can be selected to suit *how* we want students to learn, and criteria established telling us *what*, and *how well*, they have learned. It is earnestly hoped that these products of the Assessment Project will be instrumental in persuading teachers and administrators by example that it is possible to turn traditional practice on its head and use assessment tasks and procedures that do indeed enhance teaching and learning.

John Biggs
Honorary Professor of Psychology
The University of Hong Kong

Enhancing Teaching and Learning through Assessment: Deriving an Appropriate Model

Assessment by portfolio: an experiment

In 1994, I was on sabbatical leave in Canada. I returned to Hong Kong very impressed with the use of 'authentic' assessment and assessment portfolios in Canadian elementary schools. Authentic assessment means that students are given assessment tasks that mimic real life; they then selected their best work to place in portfolios for their teachers to assess. It seems very simple, but the implications are profound. It seemed to me to be ideal for the sort of courses I was teaching in professional education. I was retiring from university teaching the following year, so it was now or never if I wanted to try this method of assessing students.

A splendid metaphor for assessment by portfolio was given to me by one of my part-time students:

When I stand in front of a class, I don't see stupid or unteachable learners, but boxes of treasures waiting for us to open!

Cheung Chi Ming, a P. C. Ed. student.

This prompted me to envisage the following exchange:

Teacher: How many diamonds have you got?

Student: I don't have any diamonds.

Teacher: Then you fail!

Student: But you didn't ask me about my pearls, my jade or my amethysts!

Asking pre-set questions with pre-determined answers is shooting fish in muddy water. If we want to know the value of what our students have acquired, we have to ask them to show us all their treasures, not just the diamonds we happen to think of.

My students were teachers enrolled in a part-time B. Ed. programme, the unit in question about how knowledge of psychology could improve teaching. During the day, they had plenty of opportunity to see how psychology might be doing that. They were the ones to tell me if it had, and how it had, not for me to tell them how it should have helped and then for me to assess them on how well they remembered what I'd told them. The following is not atypical of traditional assessment:

I hate to say it, but what you have got to do is to have a list of 'facts'; you write down the important points and memorize those, then you'll do all right in the test ... If you can give a bit of factual information – so and so did that, and concluded that – for two sides of writing, then you'll get a good mark.

A psychology undergraduate, quoted in Ramsden (1984; p. 144)

A common enough assessment task, but it sends students entirely the wrong message about what it means to understand and apply psychology. Unfortunately, it is one that students are used to and have learned how to handle. My B. Ed. students were not surprisingly deeply threatened when asked to show me their gemstones of how psychology had improved their teaching.

This is what one wrote at the beginning:

How am I supposed to do it well when I'm not sure exactly what the professor wants to see in it?... though he did say that we can put what means much to us in the portfolio, yet how can I be sure that he agrees with me?

I suggested what kinds of thing they might place in their portfolios, and that they keep a reflective diary, writing in it anything that might indicate how their teaching had been improved, such as samples of conversations with their own students, lesson plans, samples of student work. After a trial run, they got the idea. When they finally submitted their portfolios, I was stunned. They were rich and exciting, the results, in terms of As and Bs awarded, better than ever before; the feedback the best I'd received from a class.

Here are a couple of excerpts from their diaries:

All (the teacher) said was 'show me the evidence of your learning that has taken place' and we have to ponder, reflect and project the theories we have learnt into our own teaching... If it had only been an exam or an essay, we would have probably just repeated his ideas to him and continued to teach the same way as we always do!

Instead of bombing us with lengthy lectures and lecture notes, we have to reflect on our own learning experiences and to respond critically ...I feel quite excited as this course is gradually leading me to do something positive to my teaching career and to experience real growth.

What had happened? It was the backwash effect, to use Lewis Elton's term (1987; p. 92). It was exactly what Ramsden had observed, only this time it was working positively.

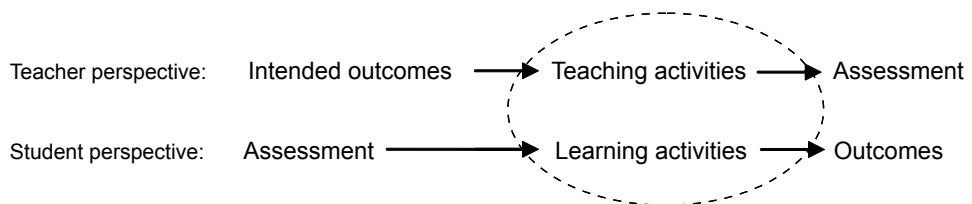


Figure 1. Teacher's and student's perspectives on assessment

The idea is so simple. We all know that students see the assessment tasks as the curriculum. Well then, just make sure that the curriculum—what we really want the students to learn—is contained in the assessment tasks. Driving instructors do it. A driving instructor wants the student to learn how to drive a car, the teaching method is driving a car, the assessment is how well the car is driven. We'd think a driving instructor who only lectured on driving, then gave a multiple-choice test at the end, to be grossly irresponsible. Yet many teachers in many universities are doing the equivalent of just that most of the time.

Why? What has happened to legitimise this situation?

The measurement model of student assessment

In the 4th century BC, during the Han Dynasty, education was the means of selecting those who excelled in their study, for they are the ones, so Confucius said, who 'should become officials' (Zheng, 1999). The purpose of education was selective, assessment norm-referenced as we say today, its task to do the selecting efficiently. This remained the case in Hong Kong until the late 1990s, and in the minds of many teachers and more parents, it still is, despite the best rhetoric of the Education Commission. Hong Kongers know about banding, and the stern role that what was then the Hong Kong Examinations Authority, now the Hong Kong Assessment and Examinations Authority, played in sorting out the Band 5 geese from Band 1 swans.

However, the obsession with selectivity is not however confined to countries of the Confucian heritage. For most of the last century, assessment systems in schools and universities were designed and implemented to serve selectivity. Who are the high fliers, who the hewers of wood and the drawers of water? Where did Johnny come in class? These were the questions that parents and teachers thought they wanted answered. It was assumed that only a few should obtain high grades, only a few should fail, and most students should fall in between.

Thus, Australian universities use the following grades: Pass, Credit, Distinction, High Distinction—implying that only a few students are to be dubbed 'highly distinguished'. At least the A B C D system of grading does not carry that implication, although Boards of Examiners get very upset, snorting 'slack standards', if most students are awarded A. In my reckoning, if most students in a class do reach the standards deserving an award of A, then we all should be very pleased indeed. But most are not, because allocating grades is not a matter of reaching certain standards, but of measuring the distance between students. 'A good test gives a good spread', measurement experts damagingly impressed on teacher education students.

CURRICULUM	TEACHING	ASSESSMENT
A list of topics to be covered	Lecture, Tutorial Practicum as defaults	Exam, MCQ Assignment as defaults

Figure 2: Curriculum, Teaching and Assessment in the Traditional Model

There is a list of topics to teach, with little or no stipulation of how well students should understand them: we simply 'teach' them, and when we have done so, we set an exam. In that exam, we'll probably set a few trick off-the-syllabus questions in order to ensure there are no geese masquerading as swans. Geese don't study outside the syllabus, you see.

Assessment here has no intrinsic relation to the intended learning outcomes. How could it? The outcomes are unspecified; there are no explicit criteria for the students to meet. The syllabus topics are specified, but they only tell teachers what they have to do; they have to 'cover' that list of topics, an unhelpful word if ever there was one, because 'the greatest enemy of understanding is coverage', as Howard Gardner (1993: 24) puts it. In the absence of criteria, grading can only be based on how students compare to each other. This isn't what university teachers really want to know, even if some of us think that it is.

This situation draws on the philosophy and techniques of the measurement model of assessment (Taylor, 1994). The measurement model derives from the study of individual differences. It is aimed at measuring an underlying trait or ability, expressing that measurement along a graduated scale so that individuals can be compared to each other or, as in the case of the IQ for example, to population norms. Complex performances need to be reduced to a unidimensional scale, an essential requirement if comparisons are to be made. Measurement theory can be extremely sophisticated, as anyone who has been involved with the workings of the previous Hong Kong Examinations Authority will know, but the application of measurement theory to education is 'twentieth century statistics applied to nineteenth century psychology' (Pellegrino, Baxter and Glaser, 1999). Some educators like it, because it gives the impression of being scientific, objective and precise, but it is not. It is the wrong model to apply to classroom assessment.

The essence of the measurement model is quantification. Educational outcomes are usually quantified either by breaking knowledge into binary units, such as words, ideas, points that are either correct or incorrect, or by arbitrarily employing 'marks' and converting them to percentages. In the first, each correct unit is considered to be worth the same as any other unit, an essential requirement if they are to be added or averaged. The final performance is then assessed as the sum of the marks awarded. It doesn't matter what the student gets correct, as long as there are (usually) fifty of them. The integrity of the performance has been lost.

Imagine if Oscars were awarded by marking each frame of a movie out of ten, and then counting up to see which movie got most marks. Do that and you lose the plot. Just so do analytic summative assessments in educational institutions lose the academic plot. Giving students feedback on how well they are doing on component aspects of a task is essential formatively, but the final summative evaluation of a complex performance makes sense only when it seen as a whole.

If analytic marking in component scores doesn't make epistemological sense, adding and averaging those scores doesn't make educational sense. Consider. A high average in most components of a course, but a failure in one component, means the student passes. The reasoning here is straight from the measurement model: that student clearly had the ability to pass, so an overall pass is justified. The fact that the student happened not to have passed one important component is brushed aside. Surely the question is not how able the student is, but how well the content to be learned was actually learned. The focus should not be on the person, but on the performance. The logic of awarding a pass to a student on a section of the course in which that student has already failed is difficult to grasp, but

it is an arithmetical consequence of quantitative marking procedures. It's like saying surgery students can pass if they get enough marks in anaesthetics and skilful use of the scalpel to cover a failure in anatomy, which might result in removing the wrong part.

It is assumed that percentages, whether created by the proportion of correct responses, or by using rating scales that add up to 100, create a universal currency that is equivalent both across subjects areas and across students. Universities have long and earnest debates about one faculty using 75% as the cut-off for an A-grade, and another using 70% as the cut-off. Such debates are trying to extract certainty from the unknowable. There is simply no way of knowing if 75% in one subject is 'the same standard' as 75% in another.

The measurement model requires that a test spreads students out, clearly sorting the high from the low performers, most often according to the normal curve on the assumption that ability determines the outcomes of learning—as ability is normally distributed, near enough, so should our grades be normally distributed. But wait a minute. Shouldn't effective teaching reduce the variance between students rather than increase it? Shouldn't good teaching lift the performance of a hitherto poor performing student nearer to that of a good student? I think so, but teachers who produce results at odds with the normal distribution are criticised by their peers as being either too lenient or too harsh, usually the former.

The measurement model also assumes that what is being measured is stable over time. If you are selecting students for academic ability, such as selection for the Imperial Court, or for graduate school, you need to assume that their relative ability will not easily change over time. Thus, tests should not only be unidimensional but have a high test-retest reliability. Yet we know that teaching is supposed to produce change in what is being measured, a change usually called 'learning'.

Now take the issue of 'fairness', which requires that norm-referenced tests are administered under standardized conditions. Thus, exams are invigilated, rigid deadlines are imposed for assignments. This context of quantification and standardisation encourages the use of artificial written assessment tasks set out of context, rather than performances authentic to their discipline.

Such tasks and standardised conditions may not allow many students to display their best learning. Individuals learn and perform optimally under different conditions. Some work best under pressure, others need more time; some best make their points in writing, others visually or orally. Many need opportunities for reflection and revision if they are to show their best.

Such considerations bring a different meaning to the word 'fairness'. Isn't fairness allowing each student to develop his or her potential? Is education a level playing field or a garden of opportunity?

The backwash from the effects of quantitative assessments on teaching and learning are negative (Elton, 1987; Crooks, 1988; Frederikson & Collins, 1989). Such testing tells students:

- Ideas are equally important
- You can skip or slack on certain areas if you are doing well elsewhere
- Declarative knowledge, out of context learning, is more important than application
- Trees are more important than the wood
- Verbatim responses must gain marks
- Success and failure depend largely on uncontrollable factors such as relative ability and luck
- Assessment is the responsibility of the teacher, self-assessment or reflection are unimportant

Students in their search for marks may easily fail to see the structures being learned; in counting the trees, they get lost in the wood. Disputes about grades become a niggling quibble about an extra mark here an extra mark there. This is demeaning for both student and teacher.

As the final grade depends on relative performance, students can easily see that their success or failure depends on luck: who in the class happened to be cleverer than they. Finally, assessment in the measurement model is completely in the teacher's hands. This should not be so; one of the important things that students need to learn as practising professionals is how to assess their own work.

The standards model of assessment

The essence of the standards model is captured in the following:

If students are to learn intended outcomes in a reasonably effective manner, then the teacher's fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes. (Shuell, 1986: 429)

Here, it is necessary:

1. to describe desired or rather intended outcomes in the form of standards or criteria that students are to attain.
2. to engage students in learning activities that are likely to bring about the intended outcomes.
3. to judge if and how well students' performances meet the criteria.

The key is in translating syllabus topics into intended learning outcomes (ILOs). The difference is important. A syllabus topic is a direction to the teacher to teach the content specified; an ILO is a direction to the students informing them how they are expected to change as a result of learning that topic. Gardner (in Wiske, 1993) uses the term 'performances of understanding' in the sense that if students really understand something, in the way we mean as educators of professionals, they would act differently towards this aspect of the world, not simply talk about it. Talking about the topic in academic language is only declarative knowledge. While this is one way of expressing what it means to 'understand' something, in most courses we teach, particularly in professional education, students need to do more than just talk, they need to demonstrate that they can put their knowledge to work, that they see things differently and behave more effectively in the topic area. This is what I call functioning knowledge (Biggs, 2003). Our ILOs must therefore not require only verbal statements from students, but that they behave appropriately in terms of set criteria or standards of performance.

These criteria need to be 'authentic' to the intended outcomes. Paraphrasing what the teacher or the textbook has said is usually not authentic. In teaching psychology to teachers, for example, it is irrelevant to my ILOs if students can repeat in an exam situation the gist of what I told them months earlier. Totally irrelevant! But it is very relevant if they can demonstrate to me that they are making

different and better decisions about their teaching as a result of what they have learned in my courses. The intended outcomes are almost always whole performances, not detached components of those performances, and are thus best assessed holistically not analytically, as already discussed.

Procedurally, it helps to express the ILOs of the unit/course in terms of verbs specifying what students should be able to do after teaching. Given we have to award grades, such as Passes or Distinctions, or As, Bs and Cs, criteria need to be specified that allow teachers to judge how well the ILOs have been met: adequately, very well, brilliantly, and what that might mean in terms of the award grade.

Different students may well have different ways of demonstrating this. It is not necessary to insist that all students undertake the same assessment tasks. The assessment task is only a means to an end: to see how well criteria have been met and there may be alternative ways of demonstrating that. In portfolio assessment, the students in effect choose their own assessment tasks.

The backwash from the standards model is very different from that of typical assessment tasks. The criteria tell students what they are expected to be able to do, with the expectation that most or all should be able to do them, the assessment tasks in most cases being directly relevant to the reasons the students had for taking the course. Holistic assessment tells students to focus on the whole task, not just enough of the components to obtain a pass mark. Assessing by the standards model tells students that success is up to them, it doesn't matter who else is in the class.

The crucial task of defining the ILOs is aided by using the SOLO taxonomy (Biggs & Collis, 1982). 'SOLO' stands for Structure of the Observed Learning Outcome. SOLO is a general framework describing the evolution of learning, from learning as a quantitative increase in knowledge, to learning as becoming structured in qualitatively more complex ways. The following stages are distinguished:

1. Prestructural, where the learning is irrelevant or inappropriate to the task.
2. Unistructural, where one relevant aspect is picked up.
3. Multistructural, where several relevant aspects are acquired, but they are not seen as connected. They are the bricks without a blueprint for the building.
4. Relational, where the learnings are integrated, so that the case is made, the phenomenon is explained: the bricks become a building.
5. Extended abstract, where the structure learned become transferable to far domains, hypotheses are constructed, alternatives are suggested.

Levels of understanding can be described as verbs in ascending order of cognitive complexity that parallel the SOLO taxonomy; these are embodied in the ILOs and the assessment tasks are designed to require those verbs. High level, extended abstract, involvement is indicated by such verbs as 'theorize', 'hypothesize', 'generalize', 'reflect', 'generate', and so on. They call for the student to conceptualize at a level extending beyond what has been dealt with in actual teaching. The next level of involvement, relational, is indicated by 'apply', 'integrate', 'analyze', 'explain', and the like; they indicate orchestration between facts and theory, action and purpose. 'Classify', 'describe', 'list', indicate a multistructural level of involvement: the understanding of boundaries, but not of systems. 'Memorize', 'identify', 'recognize' are unistructural: direct, concrete, each sufficient to itself, the level of understanding required for naming.

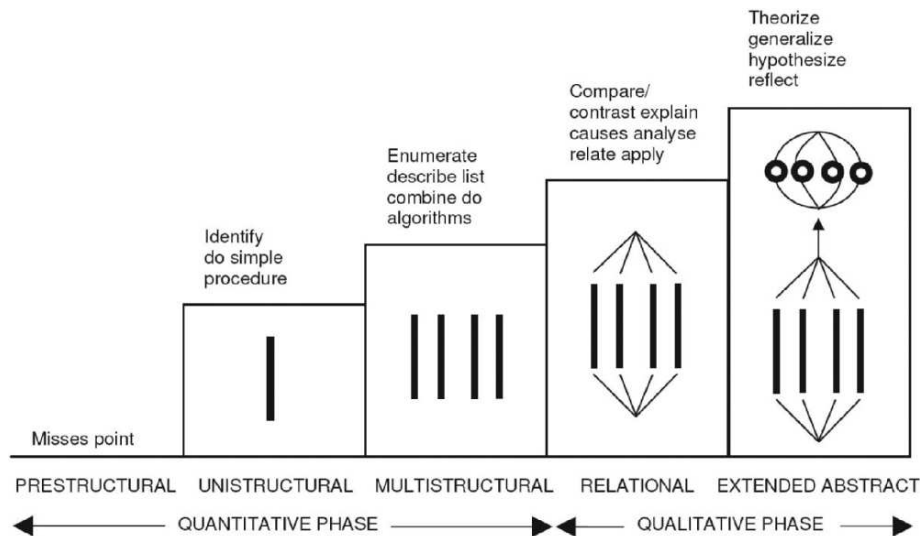


Figure 3: The SOLO Taxonomy as a hierarchy of verbs that may be used to formulate intended learning outcomes (ILOs)

Reprinted from Biggs, J (2003) *Teaching for Quality in Higher Education*, 2nd edition, SRHE/OUP, Buckingham. P. 48

The verbs in the staircase are general, indicating what each family, from lowest to highest, might look like. Particular content areas and topics would have their own specific verbs as well, and the content area of course prescribes the objects those verbs take.

Constructive alignment

Let me return to my portfolios in 1995. Although they are ostensibly about assessment, they raise questions to do with the design of the whole teaching process. The students had to show that they had met the ILOs: in this case, to show how their knowledge of psychology impacted on their teaching. The assessment tasks they chose were therefore examples of that impact. Assessing required the same activities as did the original learning. Problem-based learning is an excellent example. The ILOs refer to problems to be solved, the teaching method is solving those problems, the assessment is based on how well the problems are solved. There is probably no better way of encouraging students to engage in appropriate learning activities, as Shuell put it, than incorporating these same activities into the assessment tasks.

The crucial verbs or learning activities are therefore contained in:

- the ILOs,
- the teaching method
- the tasks used for assessing if those verbs had been used.

The verbs create alignment throughout the system, and because the alignment is based in constructivist psychology, I call it constructive alignment (Biggs, 1996; 2003) (Figure 4)

It came as no surprise to find that such an obvious idea had been suggested before: fifty years previously, by Ralph Tyler (1949). Tyler’s book was used in most if not all teacher education courses in the USA for years but with zero effect. The time had not yet come. I guess the main problems were, first, the grip measurement model thinking had on education. Norm-referenced assessment, which precluded qualitative assessment in terms of realistic ILOs, had become the conventional wisdom.

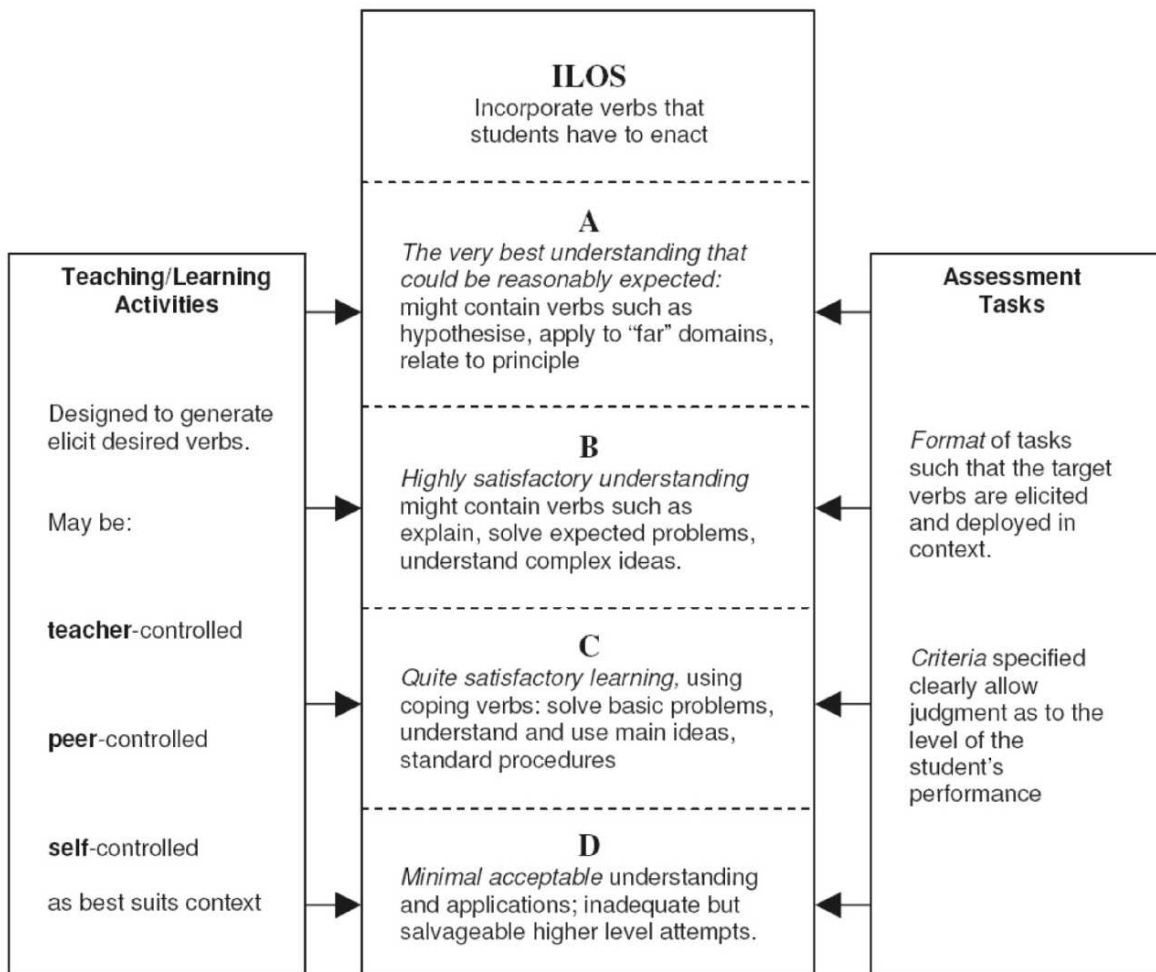


Figure 4: Aligning Intended Learning Outcomes, Teaching, and Assessment Tasks
 Modified from Biggs, J (2003) *Teaching for Quality in Higher Education*,
 2nd edition, SRHE/OUP, Buckingham. P. 28

Secondly, constructive alignment is hard to put into practice unless different levels of understanding are translated into performances of understanding. What we mean by higher and lower levels of understanding is defined in terms of how students will behave, not just talk. If we stay with declarative knowledge only, students can so easily deceive with ‘cow’, as William Perry (1970) put it, which is playing the academic game by throwing high-sounding terminology around. ‘Bullshit’ is a plainer way of putting it. Perry describes how he gate-crashed a sociology exam at Harvard. He, a nonsociologist, passed easily without having attended a single lecture or having seen the syllabus. This was misalignment on a grand scale—teaching was simply irrelevant—but perfectly explicable on the measurement model of assessment.

Constructive alignment (CA) has in a few years become widely accepted as the way to go in higher education, but the same principles apply in any instructional setting, at any level, including driving instruction. CA is used in the UK and in Hong Kong in the context of quality assurance in university teaching. The Hong Kong PolyU uses it in its assessment guidelines, while the UGC in Hong Kong is supporting two major projects, the Constructive Alignment Project and the Assessment Project itself, which is hosting this Conference.

In the Assessment Project, there are eight subprojects in various departments. Assessment practices have been revised in order to reflect the ILOs in selected subject areas more authentically; they include portfolio assessment, the use of the SOLO taxonomy, self- and peer assessment, analysis of online discussion, poster assessment, negotiation between student and supervisor, amongst others.

Some projects are revealing that such changes are hard to implement. Despite the clear signals from the UGC and from institutional mission statements, many departments and teaching staff operate at ground level in the shadow of the measurement model. In one survey conducted in the Assessment Project, a majority of staff saw the main function of assessment as ‘sorting students out’. Assessment tasks are chosen because they are there from time immemorial—since the Han Dynasty in fact—not because the tasks are the most appropriate ones for assessing the content or level of understanding required in the subjects we teach. Using the same assessments tasks whatever the course objectives only results in poor alignment. Students are distracted by the negative backwash, causing them to distort their learning to suit the assessment.

The Assessment Project will hopefully be instrumental in persuading teachers and administrators by example that traditional practice needs turning on its head. If you want to see how, visit the websites of the Project itself, and of the Assessment Resource Centre, where these and many other examples will be displayed. You will see that assessment tasks can be selected to suit how we want students to learn, and criteria established telling us what and how well they have been learned.

That is what assessment is about.

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Implementing Criterion-Referenced Assessment

Views on the Adoption and Implementation of the SOLO Taxonomy

Cathy S.P. Wong
Department of English
The Hong Kong Polytechnic University, Hong Kong SAR, China

This paper reports on the findings of teachers' views on the adoption of the SOLO taxonomy after its implementation for a year. Individual interviews were conducted with 14 staff members of an academic department of a university in Hong Kong. All of them have used the SOLO taxonomy for at least a year. Results show that teachers find the SOLO taxonomy helpful because it provides a framework for all staff members to follow. It also provides a common platform for the assessment of different subjects. However, teachers point out that the criteria derived from the SOLO taxonomy need fine-tuning. In terms of its implementation, teachers feel that more coordination and discussion is needed. Also, the issue of quality assurance must be addressed in order to make the assessment criteria a success. In short, the views on the adoption of the SOLO taxonomy are quite positive in spite of some practical problems.

1. Introduction

Currently, two different approaches to assessment are adopted in universities worldwide. One is norm-referenced in which learners' performances within a group are compared and ranked according to an assumed normal distribution (i.e. a bell curve). The other is criterion-referenced where performance is judged on the basis of a set of explicitly stated criteria that are expected of the learners.

This paper reports on the implementation of a criterion-referenced model on assessment in an academic department of a university in Hong Kong.

The assessment practice of the Department of English in the Hong Kong Polytechnic University before the academic year 2002/03 was a mix of the two approaches mentioned above: norm-referenced and criterion-referenced. Some teachers followed the norm-referenced criteria and grades of the learners' performance were distributed according to a bell curve, regardless of the class size or assessment tasks. Some teachers used "band descriptors" or other criteria specifically designed for some assessment tasks for grading. Others used both.

Such a "laissez-faire" practice was not satisfactory. Most teachers felt that a more consistent and explicit policy should be established. After the Departmental Learning and Teaching Committee had organized a series of workshops and seminars on assessment, a change took place in the academic year 2002/03. Staff members expressed the views that the norm-referenced model had ranked learners artificially, especially for small classes, without due considerations of what learners had actually learned. They were convinced that in order to attain better learning outcomes, the norm-referenced model had to be abandoned. It was therefore agreed that the department should adopt a criterion-referenced assessment approach and all staff members should comply. Since two types of subjects were offered by the English Department, two sets of criteria were adopted: the "SOLO Taxonomy" (Biggs & Collis, 1982; Biggs, 1995, 1999a, 1999b) was used for the content subjects and a set of "Band Descriptors" was used for proficiency subjects.

Carlson, MacDonald, Gorely, Hanrahan and Burgess-Limerick (2000) illustrate how a department in an Australian university, through reviewing its implementation of criterion-referenced assessment, learned more about the process, problems and solutions of the newly adopted policy. Similarly, Price and Rust (1999) reports on the experience of an academic unit of a UK university in its attempt to establish a common assessment practice. Both studies demonstrate how important it is to understand the process of implementing a new assessment policy. Therefore, a review of the implementation of the SOLO taxonomy was deemed necessary for the Department of English of the Hong Kong Polytechnic University.

After this policy had been adopted for about a year, a study was conducted in the academic year 2003/04 to review it. This paper serves the purpose of reporting on this review as well as making useful suggestions for improvement.

2. The SOLO taxonomy

2.1 The theoretical background of the SOLO taxonomy

SOLO stands for Structure of the Observed Learning Outcome. The SOLO Taxonomy is the brainchild of Biggs and Collis (1982). Its essence, application and alignment with the curriculum is detailed in Biggs (1995, 1999a, 1999b). According to the SOLO taxonomy, the assessment of learners' performance is based on their development in terms of the complexity in understanding, from surface understanding to deep understanding. Thus, five stages of development are identified:

1. prestructural,
2. unistructural,
3. multistructural,
4. relational, and
5. extended abstract.

The five stages are elaborated in the following way (Biggs, 1995, pp.11-12):

Prestructural: The task is not attacked appropriately; the student hasn't really understood the point and uses too simple a way of going about it. The performance is incompetent.

Unistructural: One or a few aspects of the task are picked up and used. Verbs/Terms: identify, name. Learning goals include acquiring terminology, to accomplish the first step in mastering a task.

Multistructural: Several aspects of the task are learned but are treated as if they were separate. Verbs/terms: combine, describe, list, how many ways can you... what are the main points... Learning goals require coverage, 'knowing about', performing algorithms such as the four rules of number.

Relational: The quantitative component aspects then become integrated into a coherent whole; this level is what is normally meant by an adequate understanding of the topic. However, there are many subgoals, which involve more or less understanding. Verbs/terms: analyse, criticise, argue, justify, understand, apply, relate X with Y, explain. Learning goals emphasize understanding, application, problem solving, conceptualizing, reasoning, and inquiring.

Extended abstract: The previous integrated whole may be conceptualised at a higher level of abstraction and generalised to a new topic or area. Verbs/terms: hypothesize, reflect, generate. Learning goals require students to theorize about a topic.

These five stages of development of understanding also reflect the cognitive complexity of learning. Accordingly, learners' performance is assessed along these dimensions.

Though most commonly cited with reference to assessment, the SOLO taxonomy in fact exerts its influence beyond assessment. It is a "potentially useful tool in higher education both to shape and assess learning" (Boulton-Lewis, 1995, p.152). The ultimate goal of the SOLO taxonomy is a teaching and learning system termed "constructive alignment" (Biggs, 1999a), which,

in Biggs' own words, is a system, "from objectives through teaching to assessing the outcomes, is aligned on the basis of learning activities embedded in the objectives" (Biggs 2002, p.6).

For the SOLO taxonomy to be effective, the curriculum objectives must be explicitly stated and clearly spelled out to both teachers and learners. The teaching activities, including the assessment tasks and assessment criteria, must be designed with reference to the complexity of understanding consistent with the course objectives.

2.2 Application of the SOLO taxonomy

Biggs and Collis (1982) have demonstrated how the SOLO taxonomy can be applied to a variety of subjects, from poetry to elementary mathematics. Studies have also shown that the SOLO taxonomy is useful in a number of disciplines (Boulton-Lewis, 1994; Campbell et al., 1998; Chick, 1998; Burnett, 1999; Lake, 1999; Chan et al., 2002).

To examine beliefs about learning, Boulton-Lewis (1994) uses the SOLO taxonomy. Based on the one-page statements collected from 21 lecturers and 869 students across 5 faculties in the Queensland University of Technology, she finds that the SOLO taxonomy has provided a useful model for deriving different levels of knowledge of learning.

Campbell, Smith and Brooker (1998) have demonstrated how, through the application of the SOLO taxonomy, the different conceptual structures of essay writing can be differentiated among learners. Thus, clearer instructional goals can be geared towards improving students' essay writing skills.

The complexity of mathematical cognition can also be characterized by the SOLO taxonomy (Chick, 1998). Her study shows that "mathematical research outcomes, indicative of formal-2 cognition, can be depicted using a mapping procedure and then evaluated for structure and complexity using the SOLO taxonomy" (Chick, 1998, p.24).

In Burneet's (1999) study, the taxonomy is applied to assess the structure of learning gained from counselling.

From the written responses of 35 clients on the benefits from counselling, it is found that a set of expanded SOLO indicators offers a promising and exciting way to view the outcomes of counselling within a learning framework.

Lake (1999) reports on how the SOLO taxonomy has been adapted to teach tertiary students to read meaning into graphs and tables. By designing a four-step template of generalized questions based on SOLO, the author can "not only promote a better understanding of specific biological concepts, but also provide students with a useful tool to develop their underlying scientific competency and critical numeracy" (Lake, 1999, p.197).

Chan, Tsui, Chan and Hong (2002) compare three educational taxonomies: the SOLO taxonomy, Bloom's taxonomy, and the reflective thinking measurement model. Two empirical studies on 28 postgraduate students of the Hong Kong Polytechnic University were carried out to investigate which of the three taxonomies is more suitable for assessing students' cognitive learning outcomes. Results show that, in spite of the conceptual ambiguity inherent in the SOLO taxonomy, it is suitable for "measuring cognitive attainment of students of different classes, subjects, levels and with different assignment requirements" (Chan et al., 2002, p.518).

The applicability of the SOLO taxonomy is well illustrated by the above studies.

2.3 Modified SOLO taxonomy for ENGL

In the case of the English Department of the Hong Kong Polytechnic University, the SOLO taxonomy was applied to linguistics subjects. Based on the SOLO taxonomy, a set of criteria was developed for all content subjects (see Table 1 below). In the academic year of 2002/03, all staff members started to use this common set of assessment criteria in grading assignments. Table 1 below shows the details of the modified taxonomy. Each of the taxonomy levels is accompanied by a brief description of the assessment criteria. These assessment criteria are mapped onto five grades (A-F) as well as the one-word description suggested by the university.

2.4 Aim of study

As depicted in Price and Rust (1999), the introduction of a common set of assessment criteria involves the setting up of an agreed set of criteria, piloting them, and reviewing them. The major aim of the study reported in this paper is two-fold: one is to review the modified SOLO Taxonomy adopted by the English Department through the views collected from staff

Grade	Assessment Criteria	SOLO
A Excellent	The answer generalises beyond the information given. It demonstrates a high degree of originality and ability to generalise and to apply in areas beyond the subject.	Extended Abstract
B Good	The answer is integrated and coherent with good coverage of relevant and accurate information. There is also evidence that the content is understood and can be applied to practice.	Relational
C Satisfactory	The information covering several features of the aspect is relevant and accurate but an integrative view of the topic is lacking.	Multistructural
D Marginal Pass	The information is basically relevant and accurate but there is a lack of meaningful response.	Unistructural
F Fail	The information is irrelevant, inaccurate or misjudged. An F grade could also be awarded for 'disciplinary' reasons such as plagiarism or other forms of academic dishonesty, or failure to satisfy programme or subject-specific requirements.	Prestructural

Table 1. Assessment Criteria for Content Subjects Based on the SOLO Taxonomy

members and the other is to uncover the ways to improve the system.

The issues to be addressed in this paper focus on four major issues:

- What do staff members perceive to be the philosophy underpinning assessment?
- What is their major concern in designing assessment tasks?
- How useful is the SOLO Taxonomy?
- What areas need improvement?

3. Research methodology

In order to find out the views of the staff members on the implementation of the SOLO taxonomy, teachers were interviewed individually by a Research Assistant between February and May 2004.

3.1 Interview questions

Ten interview questions on the four focussed areas were designed to solicit staff members' views on the implementation of the SOLO taxonomy. The questions are given in Appendix 1.

3.2 Participants

Table 2 below shows the information of the interviewees.

Rank	Prof	Asso Prof	Asst Prof	Lecturer
(Total: 14)	1	5	7	1
Taught in the Dept for	Over 5 yrs		Less than 5 yrs	
(Total: 14)	12		2	
Gender	Female		Male	
(Total: 14)	8		6	
Ethnicity	Non-Chinese		Chinese	
(Total: 14)	7		7	

Table 2. Profile of Interviewees

Altogether, 14 out of the 15 (93%) staff members who taught content subjects to which the SOLO taxonomy was applied were interviewed. Five Instructors were also interviewed but they taught only proficiency subjects so they had not used the SOLO taxonomy. Therefore, their views were not included in the discussion in this paper.

3.3 ENGL subjects offered in 2003/04

The number of subjects taught by all staff members of the English Department in the academic year 2003/04 is 127. For logistical purposes, the 127 subjects offered by the English Department were divided into six "subject groups" (a list of the content subjects is given in Appendix 2). Table 3 below provides an overview of these groupings.

Subject Group	Sem 1	Sem 2	Total
English Proficiency	19	20	39
Foreign Language Prof.	14	11	25
Linguistics	10	8	18
Linguistics in Context	10	12	22
Language Teaching	8	10	18
Thesis/Final Year Project	3	2	5
TOTAL	64	63	127

Table 3. Subjects Offered by the English Department in 2003/04

Assessment of the two proficiency subject groups, "English Proficiency" and "Foreign Language Proficiency", comprising 64 subjects, followed a set of "Band Descriptors" but not the SOLO taxonomy. The "Thesis/Final Year Project" group used a set of assessment criteria more elaborate than the SOLO taxonomy but the basic concepts were almost the same. All the other "content" subjects (linguistics, linguistics in context, and language teaching) employed the SOLO taxonomy.

3.4 Procedure

The Research Assistant interviewed the 19 teachers individually. 17 interview sessions were audio-taped and each was transcribed immediately afterwards, then double-checked by the author. Since 2 teachers chose not to be audio-taped, notes were taken during their interviews instead of audio-taping. Based on the

transcriptions and interview notes, the responses to the 10 questions of the 14 teachers (who taught content subjects) were then categorized, summarized, and analyzed.

The analysis of the results and findings are presented in Section 4 below.

4. Results and findings

4.1 Overall responses

The overall responses of the interviewees were positive. They had all used the SOLO taxonomy and found that it was a useful set of guidelines for assessment. However, quite a number of the teachers felt that the criteria needed fine-tuning. Some commented that a more elaborate system had to be established to achieve reliable and consistent application of the criteria across teachers and across subjects.

In the sections below, a summary of the responses to each question will first be presented. This is followed by a more detailed discussion of these responses.

4.2 Responses of individual questions

Based on the transcriptions and notes of the interviews, the 14 interviewees' responses are tabulated below. For ease of comprehension, the category which receives the most responses is presented first.

Question 1 asks: *"What role does assessment play in learning? Why do we need assessment in teaching?"*

Table 4 sums up the responses of the 14 interviewees.

Over 70% (10 out of 14) of the respondents regard assessment as a measurement of the progress of learning and teaching. This is consistent with the fundamental principle of the criterion-referenced model of assessment in which assessment is "designed to assess changes in performance as a result of learning, for the purpose of seeing what, and how well, something has been

learned" (Biggs, 1999a, p.144). More specifically, to evaluate how much the learning objectives have been achieved is central to the conceptualization of the SOLO taxonomy (Biggs, 1999a, pp.43-50). As shown in Table 4, the majority of the interviewees share this underpinning philosophy.

Number	Responses to Q1
10 / 14	as an evaluative tool or measurement for both learning and teaching in terms of whether -- objectives have been achieved -- progress has been made
6 / 14	for ranking students in order to give them credentials later
4 / 14	assessment is equivalent to learning

Table 4. Responses to Question 1

On the other hand, nearly half of the interviewees believe that assessment is to "rank" students, which serves the ultimate goal of awarding learners with credentials. This line of thoughts resembles the type of "institutional" mindset which usually stipulates that the distribution of grades and final awards should follow a "normal distribution" (i.e. a bell curve). This "norm-referenced" approach was once the norm within the university and the traces of that norm are evident in many staff members' attitude.¹

Question 2 asks: *"When you design an assessment task, what is your major concern?"*

Number	Responses to Q2
13 / 14	relevance to learning, teaching, course objectives, etc.
6 / 14	nature of tasks: challenging / rewarding / interesting
4 / 14	levels of learners

Table 5. Responses to Question 2

Overwhelmingly, the interviewees consider relevance to teaching and learning as the most important element in designing their assessment tasks. This reflects that the alignment between the goals of teaching and learning and the assessment tasks is of top priority among this

¹ The University adopted criterion-referenced assessment in 2005/06.

group of staff members, a phenomenon which is encouraging as far as the implementation of SOLO is concerned.

Question 3 asks: *"What types of assessment tasks have you used in your teaching (e.g. exam, term paper)?"*

Number	Responses to Q3
8 / 14	term paper / essay
7 / 14	oral presentation
6 / 14	quiz / test / in-class written exercise
4 / 14	exam
3 / 14	small scale project
3 / 14	student-led seminar
2 / 14	journal writing
2 / 14	online exercise / web discussion
2 / 14	others: critique / video

Table 6. Responses to Question 3

Question 4 asks: *"Which type do you think is the most effective?"*

Number	Responses to Q4
5 / 14	depends on the subject / objective / purpose
5 / 14	specific ones: -- portfolio / project -- ones that involve reflection / critical thinking / active learning / flexibility
2 / 14	a combination of different types
2 / 14	none

Table 7. Responses to Question 4

Table 6 and Table 7 above demonstrate several characteristics of the assessment tasks used by staff members in the English department. First, a large variety of assessment methods were employed. A total of nine different types were recorded. In terms of effectiveness, no one particular type was regarded as "the most effective". It depended upon the objectives of the assessment.

Second, some assessment tasks involve on-going reflective critical thinking, such as journal writing, and web discussion. Such tasks are deemed to be the more effective ones by some staff.

The third feature is that many of these methods require

a combination of high level skills such as data analysis and logical organization (e.g. projects, term papers, oral presentations, student-led seminars, etc.). These tasks enable the application of the full range of the criteria outlined in the SOLO taxonomy.

Such characteristics show a healthy sign towards the adoption of the criterion-referenced approach and the application of the SOLO taxonomy.

Question 5 asks: *"Could you please briefly describe the departmental assessment criteria?"*²

Number	Responses to Q5
12 / 14	"SOLO taxonomy" for content subjects and "band descriptors" for proficiency subjects
1 / 14	one for the content subjects and one for the proficiency subjects

Table 8. Responses to Question 5

Question 5 was meant to ensure that the interviewees were indeed aware of the implementation of the SOLO taxonomy within the department so that their responses were valid. The result was quite promising. 12 out of the 14 members were able to articulate the correct response. This makes their responses to the follow-up questions, Question 6 through Question 9, valid and meaningful.

Question 6 asks: *"To what extent have you followed the departmental assessment criteria in your assessment practice?"*

Number	Responses to Q6
7 / 14	to a large extent
2 / 14	before the department adopted it
1 / 14	used SOLO as a model and adapted it
10 / 14	Total of positive responses
2 / 14	"band descriptors" are easier than SOLO
1 / 14	SOLO is difficult
3 / 14	Total of negative responses

Table 9. Responses to Question 6

Table 9 indicates that the majority of staff members

² In one interview, Question 5 was not asked so only 13 responses (not 14) were recorded for this interviewee.

reported to have adhered to the SOLO taxonomy, though a few complained about it being difficult to follow. Details of the difficulties in applying the SOLO taxonomy will be discussed under Question 8 and in Section 5.2.

Question 7 asks: *"In what ways do you think the departmental assessment criteria have helped you in assessing students' work?"*

Number	Responses to Q7
4 / 14	it provides a model / an overall view
3 / 14	clarifies focus
3 / 14	easy to use
2 / 14	helps design tasks
2 / 14	useful for differentiation
1 / 14	good for students

Table 10. Responses to Question 7

The positive comments about the implementation of the SOLO taxonomy are mainly conceptual in nature. For example, it is found to serve as an overarching philosophy as far as assessment is concerned, from as abstract as clarifying focuses to as practical as helping teachers design assessment tasks.

Question 8 asks: *"What difficulties did you encounter in implementing the departmental assessment criteria?"*

Number	Responses to Q8
5 / 14	problems in matching SOLO -- for specific subjects -- for different types of tasks -- of students of different levels
4 / 14	problems in consistency and reliability across subjects, across markers
2 / 14	learners' understanding of SOLO
2 / 14	difference between content and proficiency is not always clear
1 / 14	SOLO is too lenient
1 / 14	marking is time-consuming
3 / 14	no difficulties

Table 11. Responses to Question 8

Table 11 above lists the problems that the interviewees encountered in applying the SOLO taxonomy in the respective subjects that they taught in the academic year

2003/04. It is discovered that most of the problems lie in the logistics of implementation. The major problems are two-fold. On the one hand, how consistency and reliability can be achieved across markers raised some concern. On the other hand, staff members found it difficult to apply the criteria without modifications since the criteria are very comprehensive and broad. Some teachers had to provide more specific descriptions when they applied the SOLO taxonomy to some tasks such as oral presentations. Others found that they had to spend more time on marking because they often had to re-read the assignment several times to ensure that the grades given matched the descriptions in the criteria.

Question 9 asks: *"Suggest ways that the departmental assessment criteria can be improved."*

Number	Responses to Q9
6 / 14	criteria need to be more elaborate / refined / modified
6 / 14	discussion and sharing of views / parity is needed
4 / 14	logistics of implementation

Table 12. Responses to Question 9

The ways to improve the assessment criteria suggested by staff members address the issues raised in the previous question. They deal with the details of implementation. Six interviewees commented that the assessment criteria need to be more refined or more elaborate so that they can be more readily applicable to specific tasks. Others felt the need for parity across teachers and across subjects. They suggested that more specific and detailed procedural guidelines should be provided for staff members to discuss the grades among teachers across subjects.

4.3 Summary of Findings

In general, most teachers welcomed the new policy. They believe that assessment is to measure the effectiveness of learning and teaching, to inform the parties concerned, which include students, teachers, and the public, of the outcomes of this education process. As a result, it can be seen that in designing assessment tasks, some teachers place their focus on how much students have learned, or whether the knowledge can be applied

to situations outside the classroom. From the interviews, it is also revealed that many different kinds of assessment tasks have been employed and assessment tasks vary according to the subject matter, and the objectives of the course.

As far as the SOLO taxonomy is concerned, some of the staff members find it helpful because it has provided a framework for all staff members to follow. It has provided a common platform for assessment of different subjects to take place. However, it has been pointed out that the taxonomy needs fine-tuning.

In terms of its implementation, staff feel that more coordination is needed and more discussion and sharing of ideas should be fostered. There should be a stronger quality assurance mechanism in order to make it a success.

In short, the views towards the adoption of the SOLO taxonomy are quite positive. More concerted effort is needed for reviewing the process and zeroing in on problematic areas.

5. Discussion

In this section, the findings and results reported in the previous section will be discussed with reference to two major issues that this study intends to investigate. The first issue to be addressed is how useful the SOLO taxonomy is.

5.1 How useful is the SOLO taxonomy?

The major function of the SOLO taxonomy is that it serves as a common platform for staff members of the same department to conduct assessment across a large number of subjects and across a great variety of assessment tasks. Most staff members being interviewed shared this positive view about the move towards a set of more explicit and articulate assessment criteria which are theoretically sound and widely applicable.

It has been pointed out in Section 2.2 above that the SOLO taxonomy has been shown to be applicable to a number of disciplines (Boulton-Lewis, 1994; Campbell et al., 1998; Chick, 1998; Burnett, 1999; Lake, 1999; Chan et al., 2002). The present study adds to that list by demonstrating SOLO's suitability to a number of linguistics subjects. The subjects to which the SOLO taxonomy has been applied by staff members of the English Department are mainly linguistics and linguistics related subjects. They range from introduction to basic knowledge about language such as "Introduction to Language Study" and "Lexical Studies" to applied linguistic knowledge such as "Second Language Learning" and "Analysing Professional Discourse". These subjects constitute almost half of all the subjects offered by the English Department. They are categorized as "content" subjects. The rest of the subjects are classified as "language proficiency" subjects.

When the department first decided to adopt the SOLO taxonomy as the departmental assessment criteria, the general consensus was that the taxonomy might not be suitable for the "proficiency" subjects because the objectives emphasize "skills" rather than "knowledge". A set of "benchmark" criteria would be more appropriate for the language proficiency subjects.

As a result of such a dichotomy in the categorization of subjects, two sets of criteria were used, the SOLO taxonomy for the content subjects and a set of band descriptors for the proficiency subjects. However, most staff members agree that the situation is far from ideal, especially when the categorization of some subjects seems arbitrary (for example, the subject "English for the Mass Media").

Two issues emerge from this problem. First, since both the SOLO taxonomy and the band descriptors are criterion-referenced in nature, why can the two not be merged into one? In theory, if the assessment criteria are aligned with the learning outcomes, whether they are content-based or skill-based should not become an obstacle in the application of the SOLO taxonomy. Examples of how the SOLO taxonomy can be used in English proficiency are provided in Biggs and Collis (1982, pp.95-122). There is no reason why the criteria of SOLO cannot be adapted to suit the needs of proficiency subjects. The other issue raised by staff

members is the fact that the division between "content" and "proficiency" is sometimes purely artificial. In fact, once the criterion-referenced approach is adopted, assessment becomes more holistic in nature. Accordingly, the seemingly obvious distinction between "content" versus "proficiency" becomes blurred.

To conclude, the SOLO taxonomy is very useful for the content subjects. However, the department should explore ways to merge the two sets of criteria to form one coherent set of criteria geared towards the outcome-oriented curriculum.

5.2 Problems and possible solutions

One of the concerns shared by a number of staff members in using the SOLO taxonomy is the problem of reliability and consistency. There is some conceptual ambiguity inherent in SOLO's structure which "makes categorization unstable along with the problem of low inter-rater reliability" (Chan et al., 2002, p.512). In fact, when the SOLO taxonomy was first adopted by the English Department, staff members were already aware of this issue of inter-rater reliability. Attempts have been taken to tackle this problem. It has been agreed that parity meetings would be held among teachers periodically during the semester. The purpose of these meetings would be to discuss sample scripts of students' work so as to achieve a fair application of the criteria. Comments from colleagues about this procedural measure indicate that in addition to the parity meetings stipulated for individual subjects, such meetings should also be held at a departmental level because parity across subjects is also needed.

A related problem is the mapping of the criteria onto the specific assessment tasks of the different subjects. Some staff members felt that the criteria should be more refined or more elaborate in order to suit different subjects and different tasks. This is similar to the findings reported in Chan, Tsui, Chan and Hong (2002). They also criticize the assessment criteria of the SOLO taxonomy as being vague. However, if the SOLO taxonomy is meant to be applicable across a wide variety of disciplines, it is bound to be general and hence "vague". Lake (1999) has demonstrated how the structure of the complexity of understanding can be effectively transformed into a template to be applied to

the teaching of interpreting graphs and tables in biological sciences. There is no reason why this cannot be accomplished for other subjects.

This problem can only be solved by candid sharing among staff members of their experience in adapting the taxonomy to their respective subjects and to specific assignment tasks. The accumulation of good practices and examples of the application of the SOLO taxonomy thus becomes crucial. This should be administered at the departmental level so as to build a resource base available for staff.

6. Conclusions

This paper has reported on the generally positive feedback on the implementation of the SOLO taxonomy in an academic department of a university in Hong Kong. The staff welcomed the adoption of the SOLO taxonomy because it had provided a common ground for discussion of assessment tasks, assessment criteria and learners' performance.

In spite of the widely accepted philosophical underpinnings of SOLO, a couple of practical issues have to be addressed. The major problem that needs to be solved is the need for better coordination for ensuring reliability and validity of the use of the criteria. It is suggested that more explicit guidelines be devised and that parity meetings involving different subjects and teachers will help to solve the problem. Another crucial step that the department should take is to accumulate good practices and document the experience that staff members have gained in order to provide a basis for further review and future reference.

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Appendix 1

Interview Questions

1. What role does assessment play in learning? Why do we need assessment in teaching?
2. When you design an assessment task, what is your major concern?
3. What types of assessment tasks have you used in your teaching? (e.g. exam, term paper)
4. Which type do you think is the most effective?
5. Could you briefly describe the departmental assessment criteria?
6. To what extent have you followed the departmental assessment criteria in your assessment practice?
7. In what ways do you think the departmental assessment criteria have helped you in assessing students' work?
8. What difficulties did you encounter in implementing the departmental assessment criteria?
9. Suggest ways that the departmental assessment criteria can be improved.
10. Other comments (in general)?

Appendix 2 List of content subjects (2003/04)

offered by the Department of English of the Hong Kong Polytechnic University:

Linguistics Subjects:

Introduction to Language Study
 English Pronunciation
 Lexical Studies
 Pedagogical Grammar
 Discourse Analysis
 Grammatical Analysis
 Discourse & Pragmatics
 Phonological Analysis
 Phonetics and Phonology
 Analysis of Contemporary English 1
 Pragmatics
 English Grammar
 Analysing Professional Discourse
 Discourse Analysis for Language Teaching
 Discourse Analysis
 Analysis of Contemporary English 2
 Accessing Japanese Written Documents
 Japanese Discourse Analysis and Pragmatics

Language Teaching Subjects:

Introduction to English Language Teaching
 Foundations and Processes of Learning
 Classroom Teaching and Assessment
 School Experience
 English Language Teaching Methodology 1
 Curriculum Planning & Syllabus Design
 Second Language Teaching
 Teaching Japanese as a Foreign Language
 Second Language Learning
 Testing and Assessment
 English Language Teaching Issues and Policies

Language Teaching Subjects (continued):

Guided Study Option
 Introduction to Language and Education
 Curriculum Studies
 Teaching Language Arts
 English Language Teaching Methodology 2
 Teaching Japanese for Specific Purpose

Linguistics in Context Subjects:

Intercultural Communication
 Information & Communication Technology
 for English Language Teaching
 Information & Communication Technology
 for Language Studies
 Communication
 Discourse and Management
 Research Methods
 Research Design and Methods
 Exploring Contemporary Japanese Society & Culture
 Communication in Japanese in Multilingual Workplaces
 Translating in the Multilingual Workplace
 Language and Contemporary Society
 Aspects of Contemporary Societies
 Critical Language & Cultural Studies
 Language and Gender
 Computer-mediated Communication
 Intercultural Communication in Business
 Practicum
 Interpreting in the Multilingual Workplace
 Education Research & Rhetorics of Culture
 Research Methods
 Research Design and Methods

Assessing the Writing Skills of Entry-Level Undergraduate Business Students to Enhance their Writing Development during Tertiary Studies

Carmela Briguglio
Curtin Business School
Curtin University of Technology, Perth, Western Australia

Curtin Business School (CBS) in Western Australia has an extremely diverse first year intake into its business courses, including local and international students from a variety of national, cultural and linguistic backgrounds. Of all the English language skills students require, academic writing is the area which poses most challenges for them. A group of staff have therefore collaborated to develop a diagnostic assessment task to be taken by all first year students, with results reported on a six-band scale developed for this purpose. The task was developed in 2003 and repeated in 2004 and 2005. In 2005 a series of special academic writing seminars was developed for those students identified as requiring support. This paper describes the development of the instrument and the scales, the implementation of trial assessments and refinements, and the sort of support seminars that were implemented to help students to continue to develop academic writing skills.

1. Introduction

The question of students' communication skills in Australian universities has been a subject of research for some years now and continues to draw attention as the number of international students in our universities continues to grow (see, for example, Ballard & Clanchy, 1991, 1997; Nesdale & Todd, 1993; Kaldor et al., 1996 & 1998; Smart et al., 2000; and Eisenchlas & Trevasques, 2003). Over the last ten years or so, a number of Curtin staff have undertaken research into students' communication skills and English communication needs including, for example: Latchem et al., 1994; Fiocco 1996; Parker et al., 1997; Mulligan & Kirkpatrick, 2000; Reid et al., 1998; Briguglio, 1998 & 2000; Radloff 1998; Zadnik, de la Harpe and Radloff, 1998; and Jones, 1999.

Particular concern is often expressed by academics at all levels about students' academic writing skills. A desire to have concrete data on the literacy standards of students led staff in the Curtin Business School (CBS) working with colleagues from the CBS Communication Skills Centre (the language and study skills support unit of the Faculty) to design a task to assess the English literacy entry levels of students. This paper describes a project which aimed to obtain a picture of undergraduate students' writing skills, rather than relying on anecdotal accounts of writing needs and difficulties experienced by tertiary students.

2. Background

Similarly to other Australian universities, undergraduate students enter Curtin with a variety of minimum English language entry criteria including a pass (50%) in TEE¹ English, an IELTS² score of 6.0, a TOEFL³ score of 550 and a B or C in the CUTE⁴ test, as well as other measures. We were particularly interested to design an assessment task, purely for diagnostic purposes, that would provide a description of the writing competence of first year students. A number of existing scales and tests were examined, including the following: the ASLPR (Ingram & Wylie, 1984, now ISLPR, Ingram & Wylie, 1997; the

IELTS scales (<http://www.ielts.org/format.htm>); the Common European Framework of Reference for Languages (Council of Europe, 2001); and the Curtin University Test of English (CUTE). However, we decided to develop our own scale, firstly, because the existing scales were sometimes too narrow and vague (for example, simply indicating whether student were or were not likely to cope with the demands of a tertiary course) and, secondly, because they did not offer a suitable description (for our purposes) of what students are actually able to do in writing. Much of the literature about rating scales warns of all sorts of limitations in their use (Brindley, 1996; Alderson, 1991; Bachman, 1990). However, we took the view that, as North (1993) indicates, they can be primarily practical tools for people to use for a variety of purposes, and as such represent operational, rather than theoretical models.

Developments in second language testing indicate that: language performance has come to be seen as the essential component in assessing language proficiency; that proficiency is task-oriented; that proficiency carries with it the notion of ability or skill, degrees of which should be able to be measured; and that since different sub-skills are required to carry out certain tasks, proficiency can be thought of as the mobilisation of these sub-skills (Brindley, 1996). We were keen to assess students' writing ability for a tertiary context and felt that we needed to set a writing task that would reflect this but would not rely too much (since it is implemented in the first or second week of semester) on students' content knowledge of their first year units. We therefore came up with the list of topics described below. Implementation of the task is also described more fully in the next section.

¹TEE – Tertiary Entrance Examination, Western Australia

²IELTS – International English Language Testing System

³TOEFL – Test of English as a Foreign Language

⁴CUTE – Curtin University Test of English

3. Aims & method

As indicated above, the aims of this study were:

- to design a writing task for a large cohort of first year tertiary students in order to assess their written English skills; and
- to establish the level of support they might require to be successful in the first year tertiary context.

The cohorts for this study consisted of students enrolled in first year foundation units for the Bachelor of Commerce over the last three years (2003, 2004 and 2005). In 2003, the task was trialled with a cohort of 587 students enrolled in Information Systems 100; in 2004 and 2005 the cohort consisted of 532 and 670 students, respectively, enrolled in Legal Framework 100. The cohorts comprised students who were enrolled part-time or full-time, local or international, and school leavers or mature age students. Information Systems 100 and Legal Framework 100 are two of six core/foundation units that must be completed by students undertaking a Bachelor of Commerce degree at Curtin.

It was considered important to inform students fully about the project and to explain our aims, in order to gain their trust and, indeed, their participation in the study. We therefore took the opportunity to explain the study to them during orientation week lectures, when unit requirements were explained to them by Unit Coordinators. One of the researchers then spoke to students about the writing project and explained the sort of writing task they would be asked to undertake early in the semester. The same person spoke at all sessions in order to ensure a consistent message to students. We were particularly keen to assuage any concerns and reassured students that the aims of the task were diagnostic, and that they would have access to information about their performance. Students were also reassured about absolute confidentiality and were made aware that the results of the task would have no bearing whatsoever on their marks for the unit.

Students were told that they would be required to write half to three quarters of a page on one of three or four topics, where the emphasis would be on the language and not so much on the content. The task was planned to take place during their first or second one-hour

tutorial of semester, and would take 20 - 30 minutes to complete. The information obtained would be used by project staff to gauge the extent of support that might be needed and to better plan our support services. Only project staff would have access to information obtained and unit lecturers and tutors would only have access to summary data and not individual data. The first and second time the task was implemented, students could contact staff at the Communication Skills Centre to obtain their individual rating and receive feedback, if they so desired, but only a few took up this option. The third time the task was implemented, results were returned to students through their tutors, with a covering letter informing them of the availability of support seminars in academic writing, and urging them to attend these, especially if they fell in the lower bands.

3.1 The assessment task

Students were given a sheet with the information and instructions shown below. As can be seen, students were asked to choose one topic, but if they could not write half a page on that, they could then choose another topic as well.

Information Systems 100 Writing Task

Instructions to students

Please write at least half a page on one of the following topics. If you have trouble writing enough, you may choose another topic as well. Please use the reverse of this sheet if you wish to write more.

1. Describe your past experiences with software (what have you used, in what ways, how much, describe your expertise).
2. What do you hope to learn in IS100?
3. What do you see as challenges for you in IS100 and how do you think you can meet those challenges?
4. What challenges do you see in general for you undertaking your degree at Curtin and how do you think you can rise to those challenges?

Legal Framework 100 writing task

Instructions to students

Please write at least half a page on one of the following topics. If you have trouble writing enough, you may choose another topic as well. Please use the reverse of this sheet if you wish to write more.

1. What do you already know about law?
2. How do you see your study of law fitting in with your Curtin degree?
3. What difficulties might you face in undertaking your degree at Curtin?

For the purpose of eliciting a piece of writing which could be allocated into one of the bands below, most topics worked quite well except for topic 1 in the Information Systems task. These topics produced opportunity and scope for complex sentences and indeed for expressing more complex thoughts. Topic 1, on the other hand, tended to be selected by weaker students and generally produced simple sentences with lots of lists. Almost all students managed to write at least half a page.

3.2 The diagnostic assessment scale

The band scales developed for our project included a description of what students are able to do in written English. The process was iterative: we began with five bands but after some 50 pieces of writing had been examined decided that six bands worked better. As more samples were assessed and re-assessed, the descriptors for each band were also adjusted. Below is the list of six bands which were adopted. These have since been used and adapted by colleagues in other faculties at Curtin (Faculty of Engineering and Science) and by colleagues working in other Australian universities (e.g. the University of Canberra).

Assessment scale for academic writing

1. **Outstanding communicator** in written English, whose writing shows sophisticated use of English expression that is free of errors. The student is able to use simple and complex sentences and a rich vocabulary to convey ideas clearly. Should communicate successfully in academic and related professional contexts.
2. **Successful communicator** in written English, whose writing shows minimal errors in grammar, structure and vocabulary. Uses simple and complex sentences to convey meaning clearly. The student should communicate successfully in academic and related professional contexts.
3. **Competent communicator** in written English, who is able to express ideas clearly, although there are occasional errors in grammar, structure and vocabulary. Uses mostly simple and some complex sentences to convey meaning. The student should communicate competently in academic and related professional contexts.
4. **Modest communicator** in written English, whose writing shows some weaknesses in grammar, structure and vocabulary. Is unable to express complex ideas and uses simple sentences to convey meaning. The student is likely to require support to communicate adequately in academic and related professional contexts.
5. **Poor communicator** in written English, whose writing shows some major weaknesses in grammar, structure and vocabulary, sometimes hindering clarity. Is able to express very basic ideas in writing. The student is likely to have difficulty in coping with writing for academic and related professional contexts.
6. **Extremely poor communicator** in written English, whose writing reflects major weaknesses in grammar, structure and vocabulary, which hinder meaning and clarity. The student is unlikely to be able to cope with the demands of writing for academic and related professional contexts.

In 2005, when it was decided to give formal feedback to students including the scale, the descriptors were modified to make them more suitable for this purpose. The student version of the scale is shown below.

In the first year, all writing was marked by one assessor who also developed the bandscales before this process, adjusting them according to the experience of grading so many samples. In the second and following years, all pieces of writing have been double-marked and have been marked a third time where there seemed to be a great discrepancy between markers.

Student version of the Assessment Scale for Academic Writing

1. **You communicate very well** and your writing shows sophisticated use of English expression that is free of errors. You express your ideas clearly and should have no problem communicating successfully in academic contexts.
2. **You communicate well** in written English and your writing shows only minimal errors in grammar, structure and vocabulary. You should communicate successfully in academic contexts.
3. **You communicate competently** in written English and you are able to express your ideas clearly, although there are occasional errors in grammar, structure and vocabulary. You should communicate competently in academic contexts.
4. **You communicate reasonably well** in written English, although your writing shows some weaknesses in grammar, structure and vocabulary. You will probably require some support to communicate competently in academic contexts and you are invited to take advantage of Academic Writing Seminars being offered by CBS.
5. **You have some difficulty communicating** in written English and your writing shows some major weaknesses in grammar, structure and vocabulary, sometimes hindering clarity. You are likely to have difficulty in coping with writing for academic purposes and are strongly urged to attend Academic Writing Seminars being offered by CBS.
6. **You have difficulty communicating** in written English and your writing reflects major weaknesses in grammar, structure and vocabulary, which hinder meaning and clarity. You are unlikely to be able to cope with the demands of academic writing without support and are strongly urged to attend Academic Writing Seminars being offered by CBS.

4. Results and discussion

For the purposes of this project, students' writing was allocated to one of the six bands described above. Table 1 displays the distribution of students across the various bands for the three years the task was undertaken. The modal band is band three, with relatively few students in the lowest and highest bands.

It can be seen that the percentage of students in the top and bottom bands remains largely unchanged, as does the percentage in band 3. A change seems to have occurred in 2005 with an increase in the number of students in band 2 (up from 16.9% in previous years to 26.7%) and a decrease in band 4, from approximately 27% to 15%.

Writing band	% 2003 (Information Systems 100)	% 2004 (Legal Framework 100)	% 2005 (Legal Framework 100)
1	2.4	0.2	2.5
2	16.9	16.9	26.7
3	44.3	45.9	46
4	26.9	27.6	15
5	8.7	8.1	8.5
6	0.9	1.3	1.3
Total	100% (N 587)	100% (N 532)	100% (N 670)

Table 1. Distribution of students over the bands for 2003, 2004 & 2005

In 2003, it was decided to establish whether there was a correlation between the band and final results in the unit. A statistical analysis enabled us to establish that there was a positive relationship between writing task band and final grade; that is, the higher students were on the bandscales, the more likely they were to receive higher grades for their unit.

A comparison between CBS students and Engineering and Science (ESC) students undertaken in 2004, shows that the ESC student results fall into a pattern similar to the CBS 2005 results (see Table 2).

Writing band	Frequency CBS 2004	% CBS	Frequency ESC 2004	% ESC
1	1	0.2	25	4.2
2	90	16.9	177	30
3	244	45.9	266	45.1
4	147	27.6	87	14.7
5	43	8.1	30	5.1
6	7	1.3	5	0.8
Total	532	100%	670	100%

Table 2. Comparison of distribution in writing bands between Engineering & Science and CBS students

5. Providing support for academic writing

In 2005, the assessment task was undertaken in week 1, with results returned to students in week 2 and academic writing classes offered from week 3. The results were distributed to students through their tutors in the LF 100 unit with a covering letter providing information about the series of nine seminars being offered on the topics described below:

1. The big picture: analysing the question
2. Getting organised (planning, structure, argument)
3. Introductions with impact
4. Paragraphs that hang together well
5. Making connections (flow & cohesion)
6. Well-structured sentences
7. Making your point clearly (conciseness & precision)
8. Past, present, future (tenses, active & passive voice)
9. Editing like a professional

The above areas were identified by staff at the Communication Skills Centre based on our ongoing work with students. They seemed to work quite well, though changes may be made as we progress further with their implementation.

Since there was at this stage no compulsion for students to attend the seminars provided (although students were urged to attend, especially if their results fell into bands

5 and 6) we found that not all students took advantage of the offer. Indeed only one third of those who fell into the bottom two bands came to the classes provided, with other interested students boosting the numbers. However, we found that as demands on student time grew due to assignments, mid-semester tests and exams, then attendance dropped. Interviews with a small number of students at the end of semester indicate that those who continued to come did find them useful.

6. Emerging issues

As this diagnostic process for academic writing continues to be implemented and adapted, a few issues are emerging which will require our attention. Such issues include those described below.

First is the issue of how and when the task will be implemented. Initially the writing task was implemented in collaboration with other academic staff during the first week of tutorials and results were communicated to students through tutors. In future it may be simpler to establish a time when students can sit the task during week 1 and then mail results back to students. This is the procedure that has been established for semester 2, 2005.

Should follow-up seminars be compulsory for students in the bottom bands of the scale? The pressure from staff for students to improve their writing skills is mounting, so that it is possible that in future students in bands 5 and 6 will be obliged to attend, at least for a minimum number of (possibly six) seminars.

Pressure is also emerging from some staff to make the task a language 'test' rather than keeping it chiefly for diagnostic purposes. Since students have already demonstrated English competency in one of a number of ways before being accepted into the university, we feel it is important that the diagnostic purpose of the task be adhered to and will resist any pressure for a 'test'.

We need to monitor the program of support seminars to ensure that it is effective in supporting students and that the needs of students in academic writing are indeed being met. There are a number of issues related to how we can measure the effectiveness of the support program and therefore, indirectly, justify its costs to administrators.

Finally, a number of other people, both inside Curtin and in other universities, have taken the band scales and adapted them, as well as the writing task, to suit their own particular contexts. It will be interesting to see the developments resulting from this.

7. Conclusions

A writing task and a set of band scales for describing English writing competency at beginner tertiary level have been developed and refined over a three year period. The initial work showed a positive relationship between English literacy on a writing task and the final grade achieved in a first year undergraduate unit. A series of follow-up seminars to support academic writing were implemented and were found to be useful by those students who took advantage of them. Some issues remain to be addressed, including whether follow-up seminars should be made compulsory for some students and whether other forms of support should/could be provided. Further work is needed to develop a system where students can be identified and appropriately supported to improve their literacy skills and enhance their academic development.

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Involving Students in the Formulation of Assessment Criteria for Small Group Computing Projects

Sundrakanthi Singh
Teaching and Learning Office
Faculty of Computing, Health and Science
Edith Cowan University, Australia

Michael Collins
School of Computer and Information Science
Edith Cowan University, Australia

Competing issues such as the need to conduct authentic assessment, to achieve real-world-ness of the learning task, and to construct assessments that reflect realistic and manageable workloads for students, framed the implementation of a small group assessment project. A democratic approach that actively engaged students in the formulation of the assessment criteria relating to group size, workload and peer learning processes was used to incorporate flexibility to meet diverse students' needs, while successfully embedding relevant graduate attributes in an authentic assessment task that simulated real world experiences. The results show that students appreciated the adoption of a democratic process in the formulation of group size and determination of workload; they enhanced their teamwork and communication skills and improved their understanding of the subject and its application.

1. Introduction

Students of today have undeniable obligations: e.g. working while still enrolled in full-time study to pay course fees and living expenses, some with family commitments, all with other assignments to complete and add to the juggle of their time. Accordingly, in the first week of the semester, the unit coordinator suggested openly to students in his computer science undergraduate units that, in pursuit of realising a significant and worthwhile set of assignments and to enhance their generic skills, students might like to study in pairs - thereby sharing the load. It is not uncommon for such students to communicate via electronic means and neither the unit coordinator nor the students saw any difficulties with such paired effort and the plan was received with enthusiasm. However, by week two, when the assignment specifications were published, it was discovered that students had been drafted into group projects in their other units and many were no longer happy about working in pairs. The unit coordinator sought guidance from three main sources, namely his colleagues, the students themselves and the faculty teaching and learning office. In the end, a democratic process was followed whereby a solution was found that resolved the apparent problem satisfactorily.

project work had been unsuccessful in one instance and also that group work provided effective training for work. Importantly, staff also acknowledged a need for guidance in designing and implementing group assessment. Whilst this feedback pointed to staff members' attitudes and some of the challenges associated with group assessment, it did not help to resolve the present situation.

It became apparent that some students still wished to work in pairs, some individually and, surprisingly, some in groups of three. On that basis, a fair set of work schedules was worked out in class with the students and the assignment brief was modified and published there and then. Students were left free to choose their group size and those with whom they wished to work. One caveat was that all students in each group would receive identical marks - leaving them free to "manage" the group's internal workload and tasks.

From the faculty teaching and learning office, the following was received: "I think that the thought you have put into your preparation is fantastic. Personally, I minimise group work for all the reasons you have outlined. Paid employment/family responsibilities make it difficult..." and, further, suggested assigning a Teaching & Learning advisor to work with the unit coordinator to follow through and determine the students' feedback on the democratic nature of the process and the project implementation.

2. Background

At the stage of asking for advice and guidance, colleagues were polled via email; a direct request was sent to the Associate dean of teaching and learning and the students were canvassed openly and frankly in class - the unit coordinator fully admitted the problem now faced.

Ten email responses were received from colleagues reflecting disparate views about group work. Staff commented on compliance issues, the need for fair and transparent assessment criteria to avoid student appeals, the probability that group work encouraged collusion among students, concern that students were forced into doing too many group projects, that paired

3. The small group assessment project

The assessment task involved designing a textual reference converter analogous to the production of a protocol converter for industry application. A secondary aim of this assessment task was to satisfy academic expectations that students may implement correct citation/referencing techniques. This semester long project was organised into two stages. The first stage required identification and definition of a problem domain, a preliminary understanding of the building blocks of the solution domain, a gap analysis, and

a preliminary design. The second stage involved detailed refinement of the design and subsequent implementation and production of a solution.

The student survey

A student survey was conducted at the end of the semester to gauge the success of the project and identify areas for enhancement. The questionnaire included both open-ended and fixed alternative questions focusing on three broad areas of interest: students' experience about their involvement in the definition of the project, the development of team skills, and quality assurance issues relating to the assessment. A total of 104 completed questionnaires from three cohorts of students were received.

they had achieved a reasonable balance of workload. Their team skills were demonstrated by helping each other understand the subject content (55%), solve problems (67%), and generate innovation (60%). Students reported benefits in the development of a wide range of generic skills (e.g. communication, time management, decision making and leadership).

The quality assurance issues that were explored included the development of professional knowledge and skills, academic relevance, group dynamics, and suggestions for improvement. With regard to the development of professional knowledge and skills, 67% of the students said that the project had workplace relevance; 56% reported that the group learning processes enhanced their understanding of the subject; and 52% reported that learning in a group had improved their application of theoretical knowledge. Other reported benefits of the group learning experience included camaraderie (47%), leadership development (48%), trust building (63%), and improved motivation (58%).

4. Findings

Two aspects of students' involvement in the formulation of this assessment project were investigated, namely the choice of group size and methods of working together. Working in pairs was the most popular choice with 68% of the students having opted to work in pairs; 13% worked in groups of three and 19% worked individually. Forty-seven percent of students reported that they enjoyed working in small groups and 54% said that it suited their learning style.

With regard to the methods of working together, 67% of the students stated that they preferred to work in face-to-face situations with 73% choosing to work in labs rather than out of labs. Forty percent reported a preference for use of email to communicate with group members. These were not mutually exclusive categories. With regard to the manner of progress on the project, 40% of the students reported working continuously; 38% reported working regularly; and 22% sporadically.

The development of team skills was investigated in relation to group processes and problem solving. Students worked both autonomously (47%) and collaboratively (52%) on their projects and 51% said that

5. Discussion

Group work is frequently included in tertiary education courses across a wide range of subject domains, including computing and information science as stated by Dunne and Rawlins (2000), and Lejk, Wyvill, and Farrow (1996). This is based upon a strong theoretical rationale for developing in students more communicative and interactive ways of working within their future employment settings. Group work provides one context in which the development of communication and interpersonal skills within particular discipline areas can be encouraged and student-centred experience purposefully achieved. As stated by Norton (2004) and Gibbs (1999), when group work is linked to assessment, it is potentially a powerful lever that can drive not just what students learn, but also how they learn. In this context, the application as well as the accretion of knowledge and skills was emphasised, with the processes of learning and teamwork being valued alongside the subject content.

For this assessment project, students were able to self select their groups as well as the size of their groups. This resulted in groups that were varied in terms of academic ability, gender, language, and ethnic background. Although most surveys report that students prefer groups of 3-4 as this facilitates work distribution, in this case pairs were the most preferred option (University of Essex, 2000). Additional factors concerning group size relate to the nature and complexity of the task and the extent to which the situation reflects the real world context (Race, 2000). Although the task was a complex one involving several phases of conceptual development, and application and implementation processes that mirror practices in industry, the paired groups worked efficiently on the tasks. Also, the practice of working in pairs / small groups closely reflects the situation in industry providing students more realistic experience. While larger groups generally offer the benefits of exposing students to more roles operating within team environments, the smaller group experience in this context probably exposed students to the demands of taking on several roles and responsibilities within a single project (University of Essex, 2000). Whilst the important advantage associated with small group size identified by Race, namely relative ease in arranging group meetings was realised in this case, potential problems associated with disputes working in pairs did not arise (Race, 2000).

Students adopted a range of methods of working showing a tendency to work more in labs than out of labs. Given the high percentage of students who had reported working continuously/ regularly, it was surprising that effective time management was identified as a significant and ongoing challenge. Students putting in a huge amount of work "at the last minute" to complete assignments on time is not unusual, but appears to contradict what students actually reported about how they managed their time. Several modes of communication were used - face-to-face, email, and telephone. Although there was a preference for face-to-face communication, there was evidence of emergent skills necessary for working in virtual teams in the IT industry where graduates equipped with these course units will be competing for employment.

Within the current computer science education context,

objectives such as developing students capable of critical thinking and application of their knowledge to solve problems typical of real world situations is highly important and is also prioritised within the graduate attributes framework at Edith Cowan University (2002). Within a statistics education environment, Garfield pointed to the importance for assessments to match such learning outcomes, a notion that is widely supported in more recent literature (Garfield, 1994). For instance, Biggs (1999); Gibbs (2002); and Maclellan (2004) point to the marked shift from an exclusive evaluation of declarative knowledge towards assessment practices that are aimed at assessing procedural, strategic and conditional knowledge. Berlak's notion that assessment tasks should reflect the ways in which knowledge and skills are used in real world contexts was a guiding factor in the formulation of the assessment task (Berlak, 1992). The process-based assessment task provided opportunity for students to develop their conceptual subject knowledge and apply this to a "problem" that reflects the real world situation, thus broadening the role of assessment from merely testing and assigning grades to include both formative and evaluative components also as stated by Rowntree (1987); and Hornby (2003) respectively. Although students had to produce a tangible product in this project, the learning situation was "awash with process", i.e. students with ideas, with one another, with the lecturer, with the broader learning environment (Rowntree, 1987). The assessment integrated both process and content objectives. Thus two basic principles of assessment were present: the content principle, i.e. assessment should reflect the subject content important for students to learn; and the learning principle, i.e. the assessment enhanced students' knowledge of computer programming and integrated peer and teacher support as elements of good instructional practice (Pitts et al., 2001). Moreover, several reasons for the preference of adopting authentic assessment were applicable. First, this assessment provided insights into how students connected content knowledge to a given problem. Second, it demonstrated the nature of development students experienced in the construction of a computing product. Third, the process of continual peer and teacher feedback enabled students to adjust and improve their performance (Janesick, 2001). Overall, this assessment project effectively captured how students think, reason and apply their

knowledge and skills to solve problems, and identified the team processes and interpersonal communication skills that students utilised in the group learning environment.

The group learning experience also enhanced the development of students' generic skills. The findings were similar to those reported by Dunne & Rawlins (2000); Freeman (1995); Harvey & Green (1994); Johnson & Miles (2004); and Medlin, Graves & McGowan (2003). Students' development was realised in the following areas: exposure to alternate points of view; improved communication and interpersonal skills; effective planning and time management skills; co-operation and negotiation skills; problem solving and decision making skills; leadership skills; critical thinking and analytical skills; enhanced self efficacy; improved social skills and greater inter-cultural understanding.

The open-ended questions included in the questionnaire probed the nature and quality of students' learning. Several learning benefits were evident. Firstly, the process encouraged students to reflect on their individual learning styles and strategies as well as the interpersonal communication skills adopted in the group learning situation. This raised students' awareness about individual learning habits and processes and their verbal and written communication skills. A second significant benefit was that the group learning environment enhanced students' motivation. A majority of students reported that the group context created a general ethos where they wanted to learn. Although Race describes this feeling as intrinsic motivation, he claims that it is more powerful to describe it as a "want" for the personal development that individual students realised in this case (Race, 2000). Students identified that collaboration with group members improved their learning, and that they had established a personal ownership for wanting to learn in the group. Enhanced motivation to learn was demonstrated by various efforts to make their learning in groups more active (i.e. learning by doing) and supporting each other to make sense of complex ideas. Students also reported that the group learning experience made their learning of the subject more enjoyable, enabled them to obtain peer feedback about their evolving subject knowledge, and working with others helped them develop useful skills which

employers value, i.e. strong capacities for inquiry, abstract and logical thinking, critical analysis, oral and written communication, and interpersonal skills (Medlin, Graves & McGowan 2003). These reported benefits deserve further exploration using Newmann's three standards (i.e. analysis, disciplinary concepts, and elaborated written communication) for judging the authenticity of intellectual achievement (Newmann, 1997). The varying degrees of success experienced by groups may be attributed to factors such as the establishment of well- defined ground rules, group cohesion, acceptance of collective responsibility, full participation of group members, fair distribution of the workload, working to the strengths of group members, valuing creativity and innovation, and perhaps also managing systematic work patterns. Overall, Gibbs's (1999) argument that assessment has a significant impact on students' approaches to learning was well demonstrated during this assessment project, as was Maclellan's (2004) view that assessment tasks influence the quality of students' learning.

The group learning situation also presented several benefits for the coursework unit co-ordinator / lecturer. Students studying collaboratively removed much of the pressure from leading the group and allowed more time for planning and preparation. Additional benefits were that it made students less dependent on the lecturer to learn subject content; peer learning helped the weaker learners perform better and less time was spent explaining the same things to different students and providing feedback formatively. It also helped teachers understand the students better as individuals and make appropriate adjustments within the teaching-learning environment (Race, 2000).

From an educational perspective, several of the common issues with group assessment were highlighted earlier. It is well established in practice that group assessment may successfully address some of the workload constraints for both staff and students. Group size is usually prescribed to manage task distribution and individual students' contributions within groups. Group membership may also be prescribed by teaching staff. Both prescriptions often do not take into account students' working lives, mutual compatibility, and contribution - potentially engendering dysfunctionality. This experiment has shown that there is a positive

relationship between students' determination of group size/membership and the distribution and management of workload. The relationship was found to affect the functionality of groups and minimise commonly-occurring problems associated with dysfunctional prescribed groups.

This innovation has also shown that the success of group assessment is enhanced when both process and product orientations are matched to authentic tasks that create a context for the application of generic and disciplinary knowledge and skills. For example, the concept of negotiation is prevalent in the IT industry, where software practitioners frequently liaise in some depth with project clients and, of course, within the team. To this end, the negotiated assessment outcomes and the ability to choose team membership from within the student cohort somewhat paralleled team dynamics in the current IT industry.

Negotiation yielded students' ownership of the assessment via an open and democratic process, leading to greater positive acceptance of the task at hand and a greater willingness in students to engage and overcome problems of group dynamics and micro-management of individual contributions. It is clear from the survey results that students felt positively towards the implemented negotiated group assessment to the point that colleagues' concerns were mitigated successfully. In wider application, such relative freedom of choice within assessment offers potential to combat similarly acknowledged difficulties with group assessment. For example, less time was spent by teaching staff arbitrating on issues within groups, itself a cost saving; the experiment was successful with a moderate (104 students) sized total cohort, in a multi-campus model and across different units, suggesting that the process may be sustainable for wider delivery and with larger cohorts. In terms of students' resistance to group work, the option of working as singletons to triples was felt by students to cater for their needs.

6. Conclusions

An evaluation was performed upon the situation where a democratic process involved students in the selection of their group size and corresponding workload for computer science units. The situation arose because some students who, initially, had been keen to participate in a paired project to realise an academically and industrially justifiable project, were subsequently drafted into group work in other studies and were no longer able to participate in the paired project. The evaluation reveals that students were happy to participate in project definition and workload setting. Peer-learning allows a reduction in reliance of students upon academic staff to progress their project. Students had gains in generic skills such as teamwork while "loners" could function equally well, such as intra-group communication as might occur in an industrial software development team, problem-solving skills, a more complete analysis of the problem domain via discussion with peers, and assumption of roles by students within a group to exercise their particular skills. Desirable academic outcomes included cooperative setting of tasks that enabled students to extend and apply their programming skills, an appreciation of the coursework unit, while, in fact, they were studying it, useful application of the tools to be used to produce the implementation and the achievement of a real-world application within the equally real constraints imposed upon students of today.

In terms of progression of this experiment, we resolved future work as follows. Although students reported working steadily rather than a last-minute rush, further studies are required to see if such practice continues to be reported. Following the initial popularity of working in pairs while permitting some students to work individually, we need to investigate whether and why such perpetuates. An extension of the democratic process to determine appropriate points where students may choose between offered assignment topics as well as the formation of an equitable workload per group size - probably via monitoring of threads within online student discussion forums.

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Reinforcing Formative and Summative Assessment

Formative Assessment for Progress Tests of Applied Medical Knowledge

James Oldham
Adrian Freeman
Suzanne Chamberlain
Chris Ricketts
Institute of Clinical Education
Peninsula Medical School
Universities of Exeter and Plymouth, United Kingdom

Progress testing of applied medical knowledge has a high utility for an integrated Problem Based Learning course. Because the tests are set at the level of a new graduate, students during the first 2 years of their study have only minimal knowledge at the assessed level, and score around 10-20% with most questions eliciting a 'Don't know' response. To provide more information about what our students have learned in the first 2 years, we developed a formative assessment programme to complement the progress tests. Three consecutive groups of six students were employed to write test items with response contingent feedback. The item writing environment was redesigned after each iteration. Feedback suggests that item writing is an effective learning environment. The items written by the students were released to the whole cohort as online formative assessments. These were popular with the student cohorts. Further development of the bank of items will provide more information about student acquisition of knowledge. We are currently redesigning the next iteration of Formative Assessment of Applied Medical Knowledge using design-based methods.

1. Introduction

This article outlines features of the progress test at the Peninsula Medical School. It then presents the rationale for the development of Formative Assessment of Applied Medical Knowledge. The employment of students as item writers is described and data on the use of the assessments are reported. The advantages and disadvantages of the features of the item writing learning environment are discussed.

Progress testing of medical knowledge is a method of assessment in which all cohorts of students sit the same test, set at the standard expected of a newly qualified doctor. Progress tests are typically composed of many items which may be multiple true/false, extended matching or multiple choice. At Peninsula Medical School each test consists of 125 best-of-5 multiple choice items. Each item consists of a clinical vignette, a question, 5 options and a don't know option. Tests are sat 4 times per year with each test being a structured sample from a large item bank.

Students are able to see their knowledge grow over the course of their studies, and patterns of student scores over time can be used to identify variables of interest to the student and to the faculty. Progress tests are intended to assess deep learning because each item is designed to engage the student in clinical reasoning and functional knowledge rather than recall of isolated facts, and because each test exposes the student to a structured sample of the whole domain of applied medical knowledge appropriate to that of a newly qualified doctor.

It is particularly difficult to provide useful feedback to students during the early years of their study, as they will have only minimal knowledge at the assessed level, and do not attempt many of the questions. Scores in the first 2 years are around 10-20% with most questions eliciting a 'Don't know' response. In order to generate more detailed knowledge of what our students have learned in the first 2 years, we decided to develop a formative question bank focussed on knowledge specific to these early years.

Inevitably for a new medical school, the staff focus has been on developing summative assessments. A more

innovative approach was needed to develop the formative question bank. We recognised that students have a close involvement with the curriculum and under appropriate circumstances form a valuable educational resource. We also recognised the potential of the item writing environment for learning and noticed that opportunities for learning were being missed by excluding students from important parts of the assessment process.

The purpose of this paper is to outline the rationale for the use of students to write assessment items and report on the use and performance of the test. It proposes a design-based approach to enhancing teaching and learning through Learning Oriented Assessment.

2. Rationale

The progress test has a high utility for an integrated PBL course (Verhoeven et al., 2002; Verhoeven, 1998; Albano et al., 1996; van der Vleuten et al., 1996). It samples the whole domain of knowledge appropriate to a newly qualified doctor and avoids test directed 'cramming and dumping', it encourages clinical reasoning rather than factual recall, takes a frequent look allowing rapid remediation, and is cost effective. In the early years however students choose the 'don't know' option as they have little knowledge at the assessed level. Test data shows that the number of times a 'don't know' option is chosen declines as the student progresses through the course. One advantage of the progress test is that it focuses the student on applied medical knowledge that is aligned with intended course outcomes and avoids the test driven 'cramming and dumping' of detailed information. The disadvantage however is that in the early years the students have only studied a small number of case units, so a test that samples the whole domain of knowledge appropriate to a newly qualified doctor is too broad and not focussed on material the students have studied on the course so far.

The Formative Assessment was therefore set up to

provide more information about knowledge acquisition in the early years. We developed a bank of formative items relevant to the first 2 years of the programme, classified by case unit (19 over 2 years) and 5 curriculum themes. We were keen to align the formative assessment with the summative assessment in order to stay faithful to the pedagogic rationale and utility of the progress test.

At the PMS students are not allowed to take copies of the Progress Test exam paper out of the examination room. This is because some of the questions are drawn from the Hong Kong IDEAL database which must remain secure. Students receive item specific feedback in the form of the name of the broad topic which the item addressed (e.g. 'diagnosis of chest pain') and verification of whether their response to the item was correct or incorrect.

The key feature of the formative items however, is that the on-line assessment delivery enables the designer to provide response contingent feedback (Manson & Bruning, 2005) which explains the reasoning behind each choice and directs the student to additional learning resources (e.g. texts, workbooks, images, websites) to encourage further self-directed learning.

Feedback is one of the key principles of formative assessment (Manson & Bruning, 2005; Black & Wiliam, 1998; Sadler, 1989; Roos & Hamilton, 2005; Natriello, 1987). Our main aim was to provide the students with more specific feedback than that received after the progress test. The term 'feed-forward' might be more appropriate as it emphasises that the purpose of the feedback is to improve performance if a similar situation is encountered in the future.

2.1 The role of the student in formative assessment

Traditionally the emphasis on 'summative assessment' or 'assessment for measurement' has necessitated excluding the student from the writing of assessment items. The advantages of student involvement in areas of the undergraduate curriculum that are traditionally the domain of the faculty or 'experts' has been described in the literature (Duffy & O'Neill, 2003; Rudkin et. al., 1999). Formative assessment (Black & Wiliam, 1998; Sadler, 1989), Sustainable assessment (Boud, 2000) and

Assessment for Learning however, open up exciting opportunities for involving the student in the development of assessment items and the removal of 'artificial performance ceilings' (Sadler, 1989).

Professional behaviours include assessment skills in a wide range of contexts ranging from clinical practice to 360° staff evaluation. A trend towards increased use of authentic teaching settings and assessment strategies, and a drive to increase the reliability of assessment in undergraduate medical education by increasing the number of assessments and the number of judges, has led to practicing clinicians being increasingly involved in assessment. The exclusion of students from the development of assessment items due to the emphasis on the use of assessment for measurement has excluded students from an essential part of the assessment cycle. It prevents them from participating in the full range of professional behaviours and omits an important class of learning outcomes from the curriculum.

Item writing involves high level cognitive skills. The creation of an authentic vignette and the focus of the question onto an important topic require reflective reference to experiential learning and an understanding of the curriculum. Choice of feasible distracters that encourage clinical reasoning requires an understanding of the common areas of misunderstanding and important discriminatory factors. The item writer has to relate the specific item to the whole from which it is drawn and engage in a deep approach to learning (Marton & Booth, 1997). The writing of feed-forward requires high level teaching skills and excellent communication skills. Item writers worked in pairs and teams and this inevitably requires team, interpersonal and communication skills. Also item writers need to be fluent with the item writing environment - how to access a wide range of resources, how to use IT software and access expert colleagues for advice.

3. Methods

Three consecutive groups of six students were employed to write items with response contingent feedback. The item writing environment (organisational procedures,

quality control procedures, software systems) was redesigned after each iteration.

The test was delivered online with QuestionMark Perception software. The routinely collected data from the test was exported into Excel and SPSS and analysed for the number of students that logged on to take the test and the score on the first attempt.

This project demonstrates the 5 characteristics that are exhibited by a design-based research method (Barab & Squire, 2004; Design-Based Research Collective, 2003). Firstly there is the dual purpose of designing and evaluating the learning environment and of developing the theory of learning and assessment. On the one hand, we will explore the local impact of both the item writing environment and of the test on learning. On the other hand we will develop our understanding of student construction of knowledge, of the relationship between assessment and learning and of the role of the student in the assessment cycle. This project will not only explore the impact of the formative assessment on learning, but also develop and locate the theoretical perspective of Learning Oriented Assessment firmly in the theoretical tradition of formative assessment (Black & Wiliam, 1998; Sadler, 1989; Roos & Hamilton, 2005; Smith & Gorard, 2005; Taras, 2002).

Second, there is an iterative process of design, enactment, analysis and re-design in a naturalistic setting. Initial design efforts focussed on developing software, item writing training and quality control procedures. This process improved the quality of the items created and refined the process of creating the items and delivering the test. It also resulted in an awareness of the quality of the item writing environment for the development of both basic knowledge and clinical reasoning and also higher cognitive functions such as learning skills, communication skills, and cognitive strategies of how to write clear feedback to teach effectively etc. Now that the groundwork has been laid we are in a position to systematically adjust aspects of the designed context and explore the impact of the adjustment.

Third, the theoretical developments arising from the Learning Oriented Assessment will inform other practitioners and educational designers. It is hoped that

other institutions stimulated by the local impact of this work and inspired by the theoretical developments it embodies, will design an intervention within their own specific context. It is hoped that this process will produce 'lethal mutations' and 'productive adaptations' and so uncover some of the variables that are in play. Thus this design-based research project aims to explore the hypothesis that students benefit from the process of item writing, articulate the mechanisms at work and demonstrate an impact on learning. The model will be available for adapting to alternative environments and for further developments of theory and practice. The validity of the theory therefore is demonstrated by its ability to do work in the world (Barab & Squire, 2004).

Fourth, the research will account for how the design functions in an authentic setting. It will not only document the success or failure of the item writing process, of the tests and of the student performance on the test, it will also refine our understanding of Learning Oriented Assessment as a learning environment and lead to revisions of practice on the ground.

Fifth, it will do this through methods that 'document and connect processes of enactment to outcomes of interest' (Design-Based Research Collective, 2003). We aim to triangulate multiple kinds and sources of data from the item writing environment and from the tests, to enquire into both knowledge acquisition and the theoretical nature of learning. Qualitative and quantitative data sets from item writers (about what were the strengths and weaknesses of the item writing environment), and from the test (student, item, and test performance) can be combined to inform both the local project and the wider debate. Reliability will be enhanced through triangulation of different data sources, repetition of analysis across cycles of enactment, and the standardisation of measures. Validity will be enhanced through iterations of the Learning Oriented Assessment project to increase alignment of theory, design, practice and measurement over time.

4. Results, analysis and discussion

4.1 Item writing

80% of items were self-generated, stemming from PMS learning environments. Students chose not to scour the internet for item ideas, and found it difficult to develop questions from the Hong Kong IDEAL Database. A student typically takes a half day session to create a complete item of high enough quality to be used in a test. The time taken depends on a variety of factors such as the quality of training in item writing, the prior knowledge of the individual, the number of revisions required of the item by the review process etc.

Items were created to reflect all 5 themes of the course (Basic science, Human science, Clinical and communication skills, Public health, and Personal and professional development). Additionally each item was mapped onto a matrix of common clinical presentations and themes of applied medical knowledge.

There was a strong consensus that item writing was of huge value to their knowledge and understanding of the curriculum, it consolidated their learning on the programme so far and they felt that they were being 'being paid to learn'.

A key finding of the study so far is the importance of training in item writing. For the first iteration the training needs were underestimated and the quality of the initial items was sometimes poor. Common mistakes were to create an item where the vignette was redundant - thereby testing basic factual recall rather than clinical reasoning of applied medical knowledge, the items sometimes contained technical item flaws, and the response contingent feedback was sometimes unfocussed.

The items created improved significantly after each iteration, as the training needs of the students became clearer, and the item writing training was redesigned to target the key areas of need. Students required guidance to help focus the questions on clinically relevant material and avoid less important topics. They required guidance on writing authentic vignettes and incorporating appropriate distracters. A 'good item' checklist was

developed, against which to evaluate the quality of items.

A key development from the initial iterations of this project is that extensive training is required to write high quality feed-forward from each item. A lot of time is now invested in developing the students' teaching skills that are required to write high quality feed-forward. Use of English has to be precise, direct and focussed if it is to be 'satisfying' to the learner. Common mistakes were to stray from the key intended learning outcome, the illogical progression of ideas, and the use of jargon. The writing of high quality feed-forward is predicated on an understanding of the intended learning outcome and high quality teaching skills. It is this high level cognitive activity that we hope to explore in future iterations of the project.

Students worked together efficiently, and the task fostered an effective learning environment. Inevitably there were tensions in the team that arose from the process of collaborative creative work and the students developed and practiced their communication and team skills.

4.2 Use of the test

Each test has the majority of items focussed on the most recent case-units which the students have studied, but also includes a sample of items from earlier tests. So tests generated for second-year students will include items from first-year tests. This means that students have to accumulate knowledge, rather than replace old with new.

The most recent first-year test was taken 118 times by 77 students (46% of the cohort). However this figure represents the number of students that logged on to take the test. In fact students sometimes took the test in pairs and small groups so the actual number of students that used the test was higher. The mean score for all attempts was 59% (SD 16).

The most recent second-year test was taken 201 times by 71 students (40% of the cohort). Again more students actually used the test. The mean score for all attempts was 61% (SD 22).

With a further development of the database of items

we will be able to demonstrate knowledge development in greater detail according to specific themes and subtopics.

Feedback from the students was very positive. They found it easy to access and take the test. The students' comments bore out the face validity of the format of the items - a clinical vignette followed by 5 options. They particularly liked the increased specificity of the feedback from the formative items and regarded it as an improvement on the feedback from the summative progress test.

Feedback from the staff that took the test was more critical of the technical item flaws in the questions. For example one commentator noted that the vignette was sometimes irrelevant, that the 'cover the options rule' was sometimes not employed, and that the topic assessed was sometimes not particularly relevant.

Future iterations of this project will employ a more detailed analysis of the test. It will explore in more detail the distribution of topics assessed, qualities of the items, and the effectiveness of the feedback. It will also employ a more sophisticated evaluation of the use of the test from the perspectives of the students, faculty and clinical practitioners.

5. Conclusions

The potential for the Learning Oriented Assessment of Applied Medical Knowledge project has been identified in this paper and a method has been detailed that can be used to improve the implementation of the project locally and also contribute to the wider understanding of learning and assessment. Future developments will track the progress of the students involved in item writing to formally evaluate the impact on their learning, and develop the management of the test to provide more information on knowledge acquisition.

We also intend to systematically adjust aspects of the Learning Oriented Assessment project in successive

iterations and observe the influence of the adjustment.

In terms of the item writing environment we are in a position to change the organisational structure of the item writing process to tease out those factors that appear to be most effective. We are able to adjust the detail of the review process to explore the effect on the quality of the items. We can vary the location of the source of items (PBL class, community placements, plenaries, Life Science Resource Centre) and explore how that influences the items created and the process of item writing. We are able to adjust the motivations of the item writers; so far we have employed a small group of students to write items and rewarded them financially, but we could embed item writing into the course, remove and or adjust characteristics of the financial incentive and explore the impact on how the task is perceived.

In terms of the test we are in a position to vary the conditions of the test such as the number of items in each test, whether each test contains fixed items or a random sample from the database, and the nature of the feedback on each item. We can then explore the impact this has on the use of the test, and on learning.

A key priority in this project is the quality of the items written. The training and item writing process has to be robust enough to develop the student's cognitive skills to that which is typical of the 'expert'. This is no easy task and the question of how to do this is the central focus of this project.

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Enhancing Student Appreciation of Written Feedback on Essay Assignments

Stephen Gomez
Richard Osborne
Faculty of Applied Sciences
University of the West of England, United Kingdom

Written feedback on essay assignments often appears to be ignored by students as indicated by repeated mistakes on subsequent essay attempts. Students seem interested only in the mark yet written comments provide feedback that can be applied to future work. To get students to consider written feedback more seriously, a two-part essay assignment was set. Part 1: students on a particular module wrote essays on a specific topic. The work was submitted, marked, annotated with written comments and returned. Part 2: students wrote a structured response to the assessors' comments. Students displayed a higher level of learning when the second part of the assignment was compared to the first and, students largely agreed that it was a useful exercise. Although learning was evident, most students disliked the exercise, saying they did not gain from it contrary to the evidence shown in their own coursework.

1. Introduction

It is generally agreed that assessment provides the means for evaluating student learning. If assessment is at the heart of the learning experience, then feedback on assessment is essential as it potentially affects future learning and student achievement. Feedback has been defined as giving information about the gap between the actual performance level and the reference level, which is subsequently used to alter that gap (Ramaprasad, 1983). Although students generally appreciate and desire feedback there is evidence that they often ignore it (Hounsell, 1987), or do not understand it (Lea & Street, 1998) being interested only in the mark (Wotjas, 1998), whether they have passed and how their mark compares with their peers. In the words of Gibbs and Simpson (2004), assessment "sometimes appears to be one and at the same time, enormously expensive, disliked by both students and teachers, and largely ineffective in supporting learning". Snyder (1971) found that students were more influenced by the assessment than by the teaching and consequently, for assessment to be part of learning, effective feedback must be at the centre of this process.

As reflective academic practitioners involved in the delivery of bioscience material to final year undergraduates for a BSc (Hons) degree in Applied Biological Sciences, we are constantly struck by how little reflection seems to occur in our students who apparently do not apply feedback to future work and indeed seem to undervalue or even ignore markers' comments. They often appear to start the next assignment anew without applying the feedback from previous assignments.

As assessors, we provide feedback on students' work by commenting, correcting and awarding marks, but, the perception is, that students often skim over the written comments, do not apply the feedback to future work, and do not appreciate generic advice and how to apply it to situations outside the present context. In this way, students appear to approach each new assignment from 'scratch'. This situation is evidenced by us seeing the same mistakes repeated on subsequent students' work and often we have to write similar comments each time.

Our aim was to get students to:

- Appreciate the importance of feedback.
- Focus and reflect on feedback.
- Prioritise feedback comments.
- Draw up specific and generic action points resulting from feedback.
- Evidence their attitudes to feedback.

2. Methodology

2.1 Sample population

The sample population consisted of 59 students enrolled on a final year degree (Higher Education Level 3, L3) neuroscience optional module called *Brain Function & Disorder*. About a third of the population were psychology students with the majority being bioscience students. Some were in their fourth year of higher education (HE) having been on a one year placement but the majority were in the third year of HE study.

2.2 Essay assignments

Essay assignments are a common form of assessment used throughout the degree programmes in the faculty, both as assessed coursework and written examinations. Students, therefore, would have had much experience with writing essays and receiving feedback from assessors by the time they reached the final year of their HE studies.

2.3 Structure of the reflective assignment

The reflective assignment we used in this exercise was given in two parts: the first being in semester 1 and the second part in semester 2. Students were informed about the structure of the whole assignment at the start of the academic year.

2.3.1 First part

The first part of the exercise involved the students

writing a 1500-word essay assignment entitled: *'Ecstasy' is a neurological 'time-bomb'* Discuss this statement in terms of the likely neurochemical, neurological and behavioural consequences of its use.

Students were given 8 weeks to write the essay in amongst other coursework and lectures in this and other modules. Submitted essays were read by both authors of this paper and received a mark. Each essay was individually annotated with extensive written comments and advice on improvement. The essays were then photocopied and photocopies retained by us and the originals returned to the students within four weeks of the hand-in date in compliance with faculty policy.

2.3.2 Second part

In the second part of the exercise, which followed three months later, students were asked to reflect on the markers' comments and produce a written response using the following framework:

- a. reflect on the actual mark awarded and compare with their prior expectations of the mark they thought they would receive;
- b. compare the marker's assessment with their own assessment;
- c. prioritise the three most useful comments made by the assessor and justify their priority;
- d. produce an action plan that would improve the essay if it were to be attempted again;
- e. produce a generic action plan of points learned from this exercise that could be applied to future assignments;
- f. reflect on the usefulness of feedback as well as this type of exercise in enhancing learning.

The second part of the assignment was assessed according to the appropriate generic criteria for L3 learning in HE as defined by the SEEC Credit Level Descriptors (SEEC Credit Level Descriptors).

Credit Level Descriptors Adapted from Credit Level Descriptors for Further and Higher Education Southern England Consortium for Credit Accumulation and Transfer, January 2003.

i. Development of Knowledge and Understanding (subject specific)

The Learner:

- **Knowledge base:** has a comprehensive/detailed knowledge of a major discipline (e.g. Biosciences, Environmental Science), with areas of specialisation in depth, and an awareness of the provisional nature of knowledge
- **Ethical issues:** is aware of personal responsibility and professional codes of conduct and can incorporate a critical ethical dimension into a major piece of work

ii. Cognitive/Intellectual skills (generic)

The Learner:

- **Analysis:** can analyse new and/or abstract data and situations without guidance, using a range of techniques appropriate to the subject
- **Synthesis:** with minimum guidance can transform abstract data and concepts towards a given purpose and design novel solutions
- **Evaluation:** can critically evaluate evidence to support conclusions/recommendations, reviewing its reliability, validity and significance. Can investigate contradictory information/identify reasons for contradictions
- **Application:** is confident and flexible in identifying and defining complex problems and can apply appropriate knowledge and skills to their solution

iii. Key/transferable skills (generic)

The Learner:

- **Group working:** can interact effectively within a team / learning / professional group, recognise, support or be proactive in leadership, negotiate in a professional context and manage conflict
- **Learning resources:** with minimum guidance can manage own learning using full range of resources for the discipline(s). Can work professionally within the discipline
- **Self evaluation:** is confident in application of own criteria of judgement and can challenge received opinion and reflect on action. Can seek and make

use of feedback

- **Information management:** can select and manage information, competently undertaking reasonably straight-forward research tasks with minimum guidance
- **Autonomy:** can take responsibility for own work and can criticise it
- **Communications:** can engage effectively in debate in a professional manner and produce detailed and coherent project reports
- **Problem solving:** is confident and flexible in identifying and defining complex problems and the application of appropriate knowledge, tools / methods to their solution

iv. Practical skills (subject specific)

The Learner:

- **Application of skills:** can operate in complex and unpredictable contexts, requiring selection and application from a wide range of innovative or standard techniques
- **Autonomy in skill use:** able to act autonomously, with minimal supervision or direction, within agreed guidelines

3. Results

3.1 Initial intentions

The assignment did not start out as a pedagogical research exercise but as a way of encouraging students to take more notice of written feedback and to implement advice given by assessors in subsequent assignments. However, the results obtained and the reactions by the students provided insights into students' perspectives on feedback that we considered were of value to the wider HE community. Although some of the findings are specific to the particular topic set, most findings were of a more generic nature.

3.2 Overall results

When students were asked to reflect on the mark awarded compared to their expectations of the mark they felt they should have received, 40% students agreed that the mark was as they expected; 44% said it was lower than expected and just 16% felt that it had exceeded their expectations (Fig. 1).

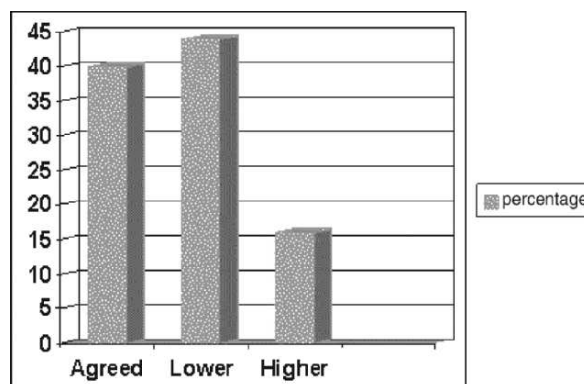


Figure 1. Histogram showing students' expectations of the mark for their essays with percentage on the y axis. Similar proportions of students received the mark they expected as those who obtained lower marks than expected

In the case of the feedback given, 50% of students reported their initial agreement with the comments made. However, following reflection, 88% of students noted that the feedback was accurate and had enhanced their understanding of what was required by the essay title as well as the subject matter under consideration.

Over 90% students said that the most useful comments made were those directing them towards using the "aetiology of Parkinson's Disease and late onset polio symptoms as models of a neurological time-bomb", "exploring the effect of ecstasy on dopamine as well as serotonin" and giving a detailed account of key synthetic enzymes. Only one student completely disagreed with the feedback noting that the "exercise was ridiculous at this level [i.e. final year of the degree]", the "assessor was biased" and that "I wished that I had read all the comments relating to this essay ASAP so that I could have made a complaint"!

Most of the subsequent student action plans noted the need to understand all the words and the meaning of the title overall. The majority of students noted that the key word in the title was "time-bomb" and reported that they had chosen to ignore it when compiling the original essay and consequently had missed the required emphasis. Others noted that as a result of this exercise they would "spend more time contemplating weaknesses in my writing", "be aware of when it is important to expand upon an idea", have a more open mind "when reading the background material", "would not rush into answering the question without considering other relevant views", "make points explicitly rather than just hinting at them".

Despite these encouraging comments, the students disliked having to perform a reflective assignment, considered it to be "inappropriate and unnecessary at final year level" as evidenced by responses given on an anonymous questionnaire. This attitude supports the work of Jackson (1995) who reported that level 3 students tended to only look at the grade rather than at the feedback. He also found that students like to see feedback to reassure them that their assignment has been marked fairly.

Although students agreed with the statement that they learned from feedback they were non-committal as to the value of having a reflective assignment. We found a higher level of learning occurring with the reflective assignment than with the essay component but this was not recognised by most students.

4. Analysis of responses

4.1 Overall improvement in performance

As mentioned above, essay assignments are the most common form of assessment for bioscience students in the faculty. In the first year (level 1), essay titles require students to research highly factual topics and as the students progress through the levels to final year level 3, they are given increasingly discursive topics to

write about. However, the majority of students feel safer with factual accounts and the discursive element of the essay rarely emerges. On the whole, students in the final year avoid taking risks and sticking their necks out and would rather find out how their peers are tackling the essays and conform to this standard. The majority of students do not approach the academic staff if they have any problems understanding the essay topic and instead seem to ask equally uncertain friends doing the same assignment. There is much anecdotal evidence of collusion between students when writing essays as evidenced by very similar references being used and similarities between the layout and wording of the structure, content and text.

The essay set for this exercise was approached in a similar way as described above and few students displayed level 3 attributes of synthesis, evaluation, reflection and discursive powers. However, when it came to responding to the comments on the essay, all students showed a remarkable uplift in using level 3 attributes. In terms of meeting L3 criteria for assignments, students performed better in the reflection on the essay than the essay itself. This was reflected in the marks obtained overall. For the essay the mean mark was 62% (n = 59; sd 3.1%), and for the reflection the mean was 68.7% (n = 59; sd 3.8%).

Although specific questions were asked about the bioscience content, this paper focuses on the generic responses obtained as this would have wider interest in the HE community.

4.2 Value of feedback

When students were asked how valuable written feedback was on essays, the majority considered it helpful, though a sizeable proportion was neutral or negative. Common complaints from students about assessor feedback is that it is either inadequate (just a series of ticks or words) and provided long after they have completed the work and are working on other assignments.

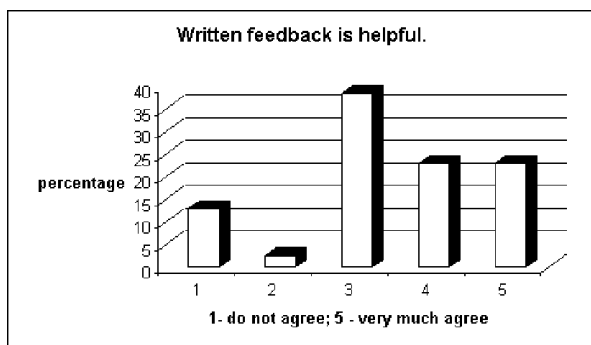


Figure 2. Shows the distribution of comments on the helpfulness of written essay feedback. An alarming proportion do not find it helpful for reasons discussed in the text

4.3 Is it sufficient to award a mark?

There is a general perception among assessors that students are only interested in the mark they receive for their work and consider this sufficient feedback. From the student questionnaires, this does not appear to be their attitude. The majority declared that the mark alone was not considered to be sufficient thus contradicting the popular belief of many academics.

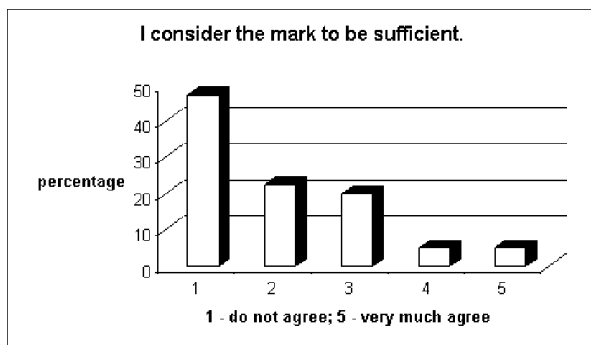


Figure 3. Shows that proportion of students who consider the mark to be sufficient feedback for essay assignments is lower than popularly believed

4.4 Are markers' comments read?

Students, as shown in this questionnaire overwhelmingly agreed that markers comments are read. This finding agrees, in part, with the results in 4.3 above indicating that the mark itself is insufficient feedback for students.

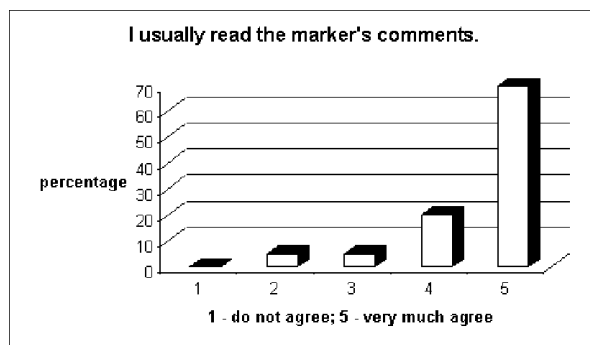


Figure 4. A high percentage of students in the study said that they usually read the marker's feedback comments

4.5 Is any attention paid to the marker's comments on essays?

In this sample, students said that they do pay attention to the marker's comments. Again this is contrary to the experience of many academics because students tend to make the same mistakes again and do not appear to learn from previous mistakes.

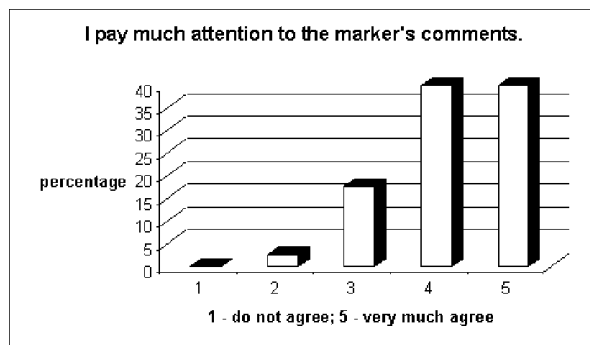


Figure 5. Contrary to the experience of markers, a high percentage of students in our sample claim that they pay attention to marker's comments

4.6 Is feedback used in other assignments?

According to the students' questionnaires, the majority said that they used feedback in other assignments. A surprisingly high proportion was neutral and this may reflect either that the feedback was considered to be specific for a particular essay or that, although it was of a generic nature, they were unwilling or unable to apply it to other work.

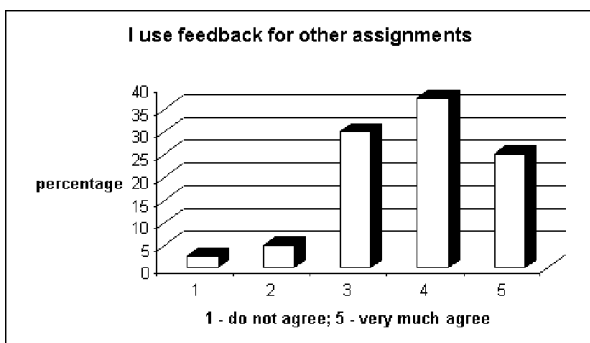


Figure 6. A high proportion of students claim that they do apply feedback to other assignments with a sizeable proportion appearing neutral

4.7 Is feedback valuable?

In many ways, this is similar to the questioned posed above, and yet the answers are less clear cut than previously with a spread of attitudes across the spectrum.

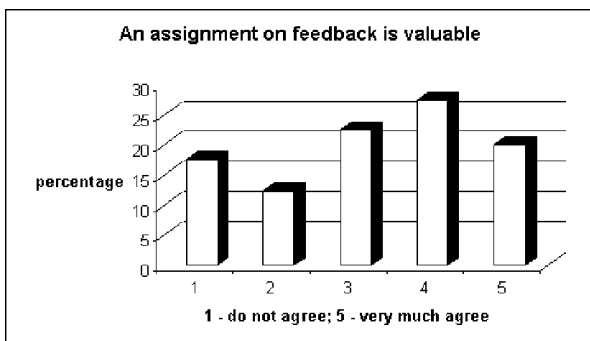


Figure 7. The spread of attitudes across the categories is difficult to explain and might be caused by individual definitions of what is valuable

These observations are in line with a survey undertaken by Maclellan (2001) showing that most students felt that feedback was only sometimes helpful with 30% of respondents stating that feedback never helped them to understand. These data may also support Ding's (1998) observations that many students make little or no use of feedback comments even if they read them. However the spread of responses to this question also reflect Brookhart's observations that successful students use both marks and feedback to direct their future study (Brookhart, 2001).

5. The student experience

This section contains information collected from the reflective comments made by individual students providing deeper insights into their attitudes.

5.1 Comments from a student whose marks were below expectation

"The mark received was not as high as I had expected. I answered the question with all the info available to me at the time. I wrote an unbiased account, 'not a one-sided tirade against ecstasy."

"I believe I was penalized for not discussing animal studies because of differences in doses' [subsequently questioned by the marker's comments on 'clubbers' taking doses near animal experimental levels - also questioned other comments from marker]."

Notwithstanding these comments, the student was able to justify the order of useful comments quite well and produced a detailed action plan and defined terms, such as 'time-bomb'. This student also blamed the marker for low mark and did not consider that some of the problems with misinterpretation could be his own fault.

As for the usefulness of the reflective exercise, the student said:

"I found this task useful, as it made me realize that I should have taken more time ... to read comments at the time (when the essay was returned)... and not just accept the mark and the comments without question."

"Many of the comments show that the marker misunderstood several points ... was biased against my work because I didn't use animal studies."

"...the fact that we had to do this in our final year was just slightly ridiculous. It would have been more useful in the first or second years when we could have learnt from it, and used it to our advantage."

Although there is some justification for the last point,

the student does not accept that s/he has learned anything from this exercise when plainly the previous comments show that s/he has very much done so.

5.2 Comments from a student whose marks were as expected

This student agreed with the marker's comments though stated that coming from a psychology background s/he did not have a strong enough base in hard science. No mention of seeking the markers help beforehand was made.

Overall, the student took the comments favourably and agreed with the marker's comments. S/he thought the feedback exercise was useful as *'helped to structure the feedback ... and then use it to go back and view the subject area with a fresh mind and investigate the areas I specifically needed to improve. This has been useful in reinforcing and consolidating my knowledge of the subject area.'*

5.3 Comments from a student whose marks were above expectation

This student said that this was his/her first assignment in science (coming from a psychology background) and that predicting the mark was difficult but was pleasantly surprised with the mark of 62%.

S/he generally agreed with the marker's comments but said that no positive comments were made - [apart from 45 ticks!]. S/he has learned much from the feedback and if writing the essay again would pay attention to all the comments. On a general point, the student felt that s/he needed to make sure that his/her essays answer the question thoroughly in future, saying:

"I think that feedback is a really important tool in helping students improve their work ... this exercise has been extremely useful in making me think about my work."

"Such an exercise would have been beneficial if carried out earlier in the course or even throughout the course. Students would take more notice of feedback and use it to improve their work."

"Tutors need to provide students with more comprehensive feedback."

5.4 Comments from a student who agreed with the mark

The student commented, *'It is important to state exactly what your interpretation of the question is in the introduction so that the marker knows [how you are approaching the question]'*.

"Feedback.. is the only way to improve your mark from essay to essay. I always read the feedback when I receive the work back but I don't tend to look at it after that point. This exercise has been useful in that not only does it make you look at the feedback...but it makes you re-read your essay and become familiar with the issues raised once more."

"Because we have received many lectures between when the essay was written and when it was returned you know more about the subject when you re-read feedback."

5.5 Comments from another student who agreed with the mark

"I always read the feedback and thought I took it in and thought it useful to a certain extent. This exercise has been very useful in highlighting how much attention I pay to the feedback. I'm expecting and overlook the feedback that was unexpected. It has also highlighted the issue of my confidence in trying to develop ideas beyond the obvious, a skill that is useful no matter what the title."

The comment above is very encouraging as it shows that this feedback exercise was transformative for some students. Quite often assessments can be treated as a means of just hitting targets and gaining marks. An assessment that leads to a student re-evaluating his/her approach to learning is a far more valuable and higher level activity.

"This type of exercise is very useful ... but feel it unfortunate that it was used in the final year for the final assessment for the first time. I will

however take what I have learned forward to the exams and future development opportunities."

Constructive feedback is valuable at any stage of learning but the point is taken that students should be exposed to this type of assessment exercise earlier in their university education and we intend to run this in years 1 and 2.

5.6 Comments from a student with a mark lower than expected

This student was disappointed by the mark obtained 'because of all the work put in.' A common reason for disappointment is that students feel that they should be rewarded for the amount of time and effort they put into their work and often do not appreciate that the marks are given for the appropriateness of the content.

S/he commented, 'I firmly believe that good feedback is fundamental to increasing one's ability to learn effectively. I believe that better feedback from the start of the degree would have given me the direction I badly needed and the confidence to try new approaches.'

"This exercise has been a useful one, and will have an impact on future learning purely from the fact that spending more time contemplating the weaknesses in my writing will undoubtedly improve it. Admittedly something I fail to do enough."

Comments from another student with a mark as expected: *'Whilst feedback is always useful and appreciated, it can be of limited value because often by the time it is received most essays have been written. There is a tendency to just look at where one went wrong specifically to that essay and not to look at how criticisms might be applied to other subjects.'*

"Doing this assignment forced the thought of how feedback given might be used in more general terms in future, and so proved extremely helpful. From now on I will try to write more generic action plans from all feedback received and keep them to refer to when writing future assignments."

And from another student: *'I found this particular*

exercise to be more time consuming than it is worth and hence not very useful. It is my last assignment in the final year and would have been more useful if you were asked to re-write the essay.'

6. Discussion

It is hoped that all academics consider themselves as reflective practitioners. If we consider reflection as being important in our practices then we should also ensure that students are encouraged to reflect on their work. The extensive use of essays in assessment of our students has in many ways produced a culture and expectation of this form of assessment for academic ability.

Any deviation from this expectation can cause a sense of insecurity and this may well have contributed to the intense reaction against the exercise we conducted. Thus, removing students from the comfort-zone of the traditional essay forces them to exercise independence and personal responsibility whereas many are waiting to be told what to do or are playing a game to keep lecturers happy (Sambell & McDowell, 1998). Another contributory factor is that many students entering higher education only have experience of repetition of ideas and rote learning and consequently lack many of the skills that essential if they are to become successful autonomous learners. Science students in particular are not given much formal opportunity to reflect on learning as much of the material covered in science programmes is highly factual. As seen in this exercise, given the opportunity, science students can display a higher level of intellectual engagement with assignments than previously witnessed. However, this enhancement was not readily apparent to the students as shown by their poor attitudes to this reflective exercise.

The questionnaire data provided further insights into the attitudes of students to reflective feedback assignments. Although many were in favour of such exercises, they were of one mind that it was too late to give such an exercise in the final year and it should be

introduced in the first year. It is true that reflection should be encouraged from the beginning of the course but the idea that reflection is not needed at the end of the course is absurd.

When some of the student representatives were quizzed on this attitude it emerged that they did indeed think that such activities were of little use at the end of the degree thereby confirming some of Jackson's earlier observations (Jackson, 1995). They did not seem to appreciate that such activities and the feedback from the activity could be applied to what they may do in their graduate life. These students seem to be unwilling to take advantage of assessment to improve their learning while at the same time having a very immature view about the nature and functions of assessment and subsequent feedback.

This attitude seems to reinforce the compartmentalization of learning experiences of students whose knowledge is context-related and cannot readily be applied outside the situation in which it was acquired. More lateral forms of learning need to be encouraged but are hampered by the modular approach to teaching which pervades both school and university education in the United Kingdom and elsewhere.

The results of the questionnaire appear to dispel the impression that students pay little regard to written feedback on essays with the majority of students saying that they do read and act on feedback. However, this claim is not evidenced when marking scripts but clearly, the month-long period between the students submitting work and receiving feedback means that coursework prepared during this interval will not benefit from feedback given on work submitted a few weeks earlier. Although this might account for some short-term delay in applying feedback, it should still be cumulative and by the final year should not be a major factor.

From this simple exercise a number of important pedagogic lessons have been learned:

- That reflection should be encouraged from the start of the course.
 - That reflection should not aim just to affect current leaning but be applicable more widely throughout the degree and that graduates should be encouraged to appreciate its value in postgraduate studies as well as the wider world of work.
-
- ## 7. Further considerations
- The study has also indicated further areas of development:
- If reflection is to be part of an assessment, then what scheme should be used to mark reflection? Students asked how we were going to mark the work and we replied that it would be based on the SEEC generic credit level descriptors for level 3 HE, which were paraphrased for them.
- If this exercise is to be assessed should we standardise the marker's comments? As the students' are of different standards, it would be difficult to provide standardised comments. We consider that this exercise is still work in progress and, faithful to our ethos of reflective feedback, we are reflecting on the results of this study and value any feedback from the HE community.
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- ## Acknowledgement
- This work is funded through NTFS (National teaching Fellowship Scheme) from HEFCE (Higher Education Funding Council for England) awarded to SG.
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- As noted by Orsmond et al (2005) academic staff not only have to give feedback but must evaluate how effective their feedback has been.
 - Students need to be given more opportunities to be involved in reflective exercises of this nature.

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Effective Verbal Feedback for Project-Based Assessment: A Case Study of the Graphic Design Critique

Mary-Jane Taylor
School of Design and Architecture
University of Canberra, Australia

Coralie McCormack
Centre for the Enhancement of Learning, Teaching and Scholarship
University of Canberra, Australia

This paper reports an action-oriented process in which final year graphic design students, a design lecturer and her colleagues collaborated to develop, trial and revise a checklist for giving constructive verbal feedback, both online and face-to-face, in a project-based assessment context. Authentic assessment, which emphasises the acquisition of relevant professional attitudes and competencies, is needed to prepare graphic design students for the workplace. Project-based assessment, which reflects real-life applications, is an established practice in design schools. The giving and receiving of feedback on projects is a critical learning moment in the assessment context that is immediately transferable to the professional design studio context.

1. Introduction

If assessment is vital to learning, and feedback is critical to learning through assessment, it is imperative that teachers investigate their practice of giving feedback on student assessment products. This imperative is even greater if we accept that assessment is highly contestable and feedback on assessment is an emotionally charged event. How then can individual teachers analyse and improve their feedback on student learning products and incorporate the improvements into their everyday teaching practice? This paper reports an action-orientated process in which final year graphic design students, a design lecturer and her colleagues collaborated to develop, trial and revise, a checklist for giving constructive verbal feedback, both online and face-to-face, in a project-based assessment context.

2. Assessment, learning and feedback in higher education

2.1 Assessment and learning

Assessment shapes learning (Brown, 2001; James et al., 2002; Juwah et al., 2004; Munn, 2003; Ramsden, 1992). Assessment "is a powerful tool in determining the type of learning skills and outcomes that we wish our graduates to achieve" (Johnston, 2003, p.221). Assessment is also highly contestable, messy, uncertain, ambiguous and challenging (Mutch, 2003; Orrell, 2003; Orrell, 2004). "Much of what occurs in grading is driven by tacit values, intuition and uncontested traditions" (Orrell, 2004, p.42). When the learning product is intangible (as with a music performance, a poetry reading), or judgements about learning require the application of aesthetic, style or creative elements (as in design and art products), the contestability of assessment decisions increases. One critical moment for the individual teacher in this messy activity we call assessment is giving feedback on a student's learning product.

2.2 Feedback and learning

Researchers have noted the importance of feedback to learning (Mutch, 2003; Bennett, 1997; Kayrooz, 1995; Ovando, 1994; Taras, 2003; Yorke, 2003). Black and Wiliam's (1998) meta-analysis of assessment feedback "showed that feedback resulted in positive benefits on learning and achievement across all content areas, knowledge and skill types and levels of education" (Juwah et al., 2004, p.4). Researchers have also found that feedback is not always successful in enhancing student learning. Jackson and Prior (2003) suggest one of the reasons for this lack of success is that "feedback is not always delivered in the most timely or innovative way that engages students and adds value in terms of their development" (p.1).

Giving and receiving feedback is not as easy as it appears (Piccinin, 2003; Wajnr, 1993). Mutch (2003) notes that, while business lecturers participating in her research did try to provide helpful feedback to students, when that feedback was analysed clear examples of poor practice were evident. Indeed Brookfield (1990, cited in Bennett, 1997, p.11) describes the task of giving feedback as "one of the most difficult, demanding and complex tasks a teacher has to face". And Yorke (2003) observes "the importance of the student's reception of feedback cannot be overestimated" (p.488).

In higher education contexts principles of effective feedback (Juwah et al., 2004; Piccinin, 2003) and characteristics of constructive delivery (Ovando, 1994; Wajnr, 1993; Brockbank & McGill, 1998; Verderber, 1999) have been suggested. As individual teachers we can 'know' the principles and characteristics of effective feedback. However, putting these into practice, consistently across an individual student's assessment tasks, across students and across subjects in a course, is difficult.

What might appear to be commonsense 'in theory' becomes complicated in practice by the feelings experienced by the giver and the receiver. When teacher feedback is vague, judgemental, ill-timed or person-focused, rather than task-focused, students receiving feedback on an assessment task can be embarrassed. They can feel diminished, discouraged and dejected by the feedback they receive. These feelings can be

accentuated when students perceive the feedback they are receiving is unrelated to their learning needs. For teachers too, giving feedback on student projects can be stressful, emotionally draining and time consuming. Juwah et al., (2004) suggest more recognition be given to the role of feedback on learners' motivational beliefs and self-esteem. It has also been suggested that feedback is under-conceptualised in the theoretical higher education literature making it difficult to implement effective practices (Yorke, 2003; Sadler, 1998) and that feedback to higher education students is an under-researched area (Mutch, 2003). While most universities have policies and procedures in relation to assessment practice they rarely provide the detail necessary to guide an individual teacher's feedback practices.

2.3 Design assessment and feedback

Authentic assessment tasks either, call upon the student's knowledge of the 'real world', or have the student complete assessable tasks which replicate 'real world' activities or processes. "Students respect assessment tasks they believe mirror the skills needed in the workplace" (James et al., 2002, p.10). Authentic assessment, which emphasises the acquisition of attitudes and competencies relevant to the design profession, is needed to prepare design students for their practice in a rapidly evolving workplace.

Project-based assessment, which is meaningful and related to real-life applications, is an established practice in art and design schools. Students receive public feedback from the lecturer on their project in a 'crit' or design critique session. Participation in design 'crits' is "essential to learning how to design" (Shaffer, 1999, cited in Conanan & Pinkard, 2001, p.1).

The skill of giving and receiving of feedback practised in the design 'crit' is immediately transferable to the professional context of the design studio. The client-designer relationship is an emotionally charged context. The ability to give and receive feedback (both positive and negative feedback) in a context where the focus of the feedback - the design - is a public expression of the designer's self which must also fulfil the hopes and desires of others - the client - is an essential attribute of a design professional.

Complicating the feedback interaction between learner and teacher (and designer and client) is the nature of the design being critiqued. Often the work has never been viewed before. It is at a development stage, rather than a finished product. This situation is challenging both for the students and the teacher. The teacher has to give feedback that is encouraging and motivating, that may contain negative elements, often without adequate time for reflection and preparation of a response prior to the feedback interaction. Effective feedback assists design students to form accurate perceptions of their abilities and to establish internal standards against which they can evaluate their own design work.

While most design educators are familiar with the general principles defining effective feedback the application of these principles in particular design learning contexts is not as well articulated. Schon (1983) has written extensively about the interactions of teacher and learner in the design studio. Bennett (1997) reports the process and outcomes of a research project which tackled the problem of giving quality individual feedback to design students working in large studio groups. Cruikshank (1998) describes the implementation and evaluation of the use of video as a method of delivering feedback to art and design students. Conanan and Pinkard (2001) investigated design students perceptions of giving and receiving asynchronous feedback to each other in the online learning context. The context of the graphic design critique has received little research attention.

2.4 Significance of the research

This paper adds to the growing literature on feedback in design education contexts. It suggests strategies for individual teachers to enhance their verbal feedback practice in a way that offers considerable potential for enhancing student learning given that it is widely recognised that assessment drives learning. In focussing on one teacher's experience this paper documents, at a personal level, a process for investigating assessment feedback practice of relevance across a range of teaching contexts (e.g. face-to-face, online). The outcome of this teacher's experience, guidelines and examples of effective verbal feedback practice in a design education context, can be used in both oral and written feedback

situations. Where assessment products have a specific focus on preparing students for a professional workplace (in this paper the graphic design studio), and the lecturer models constructive feedback, students will enter their profession with a better understanding of effective practice (in this context, feedback in client-designer interactions).

University of Canberra. The principal objectives of this final year of study are: preparing students to reach a suitable level to enter the profession; preparing an individual professional portfolio; developing student abilities to work independently; refining students' communication skills; and producing creative and individual project works.

To achieve these objectives students undertake self-selected and self-directed studies while consulting vigorously with their peers, colleagues and staff. As the year progresses, students take increased responsibility for their personal studies through to almost autonomous operation by the end of the year. Throughout the fourth year program, the lecturer facilitates, rather than performs as a didactic teacher. As a 'consultant' and sometimes as a 'client' the teacher acts as a sounding board and gives verbal feedback to the student. Verbal feedback can occur in formal or informal situations, is often impromptu, and it can occur in very public arenas. Feedback may occur informally, one-on-one in the car park, formally in a class of fifty students, or informally in a tutorial of fifteen to twenty students.

Data contributing to the action inquiry into formal oral feedback in the graphic design 'crit' has been gathered over five cycles of reflect-plan-act (Table 1).

Action inquiry cycles 1 and 2 were undertaken during 2003-2004 and have been reported elsewhere (Taylor & McCormack, 2004). A checklist for giving constructive feedback (Table 2) was developed over the first two cycles.

The outcomes of cycle 3 - embedding constructive feedback into face-to-face teaching practice - and cycle 4 - trialing the checklist in an online verbal feedback context - are the focus of the following section. The fifth cycle will commence later this year.

3. Research methodology

3.1 The action inquiry process

The purpose of an action inquiry is to learn about our professional practices with a view to improving them. In an academic context action inquiry is a process which facilitates the teacher as researcher to reflect on their teaching, and through the stages of this reflection, discover ways to improve their teaching and the learning of their students. The process of action inquiry consists of a number of phases: initial reflection, planning, action and further reflection. Investigating an aspect of teaching practice often involves the teacher/researcher in a number of cycles of these phases. At a very practical level the process has been described as:

- Review current practice
- Identify an aspect you want to improve
- Imagine a way forward
- Try it out, and
- Take stock of what happens
- Modify your plan in the light of what happened and continue with the action
- Evaluate and modify again
- And so on until you are satisfied with that aspect of your work

(McNiff & Whitehead, 2002, p.72).

3.2 Action inquiry into the graphic design critique

The action inquiry reported in this paper was undertaken within the context of the fourth and final year of studies in the subjects Graphic Design (GD) 4.1 & 4.2 of the Bachelor of Graphic Design course at the

Cycle	Description
Cycle 1: Reflecting on verbal feedback	
Reflect	Reflection on student feedback on teaching questionnaire responses prompted a reassessment of verbal feedback practice.
Plan	Literature search to identify principles for giving constructive verbal feedback.
Act	Observe experienced colleagues feedback interactions with students.
Cycle 2: Developing a checklist	
Reflect	Reflect on the 'fit' between principles identified in the literature and colleagues' feedback practice. Conduct a personal strengths / weaknesses analysis of lecturer's teaching.
Plan	Synthesis of outcomes of literature search, observation of colleagues and self-analysis into a checklist of key words/phrases characteristic of constructive verbal feedback.
Act	Test the checklist in a design 'crit'. Questionnaire to collect students' perceptions of feedback interaction.
Cycle 3: Practising f2f feedback	
Reflect	Reflect on student feedback & revisit the literature to refine list of key words and phrases into personal checklist for giving verbal feedback.
Plan	Use the checklist to guide feedback interactions when the subject GD 4.1 & 4.2 offered in 2005.
Act	Following submission and marking of projects two classes of students given individual feedback in class time. A questionnaire was administered to gather students' perceptions of the feedback.
Cycle 4: Trialing online recorded feedback	
Reflect	Reflect on analysis of students' feedback, look for new insights, evaluate limitations and refine checklist.
Plan	Trial the refined checklist in an online verbal feedback context.
Act	Following the classtime feedback given in cycle 3 lecturer recorded personalised feedback for each student which was then delivered to each student online. Questionnaire to gain students' perceptions of online feedback. Analyse students' perceptions of online and f2f feedback.
Cycle 5: Investigating the online feedback context in more detail	
Reflect	Reflect on 'fit' between checklist (theory) and practice (online, f2f).
Plan	Transcript of online verbal feedback will be analysed by lecturer and a peer using the checklist for giving constructive feedback. The reception, as well as the giving of feedback, will be investigated.

Table 1. Cycles in the action inquiry process

<p><i>Feedback is given with respect</i></p> <p><i>Feedback is neutral, not labelled</i></p> <p><i>Feedback is descriptive, not evaluative</i></p> <p><i>Feedback is specific</i></p> <p><i>Feedback is prioritised</i></p> <p><i>Feedback should focus on the positive</i></p> <p><i>Feedback is focused on what is actionable</i></p> <p><i>Feedback is an interaction</i></p>
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The overall aim for cycles 3 and 4 was to improve the practice of giving feedback. In particular, the academic sought to:

- Trial a structured process for giving verbal feedback using the checklist developed in cycles 1 and 2. Read it regularly. Read it just before class. Keep a copy at hand to glance at during class. Reflect on the outcomes immediately after class.
- Practise the process of delivery based on the checklist to a point where it becomes subliminal, automatic.
- Concentrate on praise, a possible stumbling point for me.
- Try online verbal feedback. Investigate the advantages and disadvantages of online verbal feedback. And ask students for their perceptions of the delivery of this feedback.

Students' feedback on the lecturer's attempts to achieve these aims will be analysed in the next section.

4. Outcomes of the action inquiry

4.1 Analysis of students' perceptions of feedback

In the two verbal feedback contexts, face-to-face feedback (class 1 N=31, class 2 N=34), and the online pre-recorded verbal feedback context where students were able to listen to the feedback at their convenience (class N=20), all or a majority of students, felt the feedback helped them learn (Table 3). In the case of the online feedback 70% of students listened to the feedback more than once.

<i>Did the feedback help you learn?</i>	Yes (%)	No (%)
<i>F2f class 1</i>	100	0
<i>F2f class 2</i>	80	20
<i>Online feedback</i>	100	0

Table 3. Students' perceptions of learning through feedback

In each face-to-face context most students agreed the feedback had been given in accordance with each checklist item (Table 4). In fact, for only one item in each of the face-to-face feedback contexts, did a student feel the feedback was unsatisfactory (item 6 in class 1 and item 5 in class 2). In face-to-face class 1 the majority of students agreed the feedback was either satisfactory or excellent for each checklist item. In face-to-face class 2 it was noticeable that a smaller proportion of students agreed feedback had been specific (item 4), prioritised (item 5) and focused on the positive (item 6). A high proportion of students responded with the neutral option for each of these items.

The second face-to-face class contained a small number of very vocal and self-confident students. These were distinction students who were very good but not brilliant. Such students are often dissatisfied and cannot understand why they do not get High Distinctions. Usually their work lacks the extra spark and leap of intuition and creativity, but is immaculately presented and very sound in approach. This class was also composed of students whose work was at the other end of the spectrum (mediocre or inadequate). You can only find so many good things to say about these projects. I did work on my feedback beforehand with other staff. That is, I asked their opinion of the work and how to move it forward because I anticipated a specific need in this group for the feedback to be focused on the positive.

In the online context, as in both face-to-face contexts, the majority of students agreed the feedback was given as described by each of the checklist items (Table 4). Only one student felt item 3 was unsatisfactory and one student felt item 4 was unsatisfactory. For most items only a few students ticked the neutral response on the five point scale. Interestingly, two of the three feedback items in face-to-face class 2 for which an increased proportion of students gave a neutral response (items 4 & 5), were also assigned a neutral value by some online students.

Checklist item and feedback context	Number and % Agreement (codes 4 + 5 on five point scale where 1=unsatisfactory and 5=excellent)
1. Feedback was given with respect	
F2f class 1	31 (100)
F2f class 2	27 (79)
Online feedback	19 (95)
2. Feedback neutral, not labelled	
F2f class 1	29 (94)
F2f class 2	25 (75)
Online feedback	20 (100)
3. Feedback was descriptive, not evaluative	
F2f class 1	30 (97)
F2f class 2	29 (85)
Online feedback	16 (80)
4. Feedback was specific	
F2f class 1	27 (87)
F2f class 2	26 (77)
Online feedback	15 (75)
5. Feedback was prioritised	
F2f class 1	29 (94)
F2f class 2	21 (61)
Online feedback	15 (75)
6. Feedback was focused on the positive	
F2f class 1	28 (90)
F2f class 2	21 (62)
Online feedback	19 (90)
7. Feedback focused on what is actionable	
F2f class 1	29 (94)
F2f class 2	30 (88)
Online feedback	20 (100)
8. The Feedback was an interaction	
F2f class 1	28 (90)
F2f class 2	28 (84)
Online feedback	Not applicable

Table 4. Students' percent agreement by checklist item

4.2 Learning from students' perceptions of feedback

This section reports the authors' reflections on the action inquiry to date, in particular, the new insights gained and concerns raised, both of which suggest directions for a future plan-act-reflect cycle (cycle 5).

The outcomes to date of this individual teacher's action inquiry support the suggestion by Piccinin (2003) that "it can be helpful to have a well developed and well practiced strategy" for giving feedback. Using plan-act-reflect cycles to structure an individual's inquiry into feedback practice focuses attention on each of the three phases (Piccinin, 2003) in giving feedback: the preparation phase (plan), the delivery phase (act), and the follow-up phase (reflect). Often the preparatory and follow-up phases can be neglected if the inquiry is not structured and on-going. That is, the focus is on doing (giving feedback) and the content of the feedback, rather than on the process (plan-act-reflect). Training in the process of giving and receiving feedback could enhance the effectiveness of verbal assessment feedback.

Contextualising the 'Checklist for Giving Constructive Verbal Feedback' (Table 2) within a particular teaching discipline (in this case graphic design) increased the potential for successful interactions (see (Taylor & McCormack, 2004) for examples of contextualised feedback statements). In contextualising feedback it is important to remember that one's value system (in this case design values) are communicated in the process of giving feedback.

Feedback takes practise and constant vigilance to be constructive. Just when you think you have 'got it right' (class 1) you can be surprised by students' reception of your feedback (class 2). Constructive negative feedback can be received by students as evaluative, rather than constructive, no matter how much preparation is involved on the part of the giver. The giver of feedback needs to be alert to the possibility of a mismatch between a student's expectation of their grade and the teacher's assigned grade. In this situation particular attention is needed in relation to being specific (item 4), prioritising feedback (item 5) and focusing on the positive (item 6). The task of delivering constructive feedback is a complex balancing act.

... there is a central paradox - that feedback is both important and difficult ... It seems to me that what we supervisors need is a corpus of strategic skills that will allow us to address ... goals of supervision while also meeting affective and relational goals ... feedback is a professional speech event involving multiple goals, the satisfactory resolution of which requires considerable expertise.

(Wajnr, 1993, pp.74-75)

When feedback is pre-recorded and delivered online for receipt by students in a place, and at a time of their choosing, there are both advantages and disadvantages when this mode of delivery is compared to face-to-face delivery. Advantages for the giver of feedback include:

- More time for thoughtful construction of the feedback messages.
- Feedback can be constructed in a personally comfortable environment, at a time convenient for the giver.
- Where there are multiple markers staff can listen to each others' feedback. This can increase the consistency of marking and feedback across classes within a student cohort. Increased consistency in feedback and marking could reduce student uncertainty.
- A 'database' of examples of feedback for different project grades can be built up over time. New tutors can benchmark their grading by listening to the feedback while viewing the student project (these are normally submitted online). Students too can benefit from viewing examples of a range of projects and increase their understanding of 'good' design elements.

Advantages for the receiver include:

- Students can listen to the feedback more than once.
- Listening can occur at a time, and in a location, of the student's choosing.
- The potential exists for students to reflect on the progress of their own work over time. A student can return to recorded feedback at a later date and reflect on its applicability to a current piece of work. By listening to others' feedback students can reflect on their own work in relation to the work of other

students. During class time students often concentrate when receiving their feedback but miss learning opportunities available through listening to the feedback of other students. Such reflective opportunities can assist students to form more accurate perceptions of their abilities and to establish internal standards against which they can evaluate their own design work.

However, in an online verbal feedback context where the feedback is pre-recorded rather than live, and the giver of the feedback cannot see the receiver responding to the feedback, the giver cannot adjust the feedback in response to the receiver's reactions. This mode of delivery seems to require the giver to have a wider design critique vocabulary and a higher level of competency and confidence to use it constructively. Also, the expectation that the online medium for receipt of feedback is available to all students, and is equally reliable for all receivers, may not always be fulfilled.

In summary, quality feedback is concerned with the process, not the end product. So long as the mode of delivery is appropriate, it is not the mode that counts. The process of getting to the final feedback, how you get to the key messages, is what matters.

4.3 Future research directions

Two directions for future work are anticipated (cycle 5). Firstly, the online feedback transcripts will be analysed by the lecturer and a colleague to assess the extent to which the feedback followed each of the items in the checklist. Exemplars of 'good' feedback practice will be linked to particular aspects of student work and a database for use by students and staff constructed.

Feedback is a two-way process. Attention to date has focused on the giver of the feedback. Future work will include a focus on the receiver. How comfortable do students feel in the role of 'receiver'? What factors influence students' potential to learn from feedback? How do students interpret feedback? Do students need training in how to receive and interpret feedback? How can feedback balance the needs of both giver and receiver?

5. Conclusions

This paper has reported an action-orientated process in which students, a design lecturer and her colleagues collaborated to develop guidelines, and examples of effective verbal feedback practice, in a design critique context, in a final year graphic design subject. Outcomes of this process for the students and the teacher included shared understandings about effective feedback in the designer-client context. As graduates these students will enter their profession with a better understanding of the practice of effective feedback.

The process of learning through project-based assessment may be compared to a road journey. Assessment tasks guide the student along the road towards the desired learning outcomes at the journey's end. Constructive verbal feedback might be considered a foundation to the learning road for graphic design travellers. The elements of the 'Checklist for Giving Constructive Verbal Feedback' reported in this paper are analogous to the signposts that the teacher, as traveller along this road with their students, encounters during the learning journey. These signposts can assist and inform the travellers. However, signposts can provide information only. Their messages need to be put into practice for the traveller to successfully reach the destination. Like signposts, principles to guide the giving and receiving of constructive verbal feedback must become part of the everyday practice of design educators if students are to gain the best outcomes from authentic assessment activities.

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Aligning Assessment with Learning and Teaching

Perspectives of Teachers and Students towards Assessment

Steve Frankland

Department of Industrial and Systems Engineering

The Hong Kong Polytechnic University, Hong Kong SAR, China

This paper presents some questionnaire and interview findings of a teaching learning development project titled "Enhancing Teaching and Learning through Assessment". The results revealed teachers' and students' different perceptions towards assessment, and the forces that dictate existing practices in the University. It is found that student learning is largely driven by the way they perceive they will be assessed, this dictates what and how they learn. Instead of learning (the main reason for their studying), they focus on how they will be assessed and how to acquire the highest possible grades. Unless assessment is constructively aligned with subject objectives and with teaching and learning methods, and requires understanding, it is found that surface, rather than deep learning occurs. The results also identify a conflict between formative and summative assessment. While grades on their own are not believed to be a good feedback mechanism, for various reasons, they are commonly used for assessment. The paper also highlights the important issue of criteria- and norm-referenced assessment. When assessing students, teachers are likely to be constrained by university policy that has always emphasised a normal grade distribution and grading criteria that does not always match the subjects taught resulting in likely unfairness of grading.

1. Introduction

'Learning as construction of meaning by individuals' - this paradigm of learning dominates the literature as the steering force that guides assessment practices and philosophy. This paradigmatic shift of learning conception is in alignment with changing assessment from being simply testing, to being a culture that enhances learning.

Within this culture, the major thrust has the following elements: the development of an outcome-based curriculum, where assessment addresses the following objectives the provision of formative feedback that will guide learning, and the development and implementation of Criterion-Referencing Assessment (CRA), with performance descriptors that accurately assess student learning. This paper explores the Hong Kong Polytechnic University's move towards this assessment culture. It also identifies inadequacies that can act as constraints to the successful implementation of the above issues.

2. Method

One of the essential objectives of the project is to examine assessment practices across the Hong Kong Polytechnic University with a view to making them more effective. In order to do this, a questionnaire survey was conducted of all full time teaching staff (around 1,000) to obtain an overview across the whole university. The questionnaire survey was then followed up by in-depth analysis through focus group interviews with heads of departments, teachers, and students that examined a representative cross section of the University. The questionnaire survey was completed in March 2003, and the focus group interviews were completed in June 2003.

2.1 Questionnaire survey

The questionnaire survey itself explored eleven issues, in four parts, (i) background information, (ii) current

assessment practices, (iii) views of teaching staff on current assessment practices, and (iv) other comments. The information obtained has provided quantitative information pertaining to current assessment practices in the University. The questionnaire was sent to all full-time teaching staff, i.e. 1,005 teachers of various grades. The response rate was 238, or about 24%.

2.2 Focus group interviews

A comprehensive list of questions (about 28) was prepared for use during these interviews with the heads of departments, teachers (collectively called teaching staff in this paper), and students. For the survey conducted on teachers, four topics were addressed: (i) policy guidelines and effects of external bodies; (ii) models and methods of assessment; (iii) indicators measuring students' work; and (iv) feedback mechanisms, workload and difficulties concerning assessment and its practices.

For the survey conducted on students, the questions addressed six topics; (i) general comments on assessment; (ii) methods of assessment; (iii) impact of assessment on learning; (iv) workload and difficulties concerning assessment; (v) feedback mechanisms; and (vi) identification of good practices.

The University currently has 26 departments overseen by six faculties, 15 of these were selected (representing the six faculties), as the target areas for the focus group interviews. As mentioned previously, the interviewees in each department were department heads, teaching staff, and students. Individual interviews were conducted with the heads of the 15 departments, whereas, for teaching staff, and students, interviews were conducted in groups of about five per group. It was not possible to interview staff and students from all 26 departments, so the selected departments represented a reasonable cross-section across the University. Altogether 40 interviews were conducted with 15 department heads, 13 teaching staff groups, and 12 student groups between April and June 2003.

3. Discussion

3.1 Outcome-based assessment

Biggs (2003) states that students will learn what they believe they will be examined on; and the assessment determines what and how students learn more than the curriculum itself. This is called the "backwash effect". If a system is poorly aligned, and the grading criteria is not aligned to the subject objectives; or if the criteria are not given to students, they will not be clear about what they are required to learn, what criteria their performance will be measured against, and what is meant by good work. As a result, students will engage themselves in surface learning, and cause a "negative" backwash.

In other words, the assessment criteria must be aligned to subject objectives, and this needs to be communicated to students at the beginning of the learning process. Teaching staff are then able to evaluate the extent to which students' performance matches or does not match the criteria (which is aligned with the subject's objectives), and inform them accordingly. Moreover, teachers can suggest ways in which students can improve, and give them the opportunity to do so.

The alignment between subject objectives, teaching and learning activities, and assessment criteria should actually commence at the curriculum level and should be embedded in each subject taught. One of the Hong Kong Polytechnic University's strategic objectives is to produce preferred graduates, and it has recently carried out a curriculum revision of all its academic programmes, particularly full-time programmes, for the 2005 to 2008 triennium. This revision has examined the subjects of academic programmes so that their objectives, teaching and learning activities, and assessment are constructively aligned with an outcome-based orientation. This refreshing move towards outcome-based education in academic programmes is a current international trend in higher education and is in fact now required by some professional bodies for accreditation.

3.1.1 Actual assessment practices

However, along with the curriculum revision of the University, current assessment practices of some departments may not match with this revision and need

to be aligned. They specify that the examination and continuous assessment¹ components of all the subjects should have a standard percentage of the final grade in all subjects they teach. For example; 50% examination and 50% continuous assessment, and 70% examination and 30% continuous assessment. This can be a constraint on the way in which a subject is taught and assessed. One teacher commented:

"If the lecturer has a different group of students or he thinks of a different assessment method, it's difficult for him to change. In some ways this policy may be seen to be good as its standardised but it's too specific and may hinder the flexibility when tailoring to the different needs of subjects and trying to assess students better...Many assessments are by written examinations, this guarantees individual effort but it may not really reflect the real capability of students."

(Teacher, Department A)

In some of the departments interviewed, assessment methods such as closed book examinations, tend to encourage rote learning. As a result, they are not likely to truly reflect students' ability of that particular subject and its expected learning outcomes. An interesting comment from a student who had clearly learnt how to "work the system" was:

"Examinations cannot reflect much of what you have learned and understood in a subject. It is very short term. ... Because examinations normally focus on several hot questions, and the questions are roughly of the same type every year but only with different figures, I have enough time to practice them well even if I start revising three days before the examination. ...we do most of our studies just before the examinations and shortly after it is all over, I have almost forget everything I learnt ... I think it's OK for me and I heard from other classmates that they got a A+ just by using such a studying strategy."

(Student, Department B)

¹ Continuous assessment in the Hong Kong Polytechnic University refers to all assessment components apart from a final examination. These assessments occur during the semester when a subject is taught (e.g. individual and group assignments, case studies, tests, quizzes, etc.)

It seems clear from this statement, that the type of assessment was a traditional closed book examination, probably with standard type questions that come up every year with some minor modifications. This type of approach only tends to encourage surface learning by students and to cause the negative backwash effect, i.e. just to rote learn how to answer standard questions, and then after the examination is finished, and they have obtained their grade, they forget most of what they learnt (if anything) and move on to the next subject. The teacher plays a key role in this process, and if there is an emphasis on this type of assessment, it only leads students to focus on how to get the highest grade with the minimum effort - the so-called MaxMin principle. But if the subject is planned to engage students in deep learning and to examine students' understanding, then this type of assessment will be inappropriate. Furthermore, the predominance of summative assessment (marking or grading) in the University tends to further reinforce such a backwash effect caused by inappropriate assessment.

From the above discussion, it seems that there is often an over-emphasis on the weighting of assessment components and on following the traditional assessment method rather than focusing on assessment of students' expected learning outcomes that have been correctly aligned with subject objectives, and teaching and learning activities.

3.2 Formative and summative assessment

The views of teaching staff on formative assessment and methods of providing it.

In examining current assessment practices in the University, staff perception as to why they assess students was explored and this section focuses on their responses from both the questionnaire survey and the focus group interviews.

From the questionnaire findings (Figure 1), 73% of teaching staff responded that providing feedback to students is the main reason they conduct assessment. The results of the focus group interviews were strongly correlated with this, i.e. providing feedback to students to facilitate their learning, was the major purpose of assessment. A typical comment is given below:

"I'd look at their progress and when I assess students, I like to keep it formative, an ongoing progress. Through this mechanism I try to identify both weak and strong students such that we can modify our teaching and learning methodology, helping out the weak students."

(Teacher, Department C)

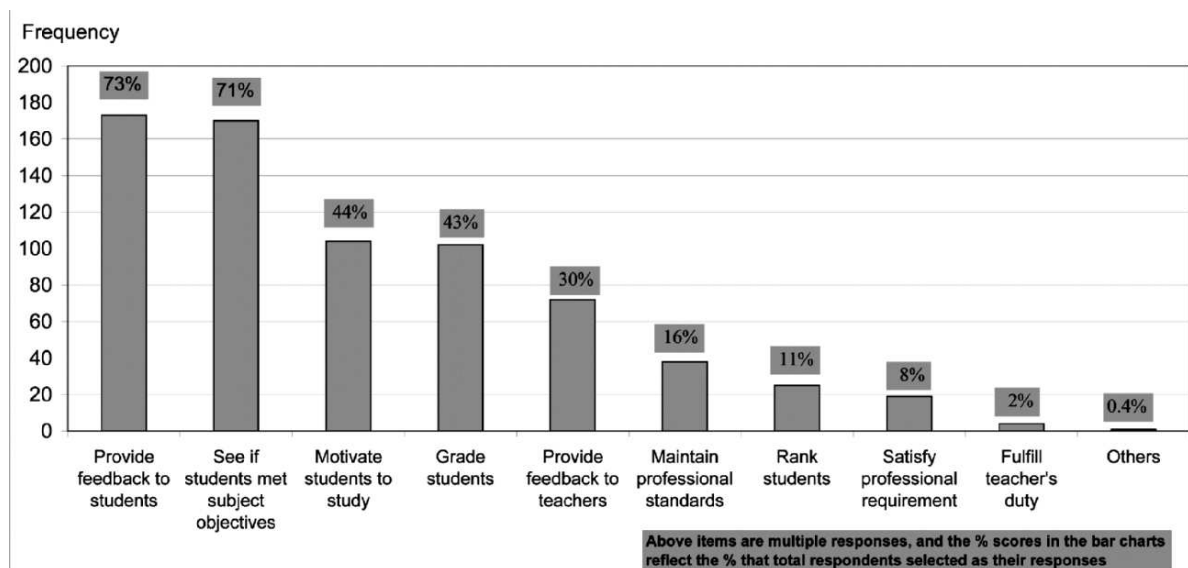


Figure 1. Reasons for Assessing Students

3.2.1 Actual assessment practices

Although the reasons that teaching staff to conduct assessment as shown from the questionnaire and focus interview findings tend to focus heavily on providing formative feedback to facilitate students' learning, the feedback that teaching staff usually give to students is at the end of an assessment task when the grade is given. Consequently, students do not have the chance to improve their performance after studying the feedback they received since the assessment is already complete and the grade for that particular task has been given. However, they can often use the formative feedback given to improve themselves for the next task. A typical comment was:

"When we grade, we write down feedback on the paper. If there are problems with certain questions, we can include them. ... This is the main mode of feedback for written assignments but if we get to see them we can give them overall feedback, not necessarily focusing on any individuals. The most direct mean of feedback would be the feedback we write on students' paper."

(Teacher, Department C)

This correlates with the results from the questionnaire survey where 80% of respondents said that they gave feedback together with grades at the end of the assessment task (Figure 2). It seems that there is little formative assessment given during the actual learning process when teaching staff are in contact with students, such as during lectures when class exercises are given, in tutorials, laboratory classes, through e-mail, or during consultation times for project work, etc. This is unfortunate since this type of feedback has the greatest effect on learning because of the interaction between staff and students, i.e. students can ask questions if they do not understand the feedback given to them. The reasons for this could be due to large class sizes that make such feedback difficult to give. Moreover, students in Hong Kong tend to be very passive and are not willing to engage in discussion with teachers. Many students in fact, expect a grade to be given, and if it is not, they wonder if the teacher has forgotten to record it!

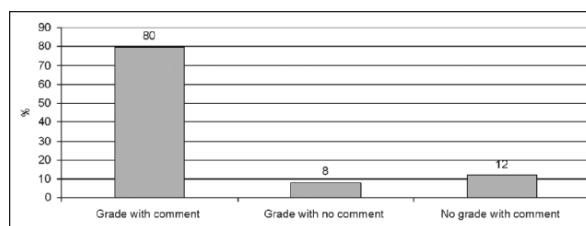


Figure 2. Content of Feedback

Prof. Biggs, who is the External Assessor of the project, has the view that "feedback" which is given after the assessment task can only be called "comments" since the assessment task has already been completed and students do not have chance to improve their learning and grade. In other words, in a grade-oriented culture, comment has a relatively lower effect on stimulating students to learn since their grades are already determined and they can do nothing to change it anyway. Whereas feedback, which is given during the learning process, before the final grade is given, fulfills its most important function of facilitating and enhancing students' learning. In addition, students are also encouraged to improve their grades by studying the feedback and learning the content of the subject better.

However, the interview findings indicate that most of the feedback is given at the end of an assessment task where grades are given. Consequently, students do not have the chance to improve their learning from the time they receive the feedback to the time their work is graded. A comment from another student was:

"To be candid, it's just lying to say "the motivation to work hard on a subject is because I have interest in it" ... I always aim at getting the highest grade as this will be reflected in the final classification of my award."

(Student, Department E)

In other words, as Prof. Biggs has suggested, the assessment determines what and how students learn. The current assessment philosophy seems to focus much more heavily on summative assessment (grading) than on formative assessment (learning). This serves to reinforce the deep-rooted grade-orientated mentality found in many students:

"For practical tests, afterwards, I gather the entire

group of students to go over the questions, showing them how to score high and what to avoid and all that ... I'd meet every student with failing grades in person, trying to understand their problems, the factors affecting their learning and so forth. Usually I'd choose the ones who received really bad scores, depending upon the class size of course but in any case they are always welcome to come check their grades and discuss whenever they need to."

(Teacher, Department E)

From this comment, the teacher seems to be totally emphasising teaching students how to score high grades instead of better facilitating the students' learning. Whether he is doing this because he believes this is what he should be doing, or whether he recognises that this is what students are really interested in, is open to conjecture. However, the end result is that both teacher and students are focusing on the wrong issue. Summative assessment should be only a by-product of the learning process, not an end in itself. However, it is not all bad news, the teaching staff is clearly willing to discuss with the students what they have done wrong and how to rectify it, hoping that they will not make the same mistakes again. Also, it is refreshing to see that he is focusing on the weak students and tries to help them improve, rather than discarding them and only focusing on the strong ones. Finally, the emphasis on teaching students how to score high grades can, in fact, have a positive connotation by clearly identifying what students need to learn to achieve higher grades and to align these to learning outcomes. In this circumstance, helping students obtain higher grades is in fact providing them with advice on how to learn better so as to achieve a higher level of expected learning outcomes.

Another example of the predominance of summative assessment is illustrated by the following comment from a student:

"But instead of returning our exam paper, giving us the model answer is more important. Just as we were always concerned about the model answer of past papers of A-level examinations², we are also concerned about it here at University. If we cannot see such answers, we may keep using the wrong concept and repeat the mistakes over

and over again the following year. ... Especially if these concepts are necessary in our future jobs, which may result in serious mistakes being made, like the collapse of the whole building because of a design fault. This is unaffordable in our profession."

(Student, Department F)

This comment is very understandable from the students' perspective, but the problem is the absence of feedback along the process. It misses the opportunity of enhancing and facilitating students' learning during the process, which both teaching staff in the interviews, supported by educationalists treasure very much. It also reveals that students, even in university, often believe that there are "model" answers. In reality, these do not exist.

3.2.2 Teaching staff's emphasis on summative assessment

There seems to be a gap between teaching staff's perception of assessment and actual practice. The focus group interviews identified a number of issues that cause a conflict by which staff do not practice assessment in the way that they would like to. These issues were their overall workload, the various policies laid down by the University together with some particular departmental policies, and the conception of what constitutes formative and summative assessment. These issues seem to have a significant influence, and can be used to explain the conflict. They do not affect summative assessment but dictate the extent to which formative assessment is given. These issues are discussed below.

Some teaching staff seem to be confused by the different roles of formative assessment and summative assessment. This reduces the effect of formative feedback in enhancing students' learning during the learning process, and reinforces the deep-rooted grade-orientated mentality found in many students. Another comment was:

² Advanced-level Examination is a public examination in Hong Kong. The student's results will be used to in the university selection process.

*"When the students get a grade, it's a feedback."
(Teacher, Department G)*

This finding matches one of the outstanding features as reviewed by Black and William (1998) in their literature on teaching staff's assessment practices: "That formative assessment is not well understood by teachers and is weak in practice".

In fact, there is a tension that exists between these formative and summative assessment roles (Biggs, 2003; Gipps, 1994; Black & William, 1998). Formative and summative assessment requires teaching staff to play a conflicting role as both a judge and facilitator at the same time. Students tend to focus on the summative grades and marks, which must be provided by teaching staff, and ignore the learning process facilitated by teaching staff's formative feedback.

In addition to the confusion regarding formative and summative assessment, the heavy workload of teaching staff also has an impact on the amount of formative feedback given during an assessment task. This is not uncommon in a university today. In addition to teaching (which includes assessment), teaching staff are required to engage themselves in research work, administrative duties, committee work, consultancy, and the like. This obviously affects the extent to which detailed feedback can be given. Providing detailed and timely feedback is always beneficial for students' learning, but it requires time and effort. A typical comment from a staff member, which conveyed the general feeling was:

"We have so much to do, other than teaching we are required to do research and publish papers, especially if you teach MSc subjects, some academic staff are programme leaders and serve on committees. Then we are encouraged to do consultancy work so as to maintain contact with industry and make use of the work that we do in our teaching. There is simply no time to give the formative feedback in a way that you would like to."

(Teacher, Department B)

The situation is exacerbated when a member of the teaching staff has large classes of students, where the time and effort for giving feedback and grading will be

increased. Another comment was:

"Some of us have large classes: last semester my class had over 240 students, then I was responsible for industrial placements and this consumed a lot of my time. Giving anything other than a grade for such a large class is very time consuming, even though I would like to do it."

(Teacher, Department C)

Provision of formative feedback is a very important part in the assessment in the mind of teaching staff. However, at the same time, some teaching staff expressed the view that giving students grades and marks for accountability purposes is also an important part of assessment. Another typical comment was:

"Also, we need to identify who are better and who are not as good. This is a social responsibility. When a student graduates, the University issues a transcript, and the ones with good records would find it easier to find jobs. For employers who have higher requirements, the results reflect a student's ability. This is our social responsibility."

(Teacher, Department B)

This matches with the two main purposes of assessment - formative and summative assessment as described by many educators such as Prof. Biggs. Formative assessment refers to feedback provided during learning so that students and teaching staff know how teaching and learning is proceeding and how it can be improved. Whereas summative assessment grades or marks students at the end of a subject and is later used for the award level and classification of the qualification (Biggs, 2003). The above comment also has an interesting connotation. It presumes that students must vary, i.e. there must be good ones, and ones that are not so good. This presumes that they follow a normal distribution curve. The purpose of education, certainly in the Hong Kong Polytechnic University is to produce students that are not normally distributed, but are preferred, and able to excel in their future careers, statistically speaking, there should be a positive skew to the distribution.

3.3 Criterion-referencing assessment (CRA) and norm-referencing (NRA) assessment

Apart from the confusion between formative and summative assessment in the minds of some teaching staff, there is another issue concerning the type of assessment system used at the University. The University used Norm-Referencing Assessment (NRA). Each subject was graded according to an eight grade scale divided into five bands. Teaching staff are given indicators of the percentage of students that would normally fall into each band. These indicators correspond to a normal distribution curve. In addition, there is a similar set of indicators in terms of GPA (Grade Point Average) used for giving final award classifications. This is what is commonly known as NRA. There is some pressure on teaching staff to adhere to these indicators since if the results fall outside, they may be asked to explain the reasons for so doing. Understandably, there has been a tendency to ensure that subject results particularly, fall within these norms even if it means artificially adjusting, either upwards, or downwards, the grades of some students. In other words, students' grades tended to be determined by comparison between each other, and not against predefined criteria. Figures 5 to 7 show grade descriptors, the grading system, and indicators respectively. Most educationists tend to advocate Criterion-Referencing Assessment (CRA) which better reflects students' performance since it relies on a predefined set of criteria that match expected learning outcomes and subject objectives (Biggs, 2003). Happily, all this has now changed. From 2005-2006 academic year, CRA is being adopted by the University.

3.3.1 Normal distribution grading policy

This part of the paper will first record the perspectives of teaching staff and students towards the University's NRA system, followed by the teaching staff's actual practice when grading. From the questionnaire survey, it was found that over 40% of the respondents were satisfied with the University's NRA system (Figure 3).

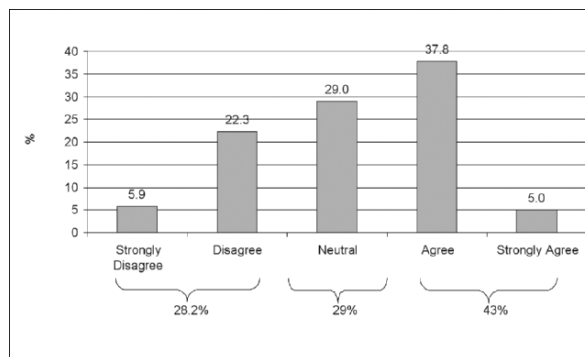


Figure 3. You are Satisfied with the University's Current Grading System

However, from the focus group interviews, they indicated that this system was constraining their grading. Comment from a teacher:

"We can say that the guidelines are a constraint to us. Even though we see that the qualities of students vary, but yet we have to take into consideration the distribution, it will turn out that grade distributions from year to year are very similar. That way, the grades may not be able to reflect the qualities of the students from year to year and students from programme to programme."

(Teacher, Department C)

The above comment indicates that teaching staff gave different views on the University's grading system during the focus group interviews as compared to that in the questionnaire survey.

Moreover, findings from the focus group interviews of students shared similar feelings to those of teaching staff with regards to the University's NRA system, i.e. they felt that it could be quite unfair and may not reflect their performance and ability:

"I also heard about the norm-referenced assessment. So even if I have done a great job which should be given Grade A but when compared to others, I got a B in return...it's frustrating. ... I think norm-referenced assessment is not fair in assessing artwork. ... I think in design, you can't say only 20% of students will get Grade A, and so on so, and so forth...Why students are

forced to the Grade C category even though they have done a great job...I see no point!"

(Student, Department F)

3.3.2 Actual grading practice

The fact that there was a difference between the University's NRA and what teaching staff believe to be a fair and reflective grading system, leads to an interesting question. How did teaching staff actually do their grading in the way they believed to be fair and equitable, but at the same time adhere to the University's NRA? In the following section, the approach that teaching staff used to tackle this situation is discussed.

From the questionnaire survey, around 50% of respondents indicated that they used the University's grading system (A+, A, ...D+, D and F), 32% said that they used a combination of their own grading method (often a numerical scale in percentages) and the University's grading system (Figure 4).

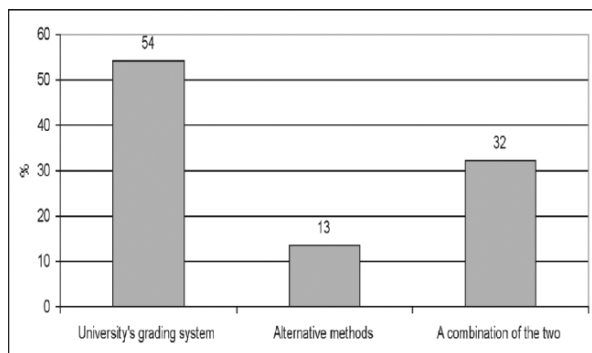


Figure 4. Grading System used for Assessment

This means that they used another system (such as percentages) which they then converted to the University's system in order to input grades into the central computer system. The remaining 13% responded that they used an alternative method. However, if it was used for summative purposes, it would also have had to be converted to the University's grading system otherwise it could not be inputted into the computer system. The findings of the focus group interviews confirmed a combination of grading methods among teaching staff:

"I will plot a histogram and then try to divide them (students' marks in an assessment task) into a group of five marks each, two marks each, whatever. Then, I will work with the University guideline as well as the departmental guideline."

(Teacher, Department B)

Some departments developed their own grading criteria and associated descriptors in order to better measure and reflect specific knowledge, skills, and understanding of students that are related to the professional expertise expected of them when they graduate. A comment from a Head of Department:

"Yes, the Programme Committee is responsible for running the programme and deciding the criteria, on the basis of the competences that we expect from our students."

(Head of Department, Department H)

3.3.3 Grading descriptors

In addition to the University's NRA, teaching staff also had concerns about the grade descriptors provided in the guidelines (Figure 5). Only a very small proportion of staff comment positively on these, whilst others have opted to either ignore them or to develop sets of their own that are specific to their subject criteria. This highlights the inadequacy and unsuitability of the descriptors as being too generic and not suitable for the wide range of different subjects taught at the University. It is rather like making a suit that fits everybody. In fact, it does not fit anybody very well, as we are all different shapes and sizes. The following comment confirms this view:

"I think it's the description for some of the grades that is problematic. For example, Grade C corresponds to Satisfactory. To me it is contradictory. In the eyes of the students, they think Grade C is already a poor grade and we have to try and explain this to them. Because I gave you a Grade C does not mean that you are lousy, your performance was still satisfactory. Maybe we need to rethink the descriptions for all the grades. It seems misleading at the moment."

(Teacher, Department G)

Grade	Elaboration on subject grading Description
A+	The student's work is of a standard rarely seen. It covers the necessary material and goes beyond it; it is accurate and entirely clear.
A	The student's work is of a very high standard. All the necessary material is thoroughly covered; it is accurate and clear.
B+	The student's work is above the average level for this subject. It is quite comprehensive, accurate and clear.
B	The student's work is mainly at the average level for this subject and in some aspects goes beyond the average.
C+	The student's work is mainly at the average level for this subject although in some aspects it falls below the average.
C	The student's work is below the average level for this subject. It is not comprehensive, and only partly accurate or clear.
D+	The student's work is well below the average for this subject and only just above the minimum acceptable level for the subject.
D	The student's work is at the lowest possible level that could receive a passing grade for the subject.
F	The student's work in the subject is unacceptable.

Figure 5. General Assessment Regulation (GAR) - Grade Descriptor

Note: As from the 2005-2006 academic year, these grade descriptors have been changed

Grade	Short Description	Indicative range of normal distribution of grades
A+	Excellent	10-20%
A		
B+	Good	25-40%
B		
C+	Satisfactory	25-40%
C		
D+	Marginal	10-20%
D		
F	Failure	0-10%

Figure 6. General Assessment Regulation (GAR) - Distribution

Note: As from the 2005-2006 academic year the percentages have been removed

Master (Indicative Range)	Bachelor (Indicative Range)	GPA or Weighted GPA	Guidelines for the awards
Distinction (0 to 10%)	1st Class Honours (0 to 10%)	3.7+ to 4.0	The student's standard of performance/attainment is outstanding , and identifies him/her as exceptionally able in the field covered by the programme.
Credit (25 to 45%)	2nd Class Honours (Division 1) (25 to 45%)	3.2+ to 3.7	The student has reached a standard of performance/attainment which is more than satisfactory but less than outstanding .
Pass (40 to 60%)	2nd Class Honours (Division 2) (40 to 60%)	2.3+ to 3.2	The student has reached a standard of performance judged to be satisfactory , and clearly higher than the 'essential minimum' required for graduation .
Pass (45 to 75%)	Third Class Honours (5 to 15%)	2.0+ to 2.3	The student has attained the 'essential minimum' required for graduation at a standard ranging from just adequate to just satisfactory .

Figure 7. General Assessment Regulation (GAR) - Grade Point Average

Note: As from the 2005-2006 academic year the percentages have been removed

3.3.4 Norm-referenced assessment (NRA) in teaching staff's grading

Although many teaching staff and students seemed to dislike the University's NRA, they still adhered to it. The reason behind this was mainly because of the following administrative protocol and legacy.

From the focus group interviews, teaching staff felt that the University's grade distribution (Figure 6) was only a guideline to be used when grading. However, in actual practice, departments take this more seriously. In each department there is a SARP (Subject Assessment Review Panel) and a BoE (Board of Examiners). These exist to formally agree and finalise subject results (the SARP), and to agree, and finalise results for awards (the BoE). The SARP and BoE therefore monitor and ensure grading is fair and equitable, and they also make reference to the indicators (Figure 6 for the SARP and Figure 7 for the BoE). The following comment emphasised the pressure that staff are subjected to if their results do not conform to the indicators:

"Subject grades are dealt with at the departmental level first, the SARP is the departmental body for finalising subject grades, the Chairman may ask us why our grades do not fall within the distribution, why are they not normal, then we

have to justify this."

(Teacher, Department F)

Another reason as to why teaching staff followed the grading distribution guidelines was historical. From the focus group interviews, it seems that most departments have not developed their own criteria and have not considered the fact that they need to do so. In fact, the public examinations which local students need to pass through before they can enter University are using NRA. NRA seems to be the grading culture in the local education system, embedded in the mindset of teaching staff and students alike, which has been transferred to the universities.

4. Conclusions

Along with the shift of the conception of learning as a construction of meaning by individuals, changes in assessment practices need to be involved concerning: (i) the development of an outcome based curriculum, with assessment to address outcome objectives, (ii) the provision of formative feedback to guide learning, and

(iii) the development of Criterion-Referenced Assessment, with performance descriptors to inform students how to achieve the desired goals. However, from the above discussions of the questionnaire findings and from the focus group interview results, it is found that there seem to be inadequacies between current assessment practices in the University and the above three areas under the new assessment culture. Therefore, further improvement is needed to smoothen the road towards the University's curriculum revision exercise mentioned previously.

Concerning the development of an outcome based curriculum, the questionnaire findings and focus group interview results show that the emphasis of some teaching staff tends to be on the weighting of assessment components, and on following traditional assessment practices with the weightings of examinations and continuous assessments in some departments. Whereas assessment of students' expected learning outcomes seems not to be strong.

Since different assessment methods are necessary for assessing the different learning outcomes contained in different subjects, this paper suggests that the subject lecturer is clearly the person who is most familiar with the subject, should be allowed to specify what the most appropriate assessment method should be. In this way, it will be aligned with the subject's learning outcomes. There is a whole range of methods that can be used, such as; examinations, tests, quizzes (closed book, open book, with many variations), assignments, case studies, projects, practicums, presentations, poster sessions, interviewing, reflective journals, etc. The teacher must be allowed to make use of these if he/she deems them to be the most appropriate. Having said this, some professional institutions require formal examinations of subjects in order to meet their academic requirements, so there are sometimes external influences on what teaching staff is required to do when assessing students.

It is considered that under the current shift of learning and curriculum revision, staff development is necessary as well as the introduction of appropriate assessment that can address a subject's outcome objectives.

For an appropriate balance of formative and summative

assessment, there seems to be a conflict between teaching staff's perceived assessment and actual practice. The focus of assessment tends to be on the summative aspect though the questionnaire survey and the focus group interview results show that staff perceive formative feedback as a very important part of assessment. There seems to be confusion between the roles of formative and summative assessment among some teaching staff, and thus reducing the impact of formative feedback on students' learning along with the assessment task. Therefore, development for staff on distinguishing the difference between formative and summative assessment and their effect on students' learning is necessary.

Concerning the development of Criterion-Referencing Assessment (CRA), it is found that the uneasy feelings of teaching staff and students about the University's Norm-Referencing Assessment (NRA) grading policy, and the growing emphasis on reflecting students' learning outcomes by appropriate grading criteria as advocated by educationalists, are very good reasons for introducing Criterion-Referencing Assessment (CRA).

The University has now carried out a revision of the curriculum of all its academic programmes, particularly full-time programmes, for the 2005 to 2008 triennium. This revision has also tackled the issue of ensuring that subject objectives, teaching and learning activities, and assessment are constructively aligned with an outcome-based orientation. This move towards outcome-based education in academic programmes is a current international trend in higher education and is in fact now required by some professional bodies for accreditation.

With regard to the concerns expressed about the use of NRA, the University has decided to remove the percentage guidelines from its General Assessment Regulations (GAR) commencing in the 2005-2006 academic year. NRA will be replaced with CRA so that summative assessment can be more specifically aligned to a subject's objectives and teaching and learning activities. This is a refreshing move, and will have a positive impact on the total process. Moreover, it will be better aligned with the University's Strategic Objective No 1, i.e. to produce "preferred graduates" not normal ones. As previously mentioned, the grade distribution

of such graduates, provided it is justified, should not be normal, but should have a positive skew.

The move from NRA to CRA however, will not be an easy task. The University has been using NRA for many years, and there will need to be a cultural change amongst teaching staff. The University will need to delegate the definition of grading criteria to faculties, individual departments and their teaching staff so that they fit their own requirements. Based on these, individual teaching staff will be able to tailor-make the grading criteria for each subject according to its expected learning outcomes. Ideally, there should also be a move to change the attitude of students so that they recognise that learning is the primary motive for studying at University rather than obtaining the highest grade possible; no easy task in any institution!

In order to bring about this change, the University has carried out the Curriculum Revision Exercise to revise the curricula of its academic programmes for the 2005-2008 Triennium. Academic departments are required to review and revise their programmes accordingly. To support the teachers in the revision exercise, the University has developed various materials. One of these is a Curriculum Revision Resource Book developed by the University's Education Development Centre (EDC) which provides guidelines, ideas and examples to assist programme teams in each department in completing the revised programmes for submitting to the University for endorsement. It contains chapters regarding programme revision, including "Aligning Assessment with Intended Learning Outcomes" which guides teaching staff in developing the criteria that align with intended learning outcomes.

In addition, the EDC has organised workshops, seminars and other activities to support teaching staff in the curriculum revision exercise. One of the examples is the one-day "Symposium on the Outcome-based Approach to Teaching, Learning and Assessment in Higher Education: International Perspectives" being held during the implementation phase of the revision exercise. The Symposium will bring in international perspectives and experience on the application of outcome-based education.

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An Integrated Approach to Learning, Teaching and Assessment in a Healthcare Ethics Module

Janis Moody

Faculty of Health and Life Sciences, School of Acute & Continuing Care Nursing
Napier University, Scotland, United Kingdom

In this paper the integral relationship between learning, teaching and assessment will be explored by describing the learning, teaching and assessment approach used in a nursing module, which focuses on ethical and legal issues in healthcare. The concept of integration will be examined by considering the various inter-related components of the module and how these build upon one another to provide an enhanced educational experience for students. The benefits of using a constructive alignment approach in relation to modular development are discussed. Consideration is given to how assessment influences learning and teaching and vice versa and the important role of peer learning in all of this is explored.

1. Introduction

This paper will consider the potential educational benefits of promoting an integrated approach to learning, teaching and assessment. The nature of these benefits will be examined with reference to a nursing module that focuses on healthcare ethics. Curricula requirements, learning, teaching and assessment strategies and peer learning and assessment will all be considered in order to demonstrate what is meant by integration in the context of this module and how this can enhance the overall educational experience for the student.

2. Integration - what it means

The aim of an integrated approach is to ensure that the various elements of learning, teaching and assessment build upon one another to produce a unified whole in order to enhance the student's overall learning experience. Thus, the elements of the learning, teaching and assessment approach adopted in this module are mutually supportive and each element forms an integral part of the whole system (Biggs, 2003).

The module was developed in line with the principles of constructive alignment which means that the learning outcomes are met by ensuring alignment of the learning, teaching and assessment strategies. In an aligned approach to learning, teaching and assessment, there is consistency throughout the system. Thus, the curriculum is stated in the form of clear objectives which specify the level of understanding required; teaching methods are selected that are likely to realize the objectives and the assessment addresses the objectives. All elements of this system address the same agenda and support each other (Biggs, 2003).

Shuell (1986) believes that it is important to bear in mind that what the student does is actually more significant in determining what is learned than what the teacher does. This highlights the importance of getting students

to engage in learning activities in order to promote their own learning. According to Biggs (2003), constructivism places the emphasis on learners constructing their own knowledge, as opposed to being passive recipients of knowledge created by others. Constructive alignment thus makes the students do the real work, the lecturer acts as a facilitator between the student and a learning environment that supports the appropriate learning activities (Biggs, 2003). This philosophical approach underpinned the development of the module which is the focus of this paper, Ethics in Healthcare (EIHC).

The various elements of EIHC will now be examined in order to demonstrate how integration is achieved and to illustrate the potential it has to enhance the student learning experience. The model in Figure 1 demonstrates how each element of the learning, teaching and assessment strategy builds upon the other. Each stage of this model will be considered in detail and the integrated nature of the learning, teaching and assessment approach will be examined. Firstly, the influence of the nursing curriculum guidelines on modular development will be considered.

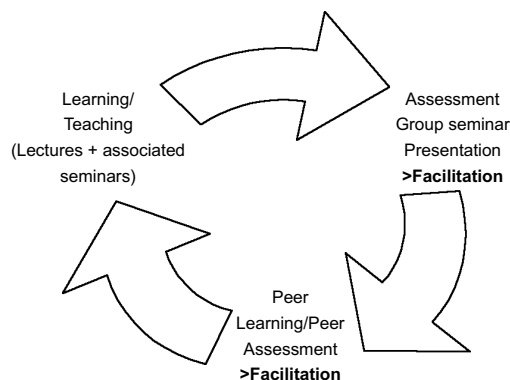


Figure 1. Integration - Learning, Teaching and Assessment

3. Curricula requirements

In the United Kingdom (UK) increasing emphasis has

been placed on ethics in the nursing curriculum and all nursing programmes now include ethics. The reasons for this are multi-faceted and include societal issues, such as, continued technological improvements in healthcare, an ageing population, resource allocation issues, and the changing role of the nurse. This has resulted in a heightened awareness of the underlying moral dimension of healthcare practice in general and nursing practice in particular (Scott, 1988).

The ethical content of the curriculum is based upon the Fitness for Practice Curriculum Guidelines (National Board for Nursing, Midwifery and Health Visiting, 2000), which brings together the statutory and professional requirements relevant to pre-registration nurse education. Fitness for Practice is based around four domains, one of which is the professional and ethical domain which identifies outcomes and competencies relating to professional, ethical and legal issues relevant to healthcare. The curricula outcomes and competencies provide the framework for the overall curriculum content relating to ethical and professional issues relevant to healthcare. Student nurses must achieve these outcomes and competencies in order to progress in the programme and register as a nurse.

One of the main challenges for nurse educators was how to integrate the required professional, ethical and legal content into an already overcrowded curriculum and make it meaningful to practice. In this particular case the challenge was met by making the most effective use of the learning, teaching and assessment strategies in order to ensure integration and thus enhance learning. This process and the resulting integrated approach to learning, teaching and assessment will now be considered in more detail.

4. The module - Ethics in Healthcare

Ethics in Healthcare is a module that students undertake in the second year of the Diploma of Higher Education in Nursing and Bachelor of Nursing Degree Programmes (Adult Nursing Branch). An integrated curriculum

approach has been adopted which entails weaving an identifiable strand of content throughout the programme (Ryden et al., 1989). A two-pronged approach is taken, in that, ethical content is included in a variety of modules and there is also a specific module, which focuses solely on ethics and law. Prior to undertaking the module, Ethics in Healthcare, students will have achieved competencies in professional and ethical issues in theory and practice modules in Year 1 and when developing EIHC it was considered important to build upon this.

Students are faced with a wide range of ethical and legal issues in their day-to-day practice and this has resulted in the aims of the module being multi-factorial. The stated aim of the module is to allow students to examine ethical, professional and legal aspects of healthcare provision. The integral relationship between ethical principles and theories and the main topics becomes apparent to students as the module progresses.

The interface between theory and practice is central to this module and students are encouraged to use their experiences in the clinical area to explore and develop an understanding of the ethical principles and theories they will be introduced to. Students are required to apply relevant theories and principles to a variety of practice related situations. Further, it is expected that on completion of the module students will be able to recognise ethical situations in practice at both micro and macro levels and to contribute to ethical decision-making within a healthcare setting with the support of clinical staff.

5. Learning and teaching strategies

The learning and teaching methods include master lectures followed by small group seminars and other activities such as, tutorials, examination of case-studies and discussion. Master lectures are used to introduce new theory topics and the small group seminars that follow enable further exploration of key areas. Discussion is an important learning and teaching

strategy as it provides students with an opportunity to express themselves in terms of the concepts under study. Further, it allows for closer contact between teacher and student and can enable development of a variety of communication skills (Jacques, 2003). Students are encouraged to actively engage with the subject matter of the module and are required to review, reflect upon and ultimately refine future practice accordingly.

Groupwork is a key element of EIHC, and as such, a central feature of the module is ensuring that the groupwork experience is a positive one for students. Groupwork activities are closely monitored and facilitated by the lecturer who is responsible for the seminar group. The role of the lecturer as facilitator in this context will be discussed in more detail later in the paper.

The nature of the group will have an effect on the learning that takes place and is significant for student engagement. The student group size varies but a cohort is approximately 200 students and there are two cohorts a year. Students undertaking the module are already in established reflective groups which consist of students who share their experiences of clinical practice on a regular basis within the university environment. In EIHC two reflective groups are combined to form a seminar group (approximately 25-30 students). Groupwork can facilitate knowledge acquisition and the development of teamwork skills, which are both essential attributes of the professional practitioner. It provides the opportunity for students to express themselves and can promote the development of communication skills (Jacques, 2003). Further, groupwork has the potential to enhance the educational experience as students learn from and with each other.

experience for students. Preparation for groupwork and also for the peer assessment, which forms part of the module assessment, is important and the role of the lecturer is pivotal in these contexts.

The module team is made up of registered nurses with varying clinical backgrounds and most of the team has undertaken further study in the field of ethics, philosophy or ethics and law. Motivation, enthusiasm for the topic area and skills in facilitation ensure that the lecturers present a positive role-model. Further, lecturers maintain links with clinical areas which helps alert them to issues of concern for patients and clinical staff.

With regard to the learning, teaching and assessment strategies adopted in the module it is considered important for lecturers to meet on a regular basis to discuss issues related to ongoing development of the module content and to share their experiences as seminar facilitators. Particular emphasis in these discussions is placed on how decisions are reached with regard to lecturer assessment of the seminar group presentation.

The same lecturer acts as a facilitator for a seminar group throughout the module thereby ensuring that consistency is maintained for student groups. The facilitator's role involves leading the seminar group discussions and serving as a role model concerning this activity. Over the course of the module, as students become familiar with the seminar activities and module content and develop confidence, the lecturer moves to a facilitative role and eventually students lead their own seminar which is their module assessment (Perry & Moody, 2005). The facilitator provides support throughout the development of the seminar presentation and gives advice on issues such as group processes, guidance regarding topic refinement, guidance regarding relevant literature and provision of resources.

6. Lecturer as facilitator

As already indicated facilitation is central to the success of this module and the aim of facilitation is to ensure that the groupwork results in a beneficial educational

7. Assessment strategy

Assessment in the context of EHC is considered a multi-dimensional part of the learning process (Ewan & White, 1996) and as such there was a clear fit philosophically and theoretically with more interpretivist orientated approaches to assessment. Interpretivist approaches to assessment clearly accept that 'truth' is a social construct, that is 'a matter of consensus among informed and sophisticated constructors' (Guba & Lincoln, 1989). Positivistic approaches to assessment, on the other hand, are based on the assumption that truth is absolute and that assessment compares student performance against a previously established model response (Elton & Johnston, 2002). The nature of the material considered in this module and the integrated approach to learning, teaching and assessment which was aspired to during modular development led quite naturally to an interpretivist approach being adopted based upon a criterion-referenced approach to assessment.

In accordance with a constructive alignment approach, the assessment addresses the objectives, in order to test to if the students have learned what the objectives state they should be learning (Biggs, 2003). A further aim of the assessment is to promote peer learning and the type and format of the assessment helps to achieve this.

The assessment strategy is a small group seminar presentation (x 3 students). This maintains the continuity of the module and requires students, within a presentation group of three, to select a topic for development for their presentation. One of the aims of small group learning, in the form of seminar groups, is to advance the topic that has been introduced in the lecture. Although seminars traditionally involve reading a paper, which is then presented by one member of a group and followed by group discussion (Quinn, 2000), the module uses a topic-centred approach (Perry & Moody, 2005). This requires students to review and reflect on the topic area using guided reading and take an active part in the seminar discussion. It is expected that students will access and retrieve relevant literature, prepare, organise and present the key issues concerning their topic to the larger seminar group and be prepared to discuss issues raised by the group (Perry & Moody,

2005).

The assessment is intended to examine the broad scope of the module content and enable the students to develop their knowledge in an area of their choice and present their findings to their peer group and the lecturer/facilitator. It was felt that as assessment is a key area in facilitating and motivating students it was important to allow students the opportunity to develop their learning in a relevant area of their choice and to share this with the wider seminar group (Perry & Moody, 2005). Further, a seminar presentation as the assessment tool provides the students with the opportunity to develop their knowledge and a variety of other skills, such as, co-operation and team working skills. Another advantage of this approach is that as students are preparing to present to a group of their peers, they are likely to be well motivated to thoroughly prepare and research their chosen topic which is likely to require and result in deep learning (Race & Brown, 2001).

The group seminar presentation is lecturer (75%) and peer (25%) assessed. The use of a combined assessment method provides an effective way of testing achievement of the learning outcomes and provides students with an opportunity to gain credit from their peers with regard to individual ability. It was felt that this approach would satisfy issues related to meeting the module outcomes in relation to the development of student learning but there would also be, because of the nature of the assessment, an impact on the learning of the students in the larger seminar group both by means of the material presented and the discussion which follows. The student seminar presentations thus have the potential to have a significant impact on the learning of other students in the group.

The lecturer assessment considers achievement of the module learning outcomes and the specific learning outcomes students prepare for their seminar presentation. A form of criteria-based assessment is used where grades are awarded according to how well student groups meet the identified learning outcomes (Biggs, 2003). The grading scale includes criteria such as knowledge and understanding, analysis and discussion, application, structure and sequence and presentation skills in conjunction with numeric scales. Each numeric grading category is assigned qualitative

criteria required to achieve the particular grade. This helps lecturers to grade student groups according to their demonstrated ability to meet the identified learning outcomes in the context of a group seminar presentation. Lecturers meet to discuss how they have reached their grading decisions to ensure articulation of their values and judgements as assessors. An overall group mark is given for the lecturer assessment.

According to Freeman and McKenzie (2002), however, students can view groupwork assessment as unfair if there is equal reward for unequal contributions. The emphasis on the role of lecturer as facilitator in EIHC helps to overcome this by ensuring that the development of the group seminar presentation is closely monitored. The level of contribution from each person within the small presenting groups is discussed at the initial meeting and followed up at progress meetings with the facilitator. If students are having a problem with someone in their group they are encouraged to try and sort this out themselves but if they are unable the facilitator will intervene.

A peer assessment element is also used, adopting a process approach, so that each student can grade and comment upon their group members in relation to their contribution to the groupwork required to develop the group seminar presentation. Students are, therefore, aware that part of their overall grade comes from their individual effort in relation to the groupwork element of EIHC which should motivate them with regard to their own contribution.

The percentage allocated to the peer assessment element is limited to 25% as this is the first time (in the nursing programme) that students are required to undertake peer assessment and they may have limited experience of this process. Students need to be well prepared for undertaking peer assessment and preparation and support are key elements in making sure that peer assessment is a meaningful activity for students. In EIHC the facilitator emphasises that all participants must take a responsible approach to peer assessment and encourages students to grade each other on the basis of their contribution to groupwork and seminar presentation development. Peer assessment in groups may be subject to bias due to friendship, gender, age, ability, ethnicity or prior experience and the facilitator

should plan in order to minimize the risk of these biases occurring (Falchikov, 2005). Classroom time is allocated to consider group processes and developing students' abilities to work in a group. Grading criteria are clear and facilitators monitor the progress of students and are available to mediate if disagreements occur (Boud et al., 2001).

Peer assessment can be outcome or process orientated. Peer assessment as an outcome can involve grading written work or oral presentations whilst peer assessment of the process focuses on the student's contribution to the different activities associated with groupwork (Elliott & Higgins, 2005). In EIHC peer assessment takes a process approach and is completed prior to the presentation by those in the seminar presentation group. The process approach to peer assessment is considered important particularly when the assessment involves groupwork (Falchikov, 2005) as it allows students to comment upon and allocate marks to their fellow group members for their commitment and contribution towards the development of the group seminar presentation. The peer assessment relates to areas such as, contribution to group activity, playing an active part in discussions, respecting other people's opinions, taking a fair share of tasks and completion of allocated tasks, playing an active part in knowledge development and showing commitment to group activity.

In addition to the seminar presentation students also provide a summary paper and a reference/reading list. Undertaking this activity aids in the planning and structuring the group seminar presentation and aims to consolidate group cohesiveness. The process of preparation necessary for the seminar presentation makes it less likely that students will take a superficial approach to learning, as success requires a level of engagement with the relevant ethics material that can result in deep learning (Cole & Chan, 1994).

8. Peer learning

Throughout the module students learn from and with each other and the lecturer has a central role in promoting and encouraging student learning in all contexts. The lecturer must be aware of and promote the potential for peer learning in all activities related to learning, teaching and assessment. The peer learning experience is an important factor in relation to integration as it has an enormous potential to enhance learning.

Peer learning refers to the use of learning, teaching and assessment strategies in which students learn from and with each other. Peer learning occurs throughout the module, during groupwork involving examining case studies and scenarios, and during the process of developing and presenting the Group Seminar Presentation. Peer learning can enhance subject mastery by promoting deeper levels of understanding based on discussion and free exchange of ideas (De Lisi, 2002). Peer learning encourages critical and active engagement with learning.

Further, students develop skills in organising and planning learning activities, working together, giving and receiving feedback and evaluating their own learning (Boud et al., 2001). The peer assessment element can also enhance learning in the context of assessment of the contribution to the groupwork undertaken and the giving and receiving of feedback which this involves. Students have to think about the contribution of others and what this has meant to the success or otherwise of the group activity and grade their peers accordingly. This is a useful learning experience for students and will also make them think about their own contribution to the development of the group seminar presentation.

9. Module evaluation

Formal and informal evaluation of the module takes place each time the module runs. Formal evaluation is

undertaken by means of a questionnaire which includes written statements by students. In addition, informal discussion regarding the modular learning, teaching and assessment methods takes place on an ongoing basis between students and their seminar facilitator. In both types of evaluation questions relate to student views on the learning, teaching and assessment processes. A central question asks students to consider the effect this form of assessment has on their learning, both in terms of what they learn and how they learn. Students tend to evaluate this module positively and comments have included that 'it is an interesting way of learning', that it has 'increased awareness of the relevance of ethics to practice', and that it has 'led to development of interpersonal skills'. Some students have commented that initially they didn't like the idea of the groupwork or the seminar presentation but ultimately they found both experiences beneficial. Feedback from student evaluations is taken into account in the ongoing development of the module.

10. Conclusions

Throughout this paper it has been demonstrated that by promoting integration between the various components of a module student learning can be enhanced. In EIHC the potential for learning has clearly been augmented by using an integrated approach to learning, teaching and assessment. The assessment method demonstrates that students have met the objectives of the module but also builds upon the students overall knowledge base regarding ethics by active promotion of peer learning. The group seminar presentation as assessment results in the content matter of the module being further developed and leads to students having a greater opportunity to clarify and discuss issues raised throughout the module. Teaching and assessment which involves a large component of groupwork can be precarious in nature if not properly monitored, it requires robust ongoing facilitation at every stage of the process to ensure its success and that is why EIHC is organised in a way which promotes this. As a consequence this module is demanding in

relation to staff time and commitment and ultimately its continuing success depends on the ongoing enthusiasm of the module team. However, promoting an integrated approach to learning, teaching and assessment not only has educational benefits for students it can also lead to increased job satisfaction for the lecturers involved.

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Aligning Teaching and Assessment: The Key to Greatly Improved Graduate Quality and Sustainable Teaching Efficiency

Rob Cowdroy
Anthony Williams
School of Architecture and Built Environment
The University of Newcastle, Australia

This paper considers the relationship between assessment method and teaching method and shows that alignment of assessment and teaching methods provides opportunities for significant increase in graduate quality and simultaneous decrease in teaching load and resource costs. The paper is based on both formal reviews of programmes in a range of disciplines including architecture, engineering, law, medicine and science, in universities in Australia, Europe and North America, and collaborative research involving linear and cross-sectional studies of teachers, programmes and successive cohorts of students in those disciplines. These reviews and research have shown that institutional reforms including new teaching methods intended to achieve greater relevance and student satisfaction, new assessment methods intended to meet accreditation and quality assurance requirements, and organisational restructuring of faculties intended to achieve "efficiencies", have all failed to achieve sustainable benefit. Worse, in many cases these interventions have been counterproductive and have resulted in "quality failure" and teacher, resource and student overload. The paper also shows that, if the assessment and teaching methods are not aligned to precisely the same expected outcomes, then the very best teaching methods are rendered ineffective, wasteful of teachers' skills and efforts, and expensive. Various outcome factors contribute to this effect, including types of knowledge and skills involved, engagement of various student thinking and learning patterns, and intended attitude and value systems. The paper shows that alignment of the teaching and assessment methods to precisely the same outcome factors provides opportunities for significant improvement in both student satisfaction and quality of graduates, and opportunities for significant reduction in teaching and resource load. The paper presents a new teacher-driven, "bottom-up" approach to the three factors at the top of the agenda in higher education throughout the Developed World: relevance of content, quality of graduates and economy of teaching load and resource costs; and to student satisfaction which is a fourth factor of increasing importance.

1. Introduction

The background to this paper is a history of failure of institutions to achieve sustainable objectives in the four dominant agenda areas of relevance of content, graduate quality, economy of teaching costs, and student satisfaction (Harman & Meeks, 2000). Formal reviews of programmes and cross-sectional and linear studies of teachers and students in a wide range of disciplines including architecture, engineering, law, medicine and the sciences, in universities in Australia, Netherlands, Belgium, France and Canada have indicated that nearly all attempts at reform have been piecemeal "top-down" interventions under the general banner of "quality assurance" and have failed, and that now there is a growing perception that institutional quality assurance interventions are, instead, causing quality failure.

The reviews and research referred to here have been undertaken collaboratively by a multidisciplinary consortium of specialists in curriculum development, professional development and educational psychology in Australia, Canada, and the Netherlands (although space in this paper is insufficient to allow inclusion of specific research data).

Attempts at reform have mostly been uncoordinated interventions in only one operative component of the teaching cycle (curricula, teaching or assessment) at a time. As indicated below, however, any change in one component creates a flow-on change in relation to the other two, and if the changes are not coordinated, then a negative quality syndrome is inevitable, with catch-up changes in each until critical failure occurs, followed by enforced intervention. For example, institutional pressures for achieving increased higher-learning abilities (on the one hand) and for competency-based assessment (on the other hand) are incompatible almost to the point of being mutually exclusive in terms of quality assurance and efficiency.

The thrust of this paper is a new paradigm representing a coordinated strategic framework that aligns the three operative elements of higher education for optimum effectiveness in relation to all four agenda items simultaneously.

2. Status quo

In practical terms, what we teach (the syllabus) and how we teach it (the teaching method) are often derived from criteria for assessment ("what we teach is that which will be assessed"). This is particularly the case where external (e.g. professional) accreditation is essential to the sustainability of a programme. Criteria for accreditation are almost invariably expressed in terms of minimum (lowest) standards, of domain-specific core technical abilities acceptable to the accrediting authority that must be achieved by all graduates. In practical terms this means the accreditation criteria are the abilities of the weakest passing graduate.

An "accreditation imperative" dominates most such programmes, and the minimum standards set by the accreditation criteria often become "criteria for assessment". In the worst situations the minimum standard core competencies become the whole curriculum, with teaching confined to the minimum necessary to "pass" the accreditation criteria, and passing all the accreditation criteria is often claimed as "excellence".

Criteria for professional accreditation, however, do not include many of the essential elements of a quality university education that are expected of all university graduates (regardless of specialisation).

Claims of excellence in these situations are simply absurd; an education programme restricted to meeting only minimum standards cannot legitimately claim excellence. In these situations, it is the learning outcome objectives that are lacking, not necessarily the teaching or assessment. Nevertheless, the actual learning outcomes do not meet university quality assurance expectations and deny claims of excellence. Relevant employers, the community and government know these claims are absurd and express their dissatisfaction through public complaints about "the problem with higher education" and take action by lobbying for intervention in the programmes and in the organization and funding of higher education (A.C.Nielsen Research Services, 2000).

As academic teachers, we react to pressures from external accreditation authorities for "greater relevance"

by adding new "relevant" content; to pressure from our institution for more "cost effectiveness" by changing our teaching methods; and to government pressure for "accountability" by changing our assessment methods (Cowdroy & Williams, 2002). Significantly, though, we tend to focus on only one of the three operative elements of education at a time (James et al., 2002); we rarely consider all three in a coordinated or integral approach, causing us to be locked into an inevitable succession of attempted "catch-up" changes that becomes a quality-failure syndrome (because the succession of changes never catch up).

3. Complexity of the operative components

To understand why we cannot change any one operative component in isolation without causing quality failure, and why we need to take a coordinated approach to all three operative elements simultaneously, we need to consider the complexity of each of the operative components and their interrelatedness. The three operative components of effective higher education are:

1. curricula which include syllabi (content) and detailed learning outcome objectives of a programme (over-riding and expanding on objectives in the programme outline) and (by implication) teaching methods appropriate to the syllabus and objectives;
2. teaching protocols which are generally considered as methods of delivery of a programme but which can also be seen as strategies and tactics for achieving the learning outcome objectives (set in 1 above);
3. assessment protocols which are generally considered as tests of individual students' achievement in terms of syllabus, but can also be seen as strategies and tactics for monitoring the effectiveness of teaching strategies (set in 2 above) in order to achieve the learning outcome objectives (set in 1 above).

4. Curricula

As indicated above, curricula can be seen to comprise two operative components: learning outcome objectives and syllabus. While curricula are also widely understood to imply or prescribe teaching methods, for present discussion we will consider teaching methods separately below.

Learning outcome objectives (or expected learning outcomes) are widely understood to be those set out in a "programme outline" intended as a broad official "contract" between the Institution and all stakeholders including students. Increasingly, however, demands for accountability and relevance have been met by including learning outcome objectives for each individual element of the syllabus (e.g. each subject, each phase and even each class), thereby superseding learning outcome objectives in the programme outline, but which are inconsistent with the letter of the programme outline.

That is, the detailed learning outcome objectives as stated for individual elements are often different from the broader learning outcome objectives as stated in the course outline, so the curriculum often represents an over-riding contract with students that are in conflict with the contract with other stakeholders, thereby confounding the criteria for achievement of any standards, let alone excellence, and raising the risk of litigation for either exceeding the learning outcomes as stated in the official contract or failing to fulfil the official contract to the letter.

Syllabi are characteristically expressed in terms of specialist knowledge to be learned, and exercises and experience to be undertaken, that will contribute towards student's ability to do specialist tasks prescribed in the learning outcome objectives. However there is a significant (often unacknowledged) gap between remembered knowledge and "doing" ability, and students and graduates are widely perceived by employers and the general community to be unable to adequately apply their knowledge in practice (A.C. Nielsen Research Services, 2000).

A frequent response to these mismatches of stakeholder

expectations is to attempt to satisfy all stakeholders by accumulation of syllabi. Stakeholder expectations, however, are often inconsistent, for instance the characteristic conservatism of accreditation authorities is inconsistent with the "employability now" expectations of employer groups. A consequence is the accumulation of diverse (some outdated) syllabi until student complaints about overload and/or irrelevance reach formal complaint level.

5. Relevance of curriculum to practice

Applying knowledge in practice requires a combination of various types of thinking (e.g. linear, lateral) to make the essential connections between theory and application in practice. In our research we have called this essential connecting thinking component "facilitative thinking", i.e., that facilitates connection of theory to application. Facilitative thinking includes making connections between multiple abstract theoretical constructs as well as engaging in a linear analytical thinking process, and is therefore an expansion of what is generally referred to as "process thinking".

Increasingly, however, practice is a thinking activity itself (e.g. making informed decisions) so that thinking becomes behaviour ("thinking as behaviour": the act of making a decision), with an array of attendant behavioural conditions such as perception, morale and motivation not usually associated with cognitive approaches to thinking. These attendant conditions are not usually included in what is referred to as "outcomes", and thinking as behaviour is therefore an expansion of what is usually meant by "learning outcomes".

This distinction between facilitative thinking and thinking as behaviour is of fundamental importance to professional education, business education and the sciences (Crick & Cowdroy, 1999; Eraut, 2000). For instance, the essential ability of an architect is not measured in terms of what is built or in drawings depicting what is to be built, but in terms of the complex

rationale that constitutes the design (of which the drawings and buildings are manifestations). Similarly, the essential ability of a medical practitioner is measured in terms of prognosis which is a complex rationale, informed by diagnosis and anticipating particular outcomes, from which treatment follows. In the sciences, the essential ability is not the experiment (even in the most exotic research environment) but the complex rationale that prognosticates outcomes ("the hypothesis" and "framing of the research question") from which that experiment follows. Finally, in business, the essential ability is not the investment, merger or marketing strategy undertaken, but the complex rationale that anticipates outcomes, from which the decision to invest and the investment itself (etc.) both follow.

The focus on thinking here does not deny the importance of the associated physical actions that characterise what an architect, medical practitioner, scientist or business manager do in practice; the thrust of the argument is that development of the respective physical abilities in higher education can only be effective if it includes explicit development of the associated thinking abilities.

6. Re-casting the curriculum

These four examples illustrate the pre-eminence of thinking-as-behaviour ability in practice, which is characteristically of a high-level conceptualisation/prognostication nature (Bergquist, 1999). However, this thinking behaviour must be informed by theoretical knowledge at a lower schematisation and diagnostic thinking level, referred to here as facilitative thinking. Further, the four examples above indicate that the behavioural thinking in each case is clearly domain-specific to each discipline and, logically, the facilitative thinking that connects domain-specific theory to domain-specific thinking behaviour must itself be domain-specific. Thus, achievement of the learning outcome objectives in the curricula requires three distinct forms of domain-specific thinking: domain-specific knowledge-recall, domain-specific facilitative

thinking and domain-specific thinking behaviour. Usually, however, only the first is explicit in the syllabus and the other two are at best vague learning outcome objectives unsupported by appropriate syllabi.

The essential roles of facilitative thinking and thinking behaviour seriously challenge conventional notions of lower-level and higher-level classifications of learning. They also challenge conventional notions of competency standards, competency-based assessment and transparency that underpin the present direction of institutional quality assurance policy and initiatives.

In order to adequately address these thinking abilities in context, the authors propose a "new-order" of levels of task ability that should be identified in the learning outcome objectives as follows:

- *lower-level* task abilities are typically procedural, such as ability to follow set procedures. Facilitative thinking at this level is characteristically making linear connections between set knowledge/theory and set procedures. Thinking behaviour required at this level is characteristically data collection, entry and ranking, informed by recall/recognition of domain-specific knowledge.
- *mid-level* task abilities are typically analytic/diagnostic and characterised by finding explanations/solutions for phenomena/problems within a limited range of set theories. Facilitative thinking at this level is typically lateral thinking that makes connections between alternative abstract theories and applications. Thinking behaviour required at this level is typically lateral, analytic and diagnostic "problem-solving", informed by recall/recognition of domain-specific knowledge and procedures. Both facilitative thinking and thinking behaviour required at this level are significantly more demanding and more domain-specific than in lower-level task abilities, and must be identified as particular objectives accompanied by particular domain-specific syllabi, if problem-solving ability learning outcome objectives are to be met.
- *higher-level* task abilities are typically anticipatory projections (prognostics, designs, strategies) to meet multiple complex requirements and to define complex future solutions. Thinking behaviour at this level is

typically individualistic, conceptual and multi-lateral, informed by both recall/recognition of multiple bodies of domain-specific knowledge and the outcome of mid-level analytic task activities. The facilitative thinking requirements at this level are multilateral, very demanding and very domain-specific, requiring special development, and they must be identified as specific learning outcome objectives accompanied by special domain-specific syllabi.

From the authors' perspective, therefore, both the learning outcome objectives and syllabi within curricula for effective education that meets societal expectations of graduate quality must be re-cast with increased emphasis on both facilitative thinking and thinking behaviour in order to provide the essential underpinnings to practice, particularly in the professions, business and the sciences.

7. Teaching protocols

In the light of preceding discussion, learning outcome objectives to be met by teaching include three levels of thinking ability and two types of behaviour: thinking behaviour and physical performance behaviour. From this perspective, learning also is behaviour. Also, as we have seen above, learning outcome objectives are all related to achievement of task abilities in students (i.e. not to the teaching). Therefore it is the learning method, not the teaching method, which must be the driving strategy for achieving the learning outcome objectives and quality.

7.1 Learning methods

Increasing emphasis on both facilitative thinking ability and thinking task ability (discussed above) requires that multiple levels of thinking ability are developed in each student, requiring multiple learning methods (Gibbs, 1995). Lower-level task abilities represent foundation abilities within any given programme, and typically require linear thinking and relatively simple behavioural responses (e.g. processing data, answering questions,

writing synoptic reports, making analogue (e.g. numerical) tables, graphics and models). Appropriate learning methods for lower-level task ability include conventional rote, recognition and repetition (RRR) methods.

Mid-level task abilities broadly represent the supporting diagnostic and problem-solving abilities in a practitioner, and typically involve lateral thinking to relate observed phenomena to set knowledge and abstract theoretical frameworks. These are more complex behavioural responses, including domain specific dialectic, diagnosis and debate (DDD). This requires a significant shift towards student-centred heuristic learning (learning by individual searching and experimenting). Case-study based cognitive apprenticeship learning strategies, for instance, have been very successful in developing mid-level task abilities.

Higher-level task abilities are typically technical and professional "expertise" abilities (e.g. complex creative architectural design; complex medical prognosis) and involve significantly more complex behaviour including "professional" approaches to prognostic/design projections, multiple alternative options, and development of criteria for selection of a "best" complex outcome and "best" complex strategy for achieving that. Effective learning strategies for higher-level task abilities are characteristically heuristic and increasingly research-and-development (R&D) oriented (i.e. closely related to the way an expert practices) with extensive praxis, often in simulated practice environments and some problem-based learning, integrated-learning and research-based learning approaches.

A further important consideration is that individual students, in addition to having differing learning abilities also learn at differing rates: our research shows that within any class or cohort, a majority can be expected to be "good to excellent", a minority can be expected to be "struggling", and a further small minority can be expected to be "outstanding". For present discussion, "outstanding" students are those few who exhibit exceptional ability akin to genius that transcends the expected outcomes.

"Struggling" students typically exhibit high early rates

of progress (learning curve) until they reach their (low) ability plateau, and then exhibit little further progress; "good to excellent" students typically exhibit a high early rate of progress, an extended plateau, and a further high rate of progress approaching a deadline; "outstanding" students typically exhibit a low rate of progress (an extended low plateau) until close to a deadline and then an exceptionally high rate of progress.

Ideally, in order to accommodate the struggling students, good to excellent students and outstanding students equitably, differing rates of learning should be accommodated within an overall learning strategy, such as through flexible timetabling and flexible criteria frameworks (Cowdroy & Mauffette, 2003; Crick & Cowdroy, 1999).

In any given course or programme that is intended to develop higher-level task abilities, therefore, a combination of learning strategies such as RRR, DDD and R&D should be engaged, in conjunction with flexible timetabling and flexible criteria frameworks to accommodate students' varying learning patterns.

7.2 Teaching methods

Teaching methods based on conventional didactic methods that conform to "good teaching practice" can accommodate development of lower-level task abilities as defined above, but cannot, on their own, accommodate the mid-level and higher-level thinking abilities increasingly in demand. More recent teaching methods such as cognitive apprenticeship and various forms of problem-based learning (PBL) have been aimed at developing "more relevant" mid-level abilities. More exotic teaching strategies including integrated learning (IL) and research-based R&D methods have been aimed at developing "professional standard" higher-level task abilities within undergraduate programmes.

These more recent teaching methods have been generally successful, although they have their own limitations, particularly when applied in their dogmatic forms. For instance, cognitive apprenticeship in its "pure" form, with its emphasis on analytic/diagnostic (mid-level) thinking behaviour, has been very successful in developing mid-level task abilities but restricts individualistic projective/ prognostic thinking and

therefore has had limited success in achieving higher-level task ability, while IL and R&D learning methods in their "pure" forms have been very successful in developing higher-level task abilities, but have restricted development of lower-level foundation task ability.

These restrictions have been relieved by adoption of multiple teaching methods within overall teaching protocols, resulting in the emergence of differing forms of each approach (i.e. differing protocols). For instance, at least five distinct forms of problem-based learning have emerged, differing according to domain and according to differing emphasis of one programme from another, leading to widespread confusion about "definitive" problem-based learning. Nevertheless, such innovatory teaching approaches have been most successful where they have been tempered by pragmatic flexibility that allows a range of teaching methods within individual subjects and across the programme to support learning of the various orders of thinking involved in the multiple task abilities required.

While this multi-protocol may seem confusing, the more precise relationships that are formed between specific objectives, specific teaching methods and specific outcomes become much more systematic and reliable in practice, without increasing loads on teachers, students or resources.

7.3 Managing the learning process

A significant aspect of more recent teaching methods such as cognitive apprenticeship, PBL and R&D, and crucial to their success or failure, has been the managing strategies adopted to support them. These managing strategies must not be confused with "administrative" obligations imposed by the institution; nor should managing strategies be confused with "facilitation" which is integral to student-centred learning methods associated with cognitive apprentice and PBL approaches.

Managing strategies represent an essential executive role of teachers that complements teachers' teaching role; they are essential to support effective learning/teaching equations; that is, they are essential to maintaining appropriate morale, motivation and orientation aspects of students' learning environments necessary for development of mid-level and higher-level thinking that

supports mid-level and higher-level task abilities.

Managing the learning/teaching equation to achieve lower-level task abilities requires strategies focused on encouragement that is already part of conventional good teaching practice. Managing to achieve mid-level and higher-level task abilities, however, requires more sophisticated approaches focused on motivating students to be self-confident, self-directing and self-evaluating, and to achieve "personal bests".

Without both motivation and self-confidence to venture away from dependence on the teacher's opinion and direction, students (generally) will not venture into self-direction and self-evaluation that are the hallmarks of student-centred learning and are essential to achievement of mid-level and (particularly) higher-level task abilities. Students cannot be motivated by decree, and motivation cannot be taught in the conventional sense, nevertheless morale and motivation, and self-confidence, self-direction and self-evaluation can be developed through application of positive motivational and self-development approaches such as some that can be drawn from small-enterprise good-management practice.

A most effective and sustainable managing strategy for developing both individual and group morale and motivation is establishment of a positive collegiate environment among students, on various class and cohort bases, and among students with related interests (e.g. related career path interests). Traditional studio-teaching in design disciplines such as architecture and industrial design, workshop teaching in engineering, laboratory teaching in science, and small-group tutorial teaching in some forms of Problem-Based Learning characteristically achieve very conducive collegiality.

A collegiate environment allows students to become mutually supportive and encouraging and, if they are positively ambitious and competitive, become mutually motivating and high-achieving on both an individual and group basis, with significant student-satisfaction returns. A significant benefit to the teacher is that a substantial part of the load of teaching and facilitation is transferred from teacher to students, reducing the load on the teacher while achieving the required results (a win-win result).

8. Assessment protocols

Assessment is widely considered as the mechanism by which student ability is measured, however assessment methods have recently been the subject of considerable review in response to external pressures, and educational assessment has additionally become the vehicle for accreditation (of programmes), evaluation of "quality assurance" (of programmes), "accountability" (of teaching effectiveness) and "transparency" (of teacher impartiality/probity), and even "accounting-ability" (cost-benefit of programmes) (Williams & Cleary, 1999). While all of these purposes are primarily focused on graduate abilities as indicators, the respective value systems are related to differing agenda and criteria, and the multiplicity of purposes inevitably confuses and corrupts the educational assessment.

The following discussion is therefore confined to educational assessment.

Assessment of lower-level task abilities is most appropriately undertaken using conventional analogue assessment methods (using numerical systems as analogies for other value systems such as quality, ranking, etc), typically by right/wrong demonstration or multiple choice examination against elemental, binary (able/unable) criteria.

Assessing mid-level task abilities, however, is more appropriately undertaken using holistic/hermeneutic approaches (interpretation of work/evidence in terms of "accepted" quality/ranking value systems) that can simultaneously accommodate multiple and variable criteria associated with various types of knowledge, various thinking processes and application skills. In particular, mid-level task abilities involve facilitative thinking that includes making abstract connections between abstract theories, and therefore cannot be assessed by conventional analogue systems, but can be indicated by manifestations and circumstantial evidence that are "recognised" by informed assessors. For instance, students' case study projects addressing mid-level task abilities are increasingly assessed holistically by "informed" assessor panels in terms of what is accepted (e.g. by faculty or across a whole discipline) as "pass-quality", "credit-quality" and "distinction-quality".

Assessing higher-level task abilities (as defined above), particularly in an R&D teaching environment, requires a more radical approach such as Authenticative Assessment drawn from conventions of evaluation of research (Cowdroy & DeGraaff, 2005) and involving "expert" assessor panels who can recognise evidence of both the underlying facilitative thinking and the thinking behaviour with attendant behavioural conditions that together constitute the outcome to be assessed. Authenticative assessment is of the student's rationale (presented and defended by the student) for interpretation of the assignment (e.g. problem) and for the particular response/solution proposed (among many possible interpretations and responses). Authenticative assessment closely reflects the assessment protocols in science (e.g. for individual research grants and refereed publication) and the evaluation of individual technical proposals in industry, commerce and the professions.

Authenticative and hermeneutic models of assessment are incompatible with elemental criteria and "economic" clerical or digital processing, but offer the opportunity to address a large body of student work (e.g. a major semester-long project), covering all subjects, in one sitting of the assessor panel, so that they are significantly more economical than conventional assessment by individual teachers for each subject.

Our research and development shows that consistent use of Authenticative and hermeneutic assessment strategies based on context-related and orthodox practice criteria, allows students to develop self-evaluation and self-direction capabilities closely related to practice, and offers opportunities for development of student-centred forms of contract assessment. Further, our research shows that development of collegiate student environments allows development of combinations of self-assessment and peer-group evaluation, and offers "cascade" benefits to weaker students in a given cohort and to successive cohorts, with flow-on benefits of significantly accelerated development of "relevant" task abilities, greatly improved student satisfaction, and significant reduction in repetitive teaching.

9. Alignment of curriculum, teaching and assessment

The question that remains is: which combination of teaching and assessment protocols is the most effective in achieving the four agenda items, i.e., relevance of content, graduate quality, economy of teaching costs, and student satisfaction? From discussion above, the effectiveness of both teaching protocols and assessment protocols is determined by their respective ability to meet the learning outcome objectives, that is, "effectiveness" requires alignment of both assessment and teaching protocols with detailed learning outcome objectives in the curriculum, in terms of the complex task objectives discussed above.

Previous discussion shows that the learning outcome objectives include a range of task ability outcomes (lower-level, mid-level and higher-level) which include their respective essential facilitative thinking and thinking-behaviour components. Previous discussion also indicates a range of teaching protocols (didactic, heuristic, R&D), and a range of assessment protocols (analogue, hermeneutic, Authenticative).

To summarise, as indicated in Figure 1:

- **if** conventional analogue assessment methods are aligned with lower-level learning methods for those components of a programme intended to achieve lower-level task abilities,
- **and if** holistic/hermeneutic assessment protocols are aligned with mid-level teaching methods for those components of a programme intended to achieve mid-level task ability,
- **and if** Authenticative assessment protocols are aligned with higher-level teaching methods for those components of a programme intended to achieve higher-level task-ability,
- **then**, the most effective combinations of teaching and assessment are achieved.

	lower order	middle order	higher order
learning	linear	lateral	heuristic
teaching	didactic	cogn app	heuristic
managing	directed	self-directed	collegiate
assessment	analogue	holistic	hermeneutic

Figure 1. Effective Combinations of Teaching and Assessment

10. Concluding remarks

The whole structure of effectiveness, however, depends on the integrity of the educational objectives: if the programme objectives have been thoroughly developed and agreed between the institution, accrediting authority and faculty, and if the task ability outcome objectives detailed in the curriculum have been comprehensively and exclusively derived from the programme objectives, then the above combinations of educational objectives, teaching protocols and assessment protocols will be robust, and most effective. They will also be very cost-effective if the opportunity is taken for a significant shift from teacher-oriented/driven teaching to student-centred/driven learning approaches.

While the multiple learning, teaching and assessment strategy approach may seem excessively complex, in practice and with appropriate managing strategies this approach has been shown to offer outstanding opportunities for significantly-reduced teacher load and resource cost, as well as significantly increased graduate quality and student satisfaction.

The main challenge for teachers is to have sufficient self-confidence to undertake this approach, and sufficient confidence in students to "hand-over"

authority (to students) to self-direct individually and collectively to develop bona fide mid-level and higher-level complex task abilities that are essential to achieving *relevance of content, graduate quality, economy of teaching costs, and student satisfaction.*

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Formative and Summative Assessment and the Notion of Constructive Alignment

Nona Muldoon
Centre for Enhancing Learning and Teaching
Charles Sturt University, NSW, Australia

Chrisann Lee
School of Accounting
Charles Sturt University, NSW, Australia

This paper discusses the different perceptions of first year accounting students about their tutorial activities and their engagements in assessment. As the literature suggests, unless participation in learning activities forms part of graded assessment, it is often difficult to engage students in these activities. Using an action research model, this paper reports the study of first year accounting students' responses to action-oriented learning tasks in tutorials. The paper focuses on the importance of aligning curriculum objectives, learning and teaching activities and assessment, i.e. the notion of constructive alignment. However, as the research findings indicate, without support at institutional level, applying constructive alignment to facilitate quality student learning outcomes is a difficult task. Thus, the impacts of policy constraints on curriculum issues are also discussed, focusing on the limitations faced by tutors and their lack of involvement in curriculum development.

1. Introduction

The literature suggests that students have varying expectations in tutorial sessions and their active participation is often challenging for academic teachers. Many academics resort to giving marks for attendance to motivate students to attend classes, but unfortunately, this practice does not guarantee active participation on the part of students. As the literature suggests, unless participation in tutorial activities forms part of graded assessment, it is often difficult to engage students in these activities.

This research was designed to investigate the type of activities that would encourage students to actively take part in the learning process and allow them to demonstrate through formative assessment the depth of their engagement with the content. The research takes as problematic different perceptions of first year accounting students about tutorial activities and their engagements in formative assessment. Specifically, the study asks the question: Does assessment drive learning? This question was particularly useful to the development of the second author, an early career academic, whose goal was to provide quality student learning outcomes. Biggs (2003) explains that to achieve such, intended learning outcomes, teaching and learning strategies and assessment must constructively align. But how can a tutor achieve this if the curriculum and assessment have been 'pre-fabricated' elsewhere? Tutors at the University where the research took place normally have no input in the decision-making process pertaining to the design of curriculum and assessment. Tutors were often constrained by the syllabus provided which mostly involved going through textbook-based questions. They can, however, use ungraded formative assessment in tutorials. But, as many academics have already recognised, the problem of the lack of student participation in tutorials (Keddie & Trotter, 1998; Ramsden, 2003), brings into question whether or not the students would engage in classroom activities and formative assessment. Moreover, would the students' perceptions of accounting influence the way they interact in the classroom and, in particular, their participation in formative assessment?

The paper commences with a discussion of teaching approaches in first year accounting subjects that focus

mostly on fundamental accounting concepts, such as debits and credits. It argues that these teaching approaches lack appropriate grounding to allow students to appreciate key attributes needed in the workplace, e.g. communication and problem-solving skills, critical-thinking abilities, interpersonal skills, ethical behaviour, open-mindedness and independence (Herring & Izard, 1992). The paper then discusses innovative action-oriented learning activities that enabled the first year accounting students at one campus to actively take part in ungraded formative assessment. However, as the research findings indicate, there is a misalignment between classroom assessment of the student sample group and their final examination, which forms part of the summative assessment.

Thus, we also discuss the impact of centralised decision-making on curriculum issues, arguing that when teaching staff are detached from the decision-making process, their personal educational goals are difficult to achieve, regardless of the passion they might possess for the discipline. The paper also highlights policy constraints when attempting to build constructive alignment (Biggs, 2003), i.e. aligning curriculum objectives, teaching and learning activities and assessment tasks. It argues that centralised decision-making practices pose some difficulties in measuring the quality of student learning outcomes.

2. Literature review

2.1 Pedagogical practices in accounting education

There is an increasing body of literature criticising accounting education for its traditional pedagogical practices (see for example Adler & Milne, 1997; Albrecht & Sack, 2000; Friedlan, 1995; Pincus, 1997; Roush & Smith, 1997). The most widely used teaching methods in accounting education seem to focus on lecture and tutorial formats, which rely heavily on textbook readings and exercises, and involve highly structured problems (Adler, 1999; Bonner, 1999). Such approaches, commentators argue, focus predominantly on the

procedural aspects of accounting, making few linkages between topics and subjects, and providing limited or no opportunities for the development of core generic business skills (Kern, 2002; Milne & McConnell, 2001). Students passively receive information, participating minimally in the learning process.

The literature suggests that the increasingly dynamic and complex business environment and the changing characteristics of student cohorts have rendered the traditional accounting education model obsolete (e.g. Russell & Smith, 2003; Saudagaran, 1996). Calls have been made to renew pedagogical practices and broaden the curriculum to provide students with a more realistic understanding of the diversifying roles that accounting plays in the changing business environments (Mohamed & Lashine, 2003; Sundem & Williams, 1992). Professionals and researchers alike assert that the emphasis ought to be given to the conceptual and user perspective rather than the procedural and preparer's perspective because the traditional model results in students being "trained" rather than "educated" (Accounting Education Change Commission, 1990; Mathews, 1990). Greater emphasis, they argue, must be placed on the development of key generic business skills, such as communication and problem-solving skills, critical-thinking abilities, interpersonal skills, ethical behaviour, open-mindedness and independence (Herring, & Izard, 1992; Foster & Bolt-Lee, 2002). There has been push to use pedagogical models such as problem-based learning, peer-assisted learning and case studies (for example, see Boyce et al., 2001; Crumbley et al., 1998; Springer & Borthick, 2004). Indeed, innovative approaches are being suggested that focus on increased learner control, participation as well as reflection that can encourage the skill of learning-to-learn (e.g. Adler & Milne, 1997; Tempone & Martin, 2003; McCoskey & Warren, 2003). But do such approaches align with students' perceptions about accounting and how they interact in the learning environment?

2.2 Students' perceptions of accounting

Research shows that many students have a misguided impression about accounting and negative stereotypical perceptions about the role of accountants (Cory, 1992; Mladenovic, 2000). Many students equate accounting with bookkeeping and perceive accounting to be a boring

number-crunching activity, driven by procedures and rules, and performed by individuals working alone (Fisher & Murphy, 1995; Inman et. al., 1989). Perceptions such as 'accounting is dull in content and unadventurous in mode' are particularly common among first year accounting students (Buckmaster & Craig, 2000, p.375). As Christensen (2004, p.119) reports, 'our first year students just knew accounting was as boring as watching paint dry'. Accounting, it appears, is something that students already knew about - a concept of debit and credit that has to be meticulously placed and has to produce one correct answer (Christensen, 2004).

Similar experiences have been reported in the literature that students have pre-conceived ideas about accounting education, that it is something to be memorised, (see for example Adams et. al., 1994; Caldwell et. al., 1996) or that teachers will show them the procedures to follow. The result is that students view their role in this context as passive recipients of information, lacking interest and initiative in learning accounting (Marriott & Marriott, 2003) and refusing to participate particularly in tutorials (Keddie & Trotter, 1998) unless the activity forms part of graded assessment.

3. Research methodology

The context of the study is a large, multi-campus regional university in Australia, where subjects are convened at a particular campus and convenors are responsible for the design of summative assessment, with some input from campus-based subject coordinators. The tutors, however, have no input in this process. The second author is a tutor in the subject, Accounting 1: Information for Business (ACC100). This is a compulsory subject for students studying for a business degree (or double degree such as Business/Information Technology, Business/Human Movement). There were on average 150 students in lecture sessions and 20 students in each of the six to nine tutorial sessions in any given semester. The first author, as educational designer, has a role to play in academic development and became the tutor's mentor and 'critical

friend' (Carr & Kemmis, 1986). The critical friend offered suggestions for the design of learning activities and formative assessment which enabled a close working relationship, offering alternative perspectives and support on pedagogical issues. This is an approach which McNiff (1988) recognised as valuable in action research projects.

Action research provided an appropriate framework for this exploratory study because in the educational context it is an approach that enables improvement of education through changes, i.e. 'by encouraging teachers to be aware of their own practice, to be critical of that practice and to be prepared to change it' (McNiff, 1988, p.4). Consistent with action research approaches, the processes undertaken in this project were cyclical and focused largely on reflecting and improving teaching practice to support quality learning.

Each phase of this project progressed through a systematic action research spiral of planning, acting, observing and reflecting (Carr & Kemmis, 1986). Planning was the stage when active learning strategies and formative assessment were progressively developed for deployment and testing in tutorial groups that the tutor managed, and later refined and used in the subject that she coordinated. Acting was the cyclical implementation stage, where students' reactions to classroom activities and assessment were carefully monitored. It was therefore important that the tutor was aware of the purpose of each learning activity, particularly formative assessment, and to evaluate learning outcomes accordingly. Strategies for data collection included observations recorded in the teaching journal, formative assessment which included student artifacts produced for the assessment, peer reviews by the critical friend and by selected academics from other disciplines, and informal and formal teaching evaluations by students. Developing reflective practice was a critical part of this research, in the sense that the cyclical data analysis and reflection paved the way for the ongoing development of new approaches for learning accounting concepts.

4. Results, analysis and discussions

4.1 Facilitating active-learning through formative assessment in a collaborative learning environment

A collaborative learning environment that encouraged students to engage with the teaching and learning activities (TLAs) was the key focus in the tutor's two tutorial groups. The aims of the learning design were three fold: to enable the students to be active rather than passive learners by taking part in authentic learning activities; to encourage them to take part in formative assessment; and to develop key generic business skills. Accordingly, the design of the TLAs was such that it focused on what the students will do to learn rather than what the tutor will do to teach.

Normally, tutors were expected to go through a set of tutorial questions in the syllabus every time they conduct a tutorial session. These were textbook questions that students were supposed to have worked on after the lecture but prior to each tutorial session. However, in addition to going through textbook questions, a series of action-oriented learning activities using real life examples and business artifacts were designed and deployed in tutorials for these two groups. Students worked in groups and/or in pairs depending on the activity. By using real transaction records in these learning activities, such as invoices, and personal and government budgets, these TLAs helped students to make connections with real-world scenarios and provide a holistic view of learning by establishing linkages between topics. Learning was situated in the context of how students will use the knowledge in their everyday life and in the real business world.

For instance, with the aim of providing a meaningful purpose for studying the topic on cash flow and managing cash using cash budgets, an activity involving students to apply the accounting concepts into their everyday life was the focus of this tutorial session. The group activity involved students in developing personal cash budgets for the semester. They worked in teams to estimate their cash receipts (source of income) and cash payments (expenses). This cash budget showed whether they would be in surplus or deficit for the

semester. For this activity, the formative assessment consisted of interactive class presentations. Part of the presentation was to discuss how student groups would go about investing the surplus or financing the deficit and discussing their strategies with the audience.

This activity helped students to contextualise and personalise the knowledge by promoting an appreciation of accounting concepts based on relevant, real life examples. It reinforced the idea that everyone can apply accounting knowledge to manage finances and promote long-term wealth management, thereby 'personalising' their learning. Such knowledge was then used as the basis for understanding bigger business transactions, in the course of progressively exposing the students to accounting concepts. Perhaps, what made the use of real business scenarios interesting was not that they were real, but because most of these examples were also from personal artifacts and business transactions of the tutor to which students related well.

Most of the learning activities for these two tutorial groups focused on fostering a deep approach to learning. For example, the tutor applied the principle of deep learning to a topic on using ratio analysis to assess business performance, a learning activity was designed that involved working on a real case. This case study was based on a Business Week article about Louis Vuitton by Moët Hennessy, titled 'Inside the world's most profitable money-machine'. The aim is to overcome learning problems that first-year students often experience in analysing and interpreting formulas (Ramsden, 2003). The brief for the student groups was to analyse this powerful company in terms of financial health and performance, using ratio analysis techniques such as the current ratio and inventory turnover. In contrast with conventional tutorial exercises, where financial data are given, this activity required students to locate the financial data from the relevant section of the annual report and calculate the appropriate ratios for analysis. When students worked out inventory turnover, which happened to be very low (a three-year average of 1.2), they speculated why such a low turnover could result in the company being so profitable. The formative assessment for this task by way of group presentation again provided an opportunity for peer learning when some students realised, and then explained, that the high price tag of the company's

products, such as handbags, would result in a lower inventory turnover than that of a grocery store.

This is a typical example of case-based activities used in the class, which promoted deep learning as it required students to interpret and apply ratios in assessing the company. The use of a case study encouraged active involvement in the learning process by promoting judgement to resolve uncertainty, and thereby generated deeper understanding (Boyce et al., 2001). Consequently, students' understanding of the meaning behind the formulas was enhanced when they analysed the trends and argued the causes behind the contradicting ratios. The case study was therefore an effective teaching method for providing a connection to the external world so that students could become aware of the ambiguities and complexities of real-world decision-making.

Besides presenting their work at the conclusion of a particular learning activity for the formative assessment, students were also asked to work in pairs to prepare and present a weekly preset textbook question. Again, these presentations were ungraded but in general, students responded positively. Some students demonstrated deep interest in the subject by taking initiatives of presenting their findings in creative ways. For example, on the question of investigating why a trial balance was unbalanced, one student group presented the question using the concept of a florist shop under new management. They went so far as decorating the classroom and then facilitated the discussion with fellow students to position the discrepancies and correct the problem.

These spontaneous actions and initiatives on the part of students clearly demonstrated their ability to develop innovation, creative thinking, critical thinking and problem-solving skills, as well as teamwork, presentation and communication skills within the context of the accounting discipline. However, the key was to create a collaborative learning environment and provide realistic contexts that will enable students to foster such development. The formative assessment approaches used were such that the students were encouraged to practise the kinds of thinking processes necessary for the accounting profession.

4.2 Reflection on and result of the first cycle

The learning design strategically embedded formative assessment in the tutorial activities and, in allowing the students to work in groups, which often included producing learning artifacts, they were able to demonstrate what they know through interactive class presentations. Group activities, according to James and McInnis (2001, p.10) 'mimic the approaches to problem-solving found in the workplace'. Hence, group work also provided opportunities for situating learning in a realistic way. The learning environment indeed provided a rich context within which students could take initiative in formative assessment, which consequently provided opportunities for students to engage with the learning of accounting concepts in a deep and meaningful way. In this learning design, formative assessment is built into the teaching and learning of a particular topic where students are likely to appreciate that it is part of the normal effort of learning about that topic. As Isaacs (2001) suggests, assessment that is added onto the subject is likely to be resented by students as it can be seen as an imposition and can appear somewhat superfluous. 'Assessment is therefore an integral component of the teaching and learning process rather than an appendix to it' (James & McInnis, 2001, p.4).

The collaborative learning environment indeed became a motivation for students to participate fully in formative assessment and thus enhanced their interest and learning in the subject. The tutor was then empowered to evaluate students' level of understanding and provide ongoing feedback on their progress. More importantly, such an approach provided a means to clarify any problematic concepts and take corrective measures in a timely manner. Viewed in this way, formative assessment had a profound impact on improving student learning. The intent was developmental, focusing on helping students to progress in the subject, rather than on assigning grades (James & McInnis, 2001; Ritter & Wilson, 2001).

It is a common perception of some academics (especially early career academics) that students may not participate actively in learning activities if such activities are not graded. They are of the view that the requirements of formal assessment often drive the learning strategy adopted by students (see for example

discussions in Gow, et. al., 1994; Hand et. al., 1996). Akin to the management saying that "what gets measured get managed", in education it seems that what gets assessed gets learned particularly if the task contributes to the final grade. However, results in this first cycle of the research show that students will participate in ungraded assessment provided they are given current, meaningful and enjoyable learning activities. As the following typical student One-minute feedback indicates:

"Hey it is fun, relaxed and enjoyable! And you learn stuff at the same time!"

"I like the way we do group activities and you really explain everything until we understand. Everything is mostly clear to me."

"Very well organised. All explanations are very clear. I did enjoy and get a lot out of the group work that we did."

"What really helps is going through the tutorial homework at the tutorial and explaining it. Having discussion of accounting concept is great. I like how you ask us questions so it makes us think."

"After each tutorial I understand a lot more. There was not anything that I did not understand today. I really like class activities and presenting our ideas to the class."

"I actually enjoy this class; you make it easy to understand because you are approachable. Thanks!"

"Classes are more active, no real problems. More depth to questions is good. Enjoying accounting finally."

A customised survey was also conducted in the final teaching week of the semester. The survey aimed to evaluate the tutor's teaching in terms of promoting active and deep approaches to learning, encouraging student participation, and generic skills development. There were 15 questions in the survey, with 21 respondents from a population of two tutorial classes totalling 30 students, yielding a response rate of 70%¹.

¹Due to re-analysis, there is a variation in the data from previously published results in Lee, C. (2005), Strategies for promoting active learning in tutorials: Insights gained from a first-year accounting subject. Proceedings of the First International Conference on Innovation in Accounting Teaching and Learning, University of Tasmania, Australia

The responses were mainly from those students who had consistent attendance over the semester and those who attended the final tutorial session. The results of the student survey were consistent with the feedback from the one-minute papers, and indicated that the tutor had clearly explained concepts (mean 6.23, range 0-7); stimulated students to think and feel involved in the classes (mean 6.23); encouraged students to express their views on the topic (mean 6.05); motivated students to think critically (mean 6.0) and, in general, appeared enthusiastic in her teaching (mean 6.76).

The analysis of the outcomes of these action-oriented TLAs validated what Ramsden (2003) suggests that the role of the teacher is not about transmission of information but making learning possible. This is achieved by creating a learning context for students to construct meanings and discover knowledge for themselves. Indeed, the experience from this first cycle indicates that when academic teachers demonstrate enthusiasm, passion for the discipline and have the ability to provide moral and behavioural support, students respond positively even to ungraded assessment.

However, the student who commented "Enjoying accounting finally" subsequently failed the subject. This particular student demonstrated through formative assessment an improved level of critical-thinking and problem-solving skills when applying accounting concepts. So why did this student fail in the examination despite enjoying accounting and doing the work? The student provided feedback that he wasn't used to memorising information and preferred the types of testing used in formative assessment. This triggered the authors to look at the design and deployment of the curriculum. While there were certainly many factors that contributed to the failure, one of the reasons was that there was a 'misalignment' between components in the curriculum. The final examination which formed part of summative assessment predominantly focused on testing declarative knowledge, such as procedures and facts recall. Declarative knowledge is knowledge that one can declare, for example tell somebody about what they read in the textbook or give a definition of something (Biggs, 2003). In contrast, the TLAs including formative assessment in the tutorials focused less on the development of declarative knowledge.

With the benefit of hindsight, the tutor overlooked to consider the format of the final exam while designing learning activities and failed to highlight the importance of mastering accounting concepts for the purpose of the exam, e.g. learning the definitions of terms. In fact, there was no consideration on the part of the tutor on how students will be assessed in the final exam. The tutor's teaching goal was to provide a motivational context within which students can construct knowledge of content through the use of problem cases, rather than relying on memory and recalling of facts. The approaches used focused largely on problem cases, and while the authentic nature of learning activities and formative assessment that were used in the tutorials allowed for declarative knowledge to turn into functioning knowledge (Biggs, 2003), it failed to align with the content of the exam and vice versa. The content of the final examination consisted of thirty multiple choice questions and four written questions typically asking students to journalise transactions or prepare adjusting entries.

It is worth noting that there was no formal analysis carried out on the impact of the misalignment on the success or failure in the final examination of the two tutorial groups. However, of the 30 students in these two groups, four were awarded High Distinction, five Distinction, nine Credit, eight Pass grades and four Fail grades. The results in Table 1 show the performance of students in the sample group based on final grades compared to the rest of the population. There were nine tutorial groups in total.

Despite the misalignments in the teaching strategy, the students in the two tutorial groups performed reasonably well in the subject overall. As observed during formative assessment, the collaborative learning environment for these two tutorial groups facilitated students' motivation and willingness to engage in higher level thinking. The final grades indicate that over half of the students in the sample group achieved above satisfactory performance, which may suggest that teaching strategies that facilitate deeper approaches to learning are preferable to surface approaches in achieving quality student learning outcomes (Ramsden, 2003; Prosser & Trigwell, 1999). However, this is an area that the authors recognised needs further study to take into account many other variables. Given that the aim

	The sample group		Population	
	No. of students = 30	Percentage of students	No. of students = 146	Percentage of students
High Distinction	4	13%	14	9%
Distinction	5	17%	32	22%
Credit	9	30%	26	18%
Pass	8	27%	36	25%
Failed	4	13%	38	26%
Total	30	100%	146	100%

Table 1. Students performance based on final grades

of higher education is to develop functioning knowledge, i.e. the integration of knowledge base (declarative knowledge), skills required for the profession (procedural knowledge) and the context for using them to solve problems (conditional knowledge) (Biggs, 2003), it may be useful to also examine assessment practices in first year accounting more closely to identify if they are constructively aligned with other components of the curriculum.

4.3 Discussion: Building constructive alignment, some policy constraints

Based on the idea of constructive alignment, learning and teaching operates within a system which consists of three central components namely, learning objectives, teaching and learning activities and assessment (Biggs, 2003). To facilitate desirable learning outcomes, these three components must be aligned, in particular the teaching methods used and the assessment tasks are aligned to the learning activities assumed in the intended outcomes. Biggs (2003) explains that constructive alignment has two aspects in that the constructive aspect refers to what the learner does, which is to 'construct meaning' through relevant learning activities. The alignment aspect, on the other hand, refers to what the teacher does. The teacher sets up a learning environment that supports the learning activities appropriate to achieving the desired learning outcomes (Biggs, 2003).

So, what are the impacts of using the principles of constructive alignment on institutional policies and vice versa?

The management of subjects within the Faculty of

Commerce at this University is such that subject convenors, who are located in particular teaching schools where the subjects are convened, take full responsibility in the design of the curriculum and assessment. Therefore, decisions on curriculum issues are centralized. The decision-making rests highly with the particular convening schools and ultimately with the subject convenor. Campus-based subject coordinators may have some input, if consulted in the curriculum design process, but tutors generally do not take part in curriculum development. The problem here is that the teaching goals of individual academic staff differ significantly at times, but in most cases the philosophical orientation of the subject convenor responsible for preparing the curriculum often underpins its design. When there is a number of staff involved in teaching a centrally-convened subject and they have competing philosophical orientations, it clearly becomes problematic when building constructive alignment because the whole idea is to link all components of the curriculum with each other. Teaching using problem-based approaches, for example, requires an approach to assessment that differs significantly with traditional assessment that is most common in directed instruction approaches (Hendry & Murphy, 1995). While the results in this first cycle of the research show that it is possible for the tutor to meet her own teaching goals where her teaching methods have contributed to students deeper engagement with the subject, the lack of involvement in curriculum design, particularly on assessment issues posed a barrier in achieving a truly constructively aligned teaching. Mladenovic (2000) warns that simply introducing various innovative teaching methods as the main intervention of changing students' perceptions of accounting is not enough. As the findings in Mladenovic's study (Mladenovic, 2000)

suggest, alignment in all components of the curriculum is the key factor if change in students' perception were to occur.

The more significant policy issue, however, that poses a bigger obstacle in building constructive alignment in accounting education is the compliance requirements of the accreditation bodies. The CPA Australia (CPAA) and Institute of Chartered Accountants in Australia (ICAA) have prescribed in their accreditation guidelines that at least 50% of summative assessment of an accredited subject must be in the form of invigilated examination (CPA Australia & The Institute of Chartered Accountants in Australia, 2005). The Faculty of Commerce on the other hand also requires written assignments to form part of summative assessment. It can be argued that these policies place some limitations on the types of assessment that can be used in accounting education. Moreover, in the accreditation guidelines, both the CPAA and ICAA have also put a heavy emphasis on the development of higher order skills and other generic business attributes. If this is one of the intended learning outcomes for accounting students, is the use of invigilated examination (as the major means of assessing student performance) the suitable assessment system that can test such skills? Put another way, can standardised conditions involving highly structured problems that are common in examination format allow students to demonstrate the development of higher order skills necessary for the accounting profession? Given the constraints discussed above, is there a place for alternative assessment in accounting education that gives credence to the necessity and appropriateness of assessment methods, based on what is being assessed in the intended learning outcomes?

5. Conclusions

The questions which arose from the reflection and analysis of the first cycle became the focus of the iterations in the successive two cycles of this research. The work is continuing where some interesting

developments have taken place in the second and final cycles as the authors engaged more deeply with the idea of constructive alignment. Using the notion of constructive alignment as an approach to curriculum design could optimise the condition of quality learning. As Biggs (2003) suggests, it is an integrated system where all aspects of teaching and assessment are tuned to support high level learning.

However, there are barriers at institutional level, as well as outside forces, that make it difficult to facilitate constructively aligned teaching. The challenge now is to take institutional constraints as a given and design a constructively aligned curriculum and assessment that meets the demands of various stake holders.

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Rethinking Teacher Professional Development

Assessment in the Context of Professional Development: The Implementation of a Portfolio Project

George Hoefflin
Institute of Special Education
University of Education, Lausanne, Switzerland

Linda Allal
Faculty of Psychology and Educational Sciences
University of Geneva, Switzerland

Certified professional development for teaching in the field of special needs requires formative assessment to foster appropriate teaching for multiple handicapped children and very slow learners. In Switzerland, these children benefit from specific types of support (e.g. speech therapy) and special classes with a reduced number of students. Certified training is provided to former schoolteachers wishing to teach in the field of special needs. In this context, professors have created an assessment system taking into account the student-teachers' skills linked to their part-time teaching job and their new "knowledge" acquired during the academic teaching program. A "Portfolio" has been chosen as the assessment tool to accompany the professional development curriculum. The paper presents the conceptualization of the assessment model.

1. Introduction

The implementation of the European Declaration of Bologna (bachelor, master programs) in the Swiss Universities of Education (Hautes Ecoles Pédagogiques) requires new approaches to the assessment of learning. This paper specifically investigates the first steps of a pilot portfolio project for the assessment of learning in the field of special needs in the Institute for Special Needs Education of the HEP Lausanne. The project is conducted in the framework of courses on "didactic and disciplinary skills" in two subject-matter areas (French and Mathematics) provided for student-teachers who are preparing for work in the field of special needs education. In this context, a portfolio was planned to accompany a module composed of three courses and two "problem-solving exercises", one in French and the other in Math; these exercises were prepared and carried out by student-teacher dyads in one of their classrooms.

The portfolio was developed initially to promote formative assessment involving interactions among student-teachers and between student-teachers and the trainers. The portfolio is also used for summative assessment based on the evolution of each student-teacher during the whole period devoted to the courses and the problem-solving exercises.

2. Research methodology

This research analyses the introduction of portfolio assessment during one semester in one of the three courses within the module.

2.1 Participants

The participants were:

- 50 student-teachers in the field of special needs at the HEP Lausanne
- One of the trainers: the professor in the course "Development and Difficulties of Children and Adolescents Acquiring Written Language" (second

semester of the program).

2.2 Modalities of the portfolio for the student-teachers

Student-teachers were asked to complete a portfolio as a self-learning tool and for a summative assessment of their competencies in the field of didactics for special needs education. To help them in their work, a preformatted document was available on the intranet. Concerning French (L1), they had to fill out the first part of the portfolio by a short summary of the course contents and then give their critical impressions about the concepts presented during the course. They were informed that reflexive comments (e.g. comments on the relevance of literacy acquisition models for their specific professional context) would be favorably considered. Then, in the second part of the portfolio, they had to articulate their knowledge of theoretical acquisition models (e.g. step by step vs. interactive models of literacy acquisition) with a concrete problem-solving exercise in their professional field involving children with learning disabilities (LDS). For this part of the portfolio, an outline helped teacher-students to structure the presentation of the child (school record, therapeutic support, family context, diagnostic hypotheses etc.). At the end of the procedure, they were asked to describe the problem-solving session that took place in the classroom, or to imagine a future intervention project adapted to a special needs approach.

The constitution of the portfolio was accompanied by several possibilities of regulation during the courses. At certain moments, it was possible for the student-teachers to interact and share their own observations and experiences with other student colleagues. Furthermore, the professor was available for individual discussions outside the course meetings.

2.3 Context and goals

We examined the relevance of portfolios as an assessment and self-assessment tool within the context of the professional development of teachers who already have a first teaching certificate. Furthermore, the use of portfolios was evaluated both by student-teachers (for its formative and reflective aspects) and by the

trainer involved in this project (evaluative analysis).

Analysis of the data from the portfolios was completed by semi-structured interviews of nine volunteer student-teachers, who were divided into two groups (one of five students, the other of four students). A professor from another institution carried out the interviews so as to insure the confidentiality of the responses. The group interviews lasted an hour. They were recorded and notes were taken by the interviewer and a second person. The students stated from the onset that the views they were going to express would not be representative since the students who were most critical of the portfolio assessment chose not to come to the group interviews. In order to improve the information base, the students collected brief written comments from 15 other students and gave this material to the interviewers.

3. Results, analysis and discussions

We will start by considering the responses given in the portfolio sections completed by the student-teachers and the trainer. Then we will examine the contents of the interviews carried out with nine student-teachers and the written comments of those who preferred not to take part in the interviews.

3.1 Portfolio content

First we would like to point out that all of the 50 student-teachers completed the portfolio sections required for assessment. Furthermore, the reflective questions pertaining to the usefulness of portfolios within student-teacher training were also completed by a large majority (95%) of student-teachers. Nonetheless, some delays in completion occurred; the student-teachers involved mentioned either the inherent workload of such approaches or the fact that they were not used to this kind of evaluation and needed some extra time to complete the task.

We shall discuss mostly the different types of answers, first regarding the critical course synthesis, then

concerning the discussion topic. To conclude, we shall comment on a few trends emerging from the more reflective questions (course relevance for professional practice, for example).

3.1.1 "Critical" course synthesis

Two main categories emerge from the student-teachers' answers. First, more than 75% of students try to cover the major course dimensions: history of writing systems (phylogeny), development of written language in children (ontogeny) and difficulties in the acquisition of written language (dyslexia/dysorthography). However, among this group of students, 26% do not develop a personal point of view on the acquired notions, nor do their answers interpret the subject matter or propose a personal reaction to the contents. Second, within this first set of students, an important sub-group representing 60% of the entire group, reanalyse the subject matter as they outline the course's contents, either by referring to knowledge learned outside the course, or by personally reacting to the proposed knowledge. Only a small minority of student-teachers (about 5%) propose a genuine critical synthesis, either by portraying the difficulties of didactically transposing the taught subject matter in classroom situations, or by describing limitations on the scope of the proposed learning models, for example. At this stage, it would seem that the portfolio experience is too novel or that the development of critical analysis needs more development during the teaching process. Finally, three student-teachers were not able to reach the required criteria set for summative assessment of this part of the portfolio. Nonetheless, these students provided a satisfactory addendum to their work after a discussion with the trainer.

3.1.2 Discussion of a problem-solving experience

Few students experienced difficulties completing this section of the portfolio. Again, answers may be subdivided into two main groups: those who delve deeper into a topic touched on during the course, and those who more or less link the discussion to their professional practice (about 50% of answers in each category). This section of the portfolio provides space to share thoughts about a given approach, which has been tried out in class, and/or about initial problem-

solving for cases of students presenting specific language acquisition difficulties. The benefit of this portfolio section for the teacher trainer is that he or she has an opportunity to see whether the models proposed during the course are experimented with or not in class. Some student-teachers demonstrate a very high level of professional competencies in terms of specific interventions in cases of language learning problems. Others encounter difficulty in transposing taught theoretical elements into classroom practice, since they do not see the relevance of the subject matter for certain kinds of pupils. It is naturally very difficult to assess the pertinence of such statements in a portfolio. It is with regard to such issues that the interactivity of the portfolio tool may be most interesting, in terms of the limits encountered by student-teachers and trainers. Thus, a student-teacher's competencies may in fact lie outside key knowledge areas dealt with in the course (for example: disorders such as autism cannot be solely reduced to language issues, require specialised knowledge and are thus missing from our essentially psycholinguistic approach).

3.1.3 Trainer comments

The trainer's workload turned out to be quite important, because, after reading the portfolios, the trainer not only assessed them (in terms of minimal scores to be obtained for course validation), but he also formulated appropriate written comments. As our assessment objective was mainly formative (certification only takes place at the end of a long process involving three courses and two problem-solving exercises), the trainer's comments either suggested additional directions of reflective thought or proposed useful constructive criticism regarding the student-teacher's academic and professional development. The time invested by the trainer was largely rewarded by the richness of the script provided by the student-teachers. Not only could the trainer observe each student's level of reflective thought and knowledge integration, but he could also benefit from genuine insight into the professional activity of the student-teachers. Thus, for most students a few written comments turned out to be sufficient to assure regulation of their progression. In other cases, if the reflective approach seemed inadequate and the entire portfolio (synthesis and discussion) was judged insufficient, a meeting was arranged to negotiate an

addendum.

During this round of evaluation, we observed a normal distribution of student-teachers' outcomes, with three at each extremity of the distribution; these were either required to produce a negotiated addendum after regulation, or they produced very high level work in terms of their theoretical synthesis as well as of the discussion of their academic and professional practice. The remainder (44 students) were to be found at the centre of the distribution. We would also like to highlight the fact that, after receiving feedback, five student-teachers requested meetings with the trainer to discuss cases of specific pupils experiencing problems who were presented in the portfolio sections. Finally, after reading the portfolios, the trainer obtained a "snapshot" of the cohort including, on the one hand, a general impression of the student-teachers' reflective abilities and, on the other hand, an idea of the diversity of their professional engagements (Behrens, 1999). This significantly assisted the trainer in adapting the course by providing complementary information.

3.1.4 Reflective questions with regard to the course's practical relevance

Reflective questions on the relevance of this course for professional practice were not compulsory since they were only introduced after the initial start of the portfolio project. Nonetheless, more than 95% of student-teachers answered the questions, which were not included in the course validation. Again, we observed two types of answers: those who emphasized course contents linked to transfer possibilities into classroom practice, and those who considered the course useful for "general knowledge" but not "directly transposable" into classroom practice. The abstraction of the models presented to the student-teachers is mentioned as an additional hurdle. There was therefore a kind of dichotomy in this group, in that certain student-teachers were familiar with approaches linking theory to practice, whereas others find it difficult to construct or use this articulation. In all cases, however, these questions encouraged explicit reflection about links between theory and practice and, in many cases; they benefited the student-teachers who were able to establish the suggested links. This kind of question will certainly have to be included into the main body of the portfolio in

the future, so that we can encourage student-teachers to successfully create such essential relationships.

3.2 Interviews with the students-teachers

This part of the paper contains a brief summary of the highlights of the views expressed in the group interviews and in the written student comments. Four topics are dealt with.

3.2.1 Similarities and differences between portfolio assessment and prior assessment experiences

The student-teachers considered the portfolio assessment to be quite different from the forms of assessment they had previously encountered in pre-service training. Several student-teachers said that they had difficulty knowing what was meant by "critical" synthesis. The lengthy comments written by the professor on their portfolios were found to be the most strikingly new feature of the portfolio assessment.

Several student-teachers mentioned that it was a new experience to be consulted about an assessment practice as it is being developed. This is what motivated them to come to the group interview.

3.2.2 Advantages of portfolio assessment

The student-teachers stated that the practice is too recent to draw any conclusions about its educational value and impact on practice. Several advantages were, nevertheless, identified by different students who stated that:

- the critical synthesis obliges a careful review of the course content (notes, readings), a selection of main points, a formulation of a "personal" representation of the content;
- the questions on theory-practice relations stimulate reflection; they are found to be more interesting by some students than the critical synthesis;
- the professor's comments are highly appreciated by the students. They state that these lengthy and detailed comments establish a "dialog" with respect to what the students wrote; they stimulate the students' motivation to continue their reflection; they justify and validate the time and effort the students

devoted to preparing the portfolio;

- the portfolio as a whole constitutes a "documented trace" of the student's work, to which he or she can return; the portfolio can subsequently become a resource document for practice.

3.2.3 Problems encountered with portfolio assessment

Many students in the interview groups and in the written comments talked about the time needed to prepare the portfolio. Quite a few stated that the time required was "disproportionate" with respect to the benefits for their practice. Several students expressed, however, the view that:

"Yes, it takes time but that seems to me normal in the context of professional training";

"I took a lot of time, that's true, but it was necessary for me to find links between theory and practice...".

Another problem raised by the students concerned the detailed nature of the instructions for preparing the portfolio. For some students, the instructions were a source of anxiety, but for others they provided a structured reference which facilitated the task. The students who spoke of anxiety also mentioned that negative past assessment experiences (fear of failure) came to the fore when preparing the portfolio, since they had few previous reference points for this type of assessment.

3.2.4 Expectations and suggestions

The students stated that "the professors are discovering this portfolio approach at the same time as we are". This seemed to contribute to some students' feelings of uncertainty, but a majority of students tended to think that improvement of assessment would not be possible without experimentation. They found it important for students to be consulted before the professors had completely established the final version of their system of assessment.

Several comments were about aspects of the portfolio assessment that could be improved:

- the students said their overview of the portfolio is not sufficiently clear; they do not have a well-defined representation of what the final product will look like;
- the objectives of the portfolio need to be explained and discussed: what competencies are to be developed and assessed?
- while clarifying the objectives that apply to all students, it would be useful to introduce more differentiation in the constitution of the portfolios; this means an acceptance that the portfolio has a "personal" dimension and that variations among students are normal;
- it would be important to develop the possibilities of "mini-conferences" with the professor during the preparation of the portfolio; this would increase its formative function;
- there could be better coordination among the professors concerning the aims and methods of portfolio assessment.

A final point needs to be mentioned: several students raised the question as to whether the assessment should be called portfolio assessment. They expressed the view that the term "portfolio" is applied to so many different types of assessment that its specificity is no longer clear.

3.3 Discussion and questions

The answers provided by the student-teachers, both in the portfolios and in the interviews, reveal that this project does not concern a self-evident assessment method merely awaiting future corroboration. Nevertheless, several factors encourage us to extend the experience, while adapting our tool as needed. Below, we identify some challenges emerging from our initial implementation; then we conclude with some prospects for the future of this project.

3.3.1 What are the advantages of the process?

In an earlier publication (Hoefflin, 2003), we tentatively listed the potential advantages of this project. Let us now see which aspects were observed as successful.

3.3.1.1 Development of independence in the framework of social interaction

It is obvious that this area has been significantly

reinforced for many student-teachers in the sense that they were asked to express in writing the multiple professional interactions taking place during their teaching activities. We believe that such formalization can strengthen the teachers' pedagogical approach when they try to share knowledge during meetings or inter-professional syntheses, for example.

3.3.1.2 Cooperative management of a differentiated pedagogy

Again, in this area, we can identify benefits highlighted in the portfolio responses. Several students specifically focused on a particular pupil with language acquisition difficulties. Issues raised by student-teachers required specific, differentiated interventions, while taking the whole class into consideration in most situations. Links with professionals in speech therapy or in other areas were also mentioned in some portfolios.

3.3.1.3 Professional commitment and mobility

One objective of the portfolio was to promote self-assessment strategies. The reflective questions largely contributed to this goal for a majority of student-teachers. Such thought processes evoke competencies that are becoming increasingly part of the relevant institutional "culture". We accept the idea that professional portfolios should also be: "organized, goal-driven documentation of your professional growth and achieved competence in the complex act called teaching. Although it is a collection of documents, a portfolio is tangible evidence of the wide range of knowledge, dispositions, and skills that you possess as a growing professional. What's more, documents in the portfolio are self-selected, reflecting your individuality and autonomy" (Campbell et al., 2001). Since portfolios invite student-teachers to link theory (reading acquisition models, for example) and practice, they can therefore consolidate their comprehension of "tools", even though some of them may not be immediately useful (for example, in a professional framework involving severely mentally retarded children). Such acquired competencies can become a resource in cases of professional mobility in the future, if needed.

3.3.2 Pitfalls we tried to avoid

When starting the project, we tried to avoid a number of pitfalls, which could have jeopardized the promotion of auto-evaluative strategies (Allal, 1999). We believe that we were able to steer clear of many of them.

3.3.2.1 Tensions occurred by different perceptions of assessment goals

Across the varying interactions between the trainer and the student-teachers with regard to assessment objectives, very few interpersonal tensions were observed. Instead, the student-teachers asked question to obtain precise information on assessment criteria. The regulations proposed to the three student-teachers experiencing problems did not lead to any major difficulties. References to procedures used by other students were sufficient to define the orientations for an addendum, which was successfully completed in all cases. More specifically, the portfolio was a useful tool for the teacher trainer to enhance the pedagogic approaches undertaken by the student-teachers, thereby fostering mutual recognition of the relations between academic knowledge and professional capabilities (Hoefflin & Frauenfelder, 2000).

3.3.2.2 Increasing inequality

We anticipated that an approach which stimulated self-assessment could create an "elite" (Perrenoud, 1995) by splitting practitioners into those who are systematically used to reflecting on their own functioning and those who only occasionally follow such an approach. We must point out that reading the portfolios revealed a difference between practitioners who systematically adopted self-assessment attitudes and others who remained at a descriptive level and thus developed a less reflective analysis. However, the potential danger of such a split tends to argue in favor of procedures that reinforce self-assessment attitudes, in particular among student-teachers who tend to rarely adopt this attitude. With that in mind, the student-teacher's portfolio "comments" section allows us to emphasize the importance of reflective attitudes when these seem to be insufficient or lacking. The option we chose was thus the correction of inequalities, according to the principle that reflective abilities enhance professional

practice; rather than making them a teaching objective in and of themselves.

3.3.2.3 Complexity of the framework

Finally, the implementation of the portfolio took place in a much wider framework than the strict student-teacher/trainer relationship (Allal, 1999); it also involved other trainers, not only in the field of didactics (French-Math) but also in areas like psychology. In this case, the coherence of portfolio implementation can be problematic, because the requirements and teaching objectives of the various teachers may vary. However, the portfolio was also an occasion to exchange opinions around a concrete product as opposed to vague objectives and future plans. Several discussions already took place during the implementation and certain changes are being considered for a better adaptation of the portfolio to teaching objectives, especially in terms of the cooperation among student-teachers solving didactic problems in French or Math.

4. Preliminary conclusions

As we currently put the Swiss directives linked to the Bologna Declaration into practice, the issue of mobility comes to the forefront and the distinctions between formative and summative evaluation (Bloom & Hastings, 1991) tend to be neglected. Thus, both among student-teachers and trainers, we observe a certain puzzlement with regard to the future application of these directives, which are supposed to be based on standards of competencies to be attained and certified. However, the primary advantage of these new constraints is that they promote reflection with regard to both course content and the evaluation of training processes leading to certification.

With that in mind, we have questioned the adequacy of the term "portfolio" for our project. We especially value the formative aspect of the implemented process (Scallon, 2000), even though we recognize the aim of certification. In this regard, a discussion has taken place among the professors who promoted the

implementation of the portfolio assessment tool. They have decided to rename this tool and now call it: an "interactive assessment file". Even though this change can seem quite formal, it is obvious for each partner that the final aim is the certification of the "didactic and disciplinary skills" module. What remains clearly in the global evaluation approach, is that optimising the value of formative assessment is explicitly promoted by "interactivity" between student-teachers and professors. We hope that further development of this assessment project will encourage formative qualities beyond the simple logging of a student-teacher's progress on the way towards becoming a special education teacher. An essential step could thus be made in the direction of establishing the profile of a reflective professional.

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Peer- and Self-Assessment - Drawing the Parallels Between Student and Staff Practice

Lorraine Stefani
Centre for Academic Development
University of Auckland, New Zealand

A basic premise of self-assessment is reflection on learning and it is often difficult to articulate to students what reflection really means. To enhance teaching and classroom practice, we need to encourage staff to reflect or to self assess against articulated standards or criteria. There is an increasing interest in promoting the Teaching Portfolio as a tool to support this level of reflection. There are parallels between this process and engaging students in self assessment procedures.

Particular processes in which staff could become more engaged include for example peer observation of classroom practice. In a well designed peer observation scheme, peer observation means just that, as opposed to observation of one's teaching by senior colleagues! In peer observation the staff pairings involved engage in discussion to draw up the 'observation contract' as in on what issues, on what aspects of classroom practice does a staff member wish to receive constructive feedback - or peer assessment. There could be very strong parallels between this process and students giving formative feedback to their peers on learning tasks and outputs.

This paper promotes the argument that academic staff need to reflect more on the processes in which they hope to engage their students and give indications of how this can be done through seeing the parallels between students reflecting on learning and staff reflecting on teaching.

1. Introduction

University teachers now work within a highly complex environment, generally under severe resource constraints. There are growing demands being made on staff relating to quality assurance and accountability; pressure to be highly competitive in traditional research publication and the need to provide an effective and efficient learning experience for a growing population of students. While there has been much emphasis at a global level for expansion of higher education (Scott, 1998) and widening access, this in itself has resulted in an increasingly diverse student population with differing demands and expectations. Barnett (1994) has argued that with respect to the teaching function of Universities, our responsibilities include: the development of the student's critical abilities; the development of the student's autonomy; supporting the student's character formation; presentation and enhancement of Society's intellectual culture.

This may seem a tall order for University teachers, but the goals may well be achievable if we believe and act upon our own rhetoric of shifting from a teacher-centred to a student-centred learning environment, placing greater emphasis on the need to encourage students to take responsibility for their own learning. The word 'rhetoric' is used advisedly. A shift in the culture of learning cannot occur without due attention being paid to the design, development and delivery of the curriculum and recognition of the need to empower learners within the teaching and learning contract (Stefani, 1999). Until recently there has been an overemphasis on a transmission mode of imparting information and knowledge to students and an absence of reflective practice and questioning of the impact of our teaching on student learning (Ramsden, 2003).

As part of the shift in emphasis towards encouraging students to take responsibility for their own learning, much effort has been placed on engaging students in learning strategies such as Personal Development Planning, maintaining learning portfolios and engaging in self and peer assessment activities. While efforts to embed these learning activities into the curriculum are laudable, they are not without difficulties. They require a paradigm shift from a teacher-centred, content driven curriculum to a student-centred, inquiry based

curriculum. They also require far greater knowledge of student learning than has previously been expected of University lecturers and more emphasis on academic staff themselves modelling the reflective, critical thinking processes we are now demanding of our students.

The intention of this paper is to draw the parallels between engaging students in critical thinking and reflection and staff themselves modelling these processes, with a particular emphasis on self and peer assessment/evaluation processes.

2. Encouraging reflection on teaching and learning

We may ask the question, 'why is it so problematic to engage academic staff in the processes of reflecting on their classroom practice and in self- assessment processes'? While the question is perfectly legitimate it is also somewhat ironic given the current trends towards promoting student self-assessment, reflection on learning and personal development planning procedures (Stefani, 2001). A partial answer to the question is that academic staff have not traditionally been asked to explicitly reflect on their practice nor to engage in peer assessment/evaluation relating to classroom practice. The traditional overemphasis on research output and the consequent perceived 'lack of esteem' for teaching (Middleton, 1998; Elton, 1995) have had the unfortunate consequence that provision of an excellent learning environment for students is assumed when promotion or career advancement issues for academics are considered.

Fortunately there is growing recognition that teaching or facilitating student learning at tertiary level is a highly complex activity worthy of research and reflection (Stefani & Elton, 2002). In actual fact there has been recognition of this for a very long time but it is only recently that this belief is being acted upon in a more visible manner. In 1985, Lord Ashby, who was Vice Chancellor of a prestigious UK University stated in the

preface to a book entitled 'Learning More and Teaching Less' (Brewer, 1985): "For many years I taught in universities. Like most academics I assumed that the only qualification I needed was expertise in the discipline I taught. It did cross my mind that how to teach might be a discipline in its own right, but I never gave it much thought. I marked thousands of examination scripts without examining what the scripts could teach me about my capacity as a teacher and examiner" (quoted in Elton, 1995).

Sadly it is probably the case that many senior academics could say the same thing today if they gave it much thought. However, internationally we are witnessing a 'sea change' in attitudes towards university teaching. The Dearing Report in the UK (NCIHE, 1997) started a ball rolling with respect to questioning 'the lack of esteem' granted to teaching. An outcome of this report was the setting up of the Institute for Learning and Teaching in Higher Education (now incorporated as part of the Higher Education Academy (HEA, 2005)). The function of the ILTHE is stated to be 'supporting effective teaching and encouraging innovative approaches to learning and teaching'. The ILTHE developed membership criteria based on five areas of professional activity which include:

- Developing effective learning environments and learner support systems
- Reflective practice and personal development (relating to teaching and learning)

More recently Australian Universities have seen the setting up of the Carrick Institute for Learning and Teaching in Higher Education. The mission statement of the Institute is 'to promote and advance learning and teaching in Australian higher education'. Some of the key objectives of the Carrick Institute include:

- Raising the profile and encouraging recognition of the fundamental importance of teaching
- Fostering and acknowledging excellent teaching
- Promoting and supporting strategic change in higher education institutions for the advancement of learning and teaching, including curriculum development and assessment (Carrick Institute, 2005)

The New Zealand government is currently engaging in

a consultation exercise with the goal of setting up a National Centre for Excellence in Tertiary Teaching with the government commenting that there must be a shift from a transmission mode of teaching to one of facilitating learning and promoting reflective practice (STEP, 2005).

It is extremely difficult to imagine that this level of resource is being put into 'teaching enhancement for the sake of maintaining the status quo. It is much more likely to be the case that there will be individual accountability for classroom practice with rather more clarity regarding evidence of reflection on practice regarding the facilitation of student learning.

How then can we support academic staff chasing their tails to achieve high ratings on their disciplinary based research output to engage in a more scholarly, research based, reflective approach to teaching? Several approaches can be taken but the remainder of this paper will focus on two particular activities that can encourage reflection on practice and how these activities may enable staff to develop a better understanding of the learning processes in which they are increasingly engaging their students. These two activities are:

- Developing and maintaining a reflective Teaching Portfolio
- Actively engaging in peer observation and feedback on classroom practice

3. The Teaching Portfolio as a tool to support reflection

The concept of a Teaching Portfolio is somewhat 'old hat' (e.g. Seldin, 1997; Stefani & Diener, 2005) but there is ample anecdotal evidence of poor uptake and engagement by staff and a low level of meaningful implementation. A project carried out recently at the University of Auckland exploring faculty views on Teaching Portfolios indicated that part of the stumbling block as regards meaningful implementation is that assumptions are made about reflection on teaching as

an understood activity (Dobbie et al., 2004). An obvious issue here is that if we ourselves have difficulty conceptualising and engaging in the processes of reflection on and self-assessing our teaching and classroom practice, how can we really promote reflection on and self-assessment of learning?

There are clear parallels between the concepts of developing and maintaining Teaching Portfolios and the interest in promoting to students the concept of Personal Development Planning (PDP). In the UK in particular there has been considerable emphasis on embedding PDP opportunities within the curriculum. PDP has been described as 'A structured process undertaken by the individual to reflect upon their learning and/or achievement to support personal, educational and career development' (QAAHE, 2005). In an ideal world, students would be enabled to enhance achievement through reflection on current attainment, make strategic decisions based on their strengths and weaknesses and 'evidence' their learning processes.

The parallel processes for staff are: reflecting upon and evaluating the impact their teaching has on student learning, and 'making strategic decisions' relating to their practice (Ramsden, 2003).

There are some excellent examples of Learning Portfolios particularly from Universities in the United States. For example, Alverno College in Milwaukee entitle their portfolio for students: A Diagnostic Digital Portfolio (DDP). This web-based system is designed to enable students to follow their progress throughout their period of study and to process or reflect on the feedback received from faculty, external assessors and peers (Doherty, 2002). More information on the DDP can be found at <http://www.ddp.alverno.edu>

What is interesting about the DDP is that it is embedded within the learning strategy from the outset of the period of study. The emphasis for student learning is on reflection, self-assessment and feedback. The lessons to be gained here relating to a Teaching Portfolio may relate to the issue of feedback. If the only purpose for a Teaching Portfolio is seen to be summative in that it is linked to appraisal systems or extrinsic reward, this may militate against a reflective approach and result in a mechanistic, repository function rather than a

developmental, formative function.

Many academic staff struggle with the concept of embedding Personal Development Planning into the curriculum and with articulating to students what it means to self-assess. In a recent book written by Nancy Falchikov on the topic of improving assessment through student involvement (Falchikov, 2005), she presents a definition of self-assessment as follows:

Self-assessment is a way for students to become involved in assessing their own development and learning. She further expands upon this with the following points:

- A way of introducing students to the concept of individual judgement
- Involving students in dialogue with teachers and peers
- Involving individual reflection about what constitutes good work
- Requiring learners to think about what they have learned so far, identifying gaps and ways in which these can be filled and take steps towards remediation (Falchikov, 2005 p.120)

My question to the reader is, what if we were to exchange the word student for 'academic staff member' and make some other minor word changes to the above definition of self-assessment and present this in the context of the purpose of a Teaching Portfolio? Would this support staff in recognising the parallels between encouraging reflection and self-assessment for students and engaging in self assessment and reflection on their own practice?

In an ideal world teaching and learning would be seen as complementary activities, faculty would take the same scholarly, reflective approach to the facilitation of student learning as they do towards their disciplinary based research. They would also model the processes of reflection for their students - and could do this through the development and maintenance of a Teaching Portfolio.

What lies behind the rhetoric of 'reflective learning' is the consideration of a 'knowledge' and a 'learning' society and the concomitant rise in the importance of intellectual capital (Jary & Parker, 1998). In order to compete effectively in a rapidly changing world,

university graduates must be able to adapt their skills to new situations, be able to adapt their knowledge and understanding constantly and be capable of making sound judgements of the value of their own and others' work and to be critical thinkers. It is therefore important that teachers ensure that students understand these objectives and provide them with appropriate guidance and teaching/learning activities to facilitate the achievement of these objectives. If we are to live up to the idea that the teaching function of universities is linked to the presentation and enhancement of Society's intellectual culture (Barnett, 1994), university academics and lecturers must show their understanding of this and accept their role in modelling reflective capacity.

At the University of Auckland a major initiative is underway to raise the profile of Teaching Portfolios. This initiative takes into consideration that the first stage of a Teaching Portfolio is likely to be a matter of developing a user friendly repository structure. On the basis of staff input the model for the portfolio will be based on 5 key aspects of teaching, namely:

- Roles and responsibilities of the individual
- Evaluations of Teaching
- Contributions to Institution or Profession
- Activities to Improve Instruction
- Honour or Recognition

Each of these headings can have a series of sub-headings or sub-files which give guidance as to the sorts of issues which might constitute evidence on current practice. An implicit action in terms of using a repository is reflecting on and recording actions and activities. For example, under Roles and Responsibilities the expectation is that individuals would provide: an indication of particular areas of expertise; the context of their teaching including learning hurdles in the specified discipline; a statement describing roles and responsibilities with a list of courses, student numbers, new course developments, teaching styles and strategies etc.

(While it is not the intention of this paper to provide full details on the proposed structure of the Teaching Portfolio, Figures 1 and 2 show the template currently being piloted. Further details of the structure and the supporting Learning Management System can be found

in Stefani and Diener, 2005).

The reflective aspect of the first section of the portfolio would entail a statement on the linkage between the rationale for teaching goals, student learning activities or processes and student outcomes. From this it might reasonably be expected that individuals could draw out a statement on their teaching philosophy, goals and approaches to facilitation of student learning.

If we consider the potential of the portfolio section relating to evaluation of teaching, we must take into account a range of different ways that teaching or classroom practice can be evaluated, judged, assessed. Good teaching involves continuing efforts to evaluate teaching for the purposes of improved learning (Prosser & Trigwell, 2001). In many cases there is an overemphasis on course and lecturer questionnaires with academic staff selecting a raft of questions over which students have no sense of ownership; the questionnaires being distributed too late in a course for any significant changes to be made in response to the outcomes and staff failing to recognise that the students are as much the stakeholder in this process as the staff themselves and thus deserve a 'closing of the loop' in terms of obtaining feedback on the outcomes of this evaluation process. Studies on student evaluations have shown that student evaluation of teaching is related to student achievement as in high achieving students rate their teachers highly (e.g. Marsh, 1987) but rarely does evaluation of this sort draw out parallels between students' conceptions of learning and staff perceptions of teaching (Prosser & Trigwell, 2001). Thus, the conclusion must be drawn that the use of evaluation questionnaires is very limited. As Elton contends, these evaluations are merely an overall measure of satisfaction or dissatisfaction and can only tell us if lecturer A is significantly better or worse than lecturer B (REF). They rarely promote reflection on teaching and learning.

There are other forms of evaluation that can easily be embedded within classroom practice. For example the work of Cross and Angelo on Classroom Assessment Techniques (1994) provides a range of ways in which simple techniques such as the 'Minute Paper' can enable the lecturer to find out what learning is occurring within their lecture session or other teaching and learning

setting. One way is to set up very simple questions five minutes before the end of a session such as: 'What were the key things you learned out of today's lecture? and What aspects of today's lecture did you not understand?'. By asking the students to give very brief responses, checking these responses and feeding the outcomes back to these same students at the next encounter, lecturers can find out what learning is occurring, and by having feedback of this type the students themselves can have their learning affirmed or gain a greater insight into their own misunderstandings. Students are confirmed as stakeholders in the evaluation process, staff are enabled to reflect on their classroom practice.

With a user friendly structure for a Teaching Portfolio, it should be a simple process for staff to record the inputs and outputs of classroom evaluation techniques which can be referred to in a future iteration of the particular course.

While it is expected that individuals will be able to draw out from their portfolio evidence of good practice for the purposes of performance review, in parallel with the concept of student learning portfolios such as the Diagnostic Digital portfolio and Personal Development Planning Portfolios, the real potential for enhancement of classroom practice lies in provision of support in the form of formative feedback. It is unlikely that senior staff will have the time and the resource to provide formative feedback on the portfolio - but there are other options, one being the enhancement of peer feedback or peer support strategies as a variation on the concept of peer observation of teaching.

The next section will explore forms of peer assessment including peer observation of teaching and other potential peer feedback strategies.

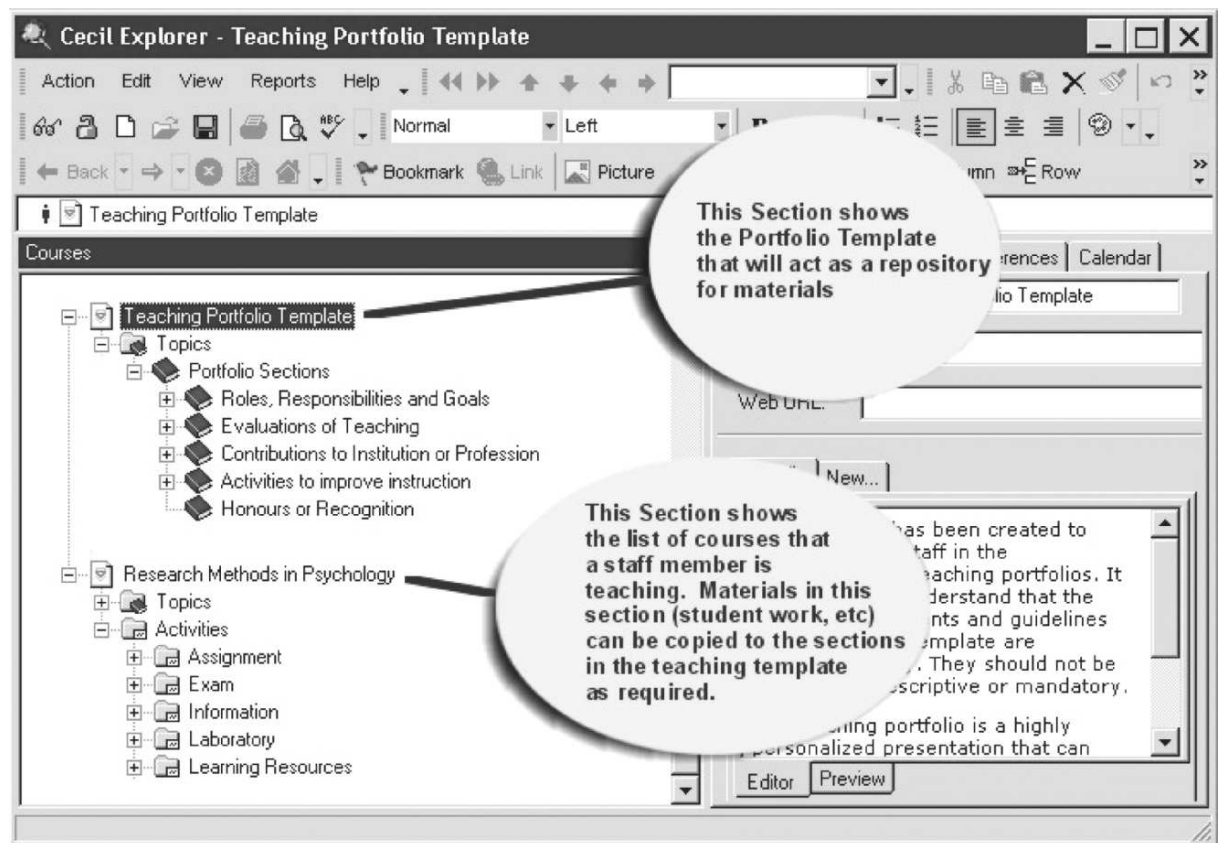


Figure 1. The University of Auckland e-Teaching Portfolio template showing a user-friendly level 1 taxonomy of activities (Stefani and Diener, 2005)

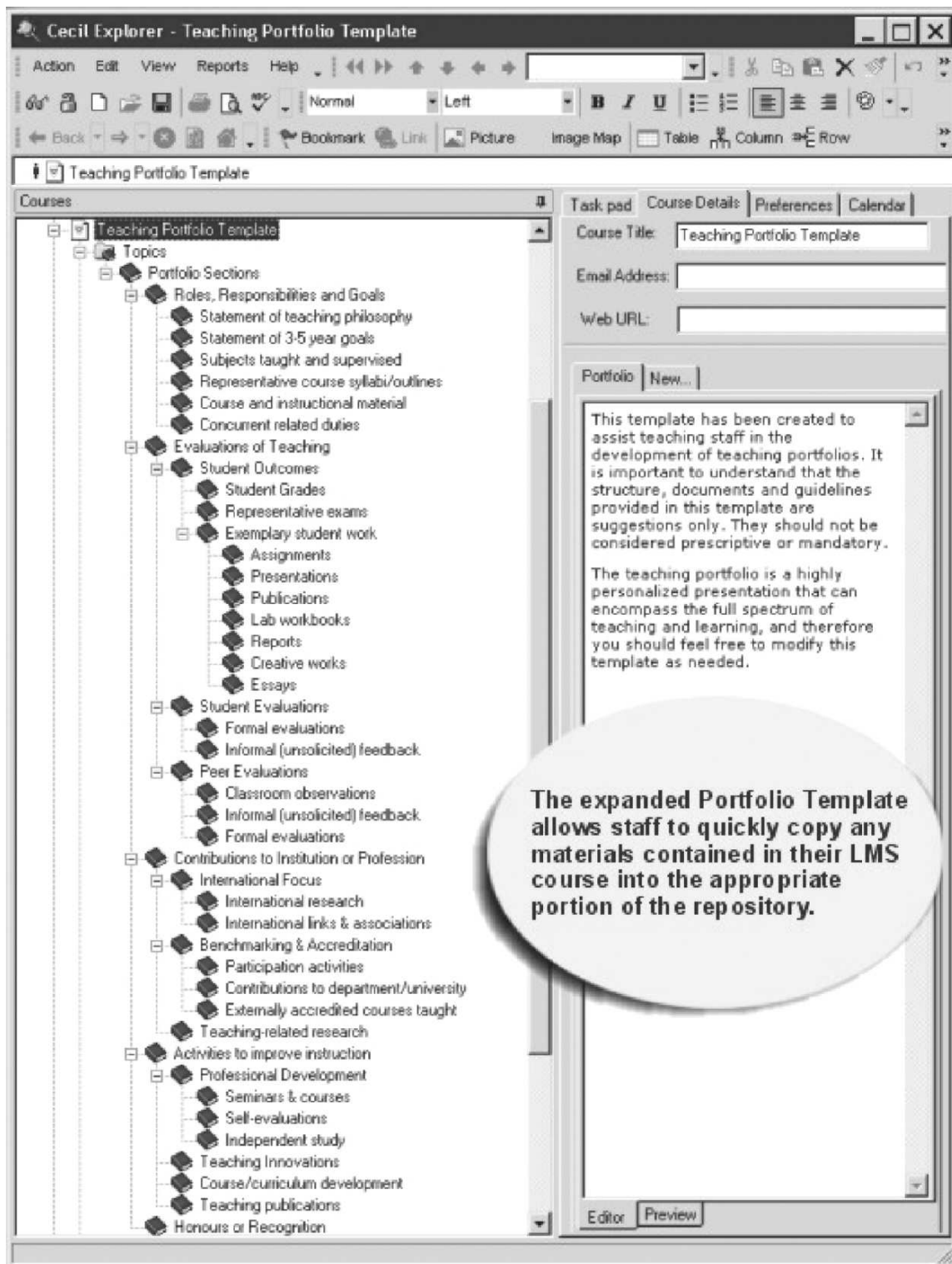


Figure 2. The University of Auckland e-Teaching Portfolio template with expanded sub-divided taxonomy for ease of storage of teaching/learning objects (Stefani and Diener 2005)

4. Peer observation, feedback and support strategies

Peer observation of teaching is growing in importance in tertiary teaching both for the purposes of evaluation and development of classroom practice. In a well designed peer observation and feedback scheme there is value for both the observed and the observer. Participants in such schemes often comment on the value of observing someone else teach and then discussing different approaches to facilitating student learning. For the observed, gaining feedback in a constructive manner can build confidence particularly for staff new to teaching (Black & McLean, 1996). In the context of peer observation, as with most other situations, the giving and receiving of feedback require high levels of communication skills (Eastcott & Farmer, 1992).

What is important about peer observation and feedback on classroom activities is that the overall intention is developmental and that there should, over time be an improvement in the student learning experience. There are at least three potential purposes of a peer observation scheme, namely:

- Individual professional development
- Performance management
- Evidence of quality assurance

A scheme will work to best advantage if it is seen as developmental, constructive and collegial. There are many examples of peer observation of teaching and much anecdotal evidence of feelings of anxiety and nervousness about the process particularly where there is a sense that the scheme is being used primarily as a means of performance appraisal. Crutchley et al. (2005) have written an excellent review of the potential problems associated with many peer observation schemes. For example, they indicate that the system is easy to subvert, reviewer reports can be simply complimentary with little evidence of significant or constructively critical professional dialogue.

The intention here is not to detail a series of peer observation schemes but rather to highlight that peer observation and feedback may be seen as a parallel to

peer assessment carried out by students.

There are now many reports in the literature on the implementation of peer assessment strategies. The work of Boud (1995) and of Falchikov (2005) in particular, provide an extensive analysis of the current literature. The underlying pedagogical principles of involving students in assessment include the goals of developing more autonomous learners, promoting critical thinking and supporting students in making objective judgements about the value of their own and other's work. Should these principles not apply to teaching and shouldn't the concept of peer observation of teaching be a modelling process for reflection and constructive critique?

Many academic staff have 'experimented' with peer and self assessment strategies. The literature on this issue is sprinkled with many highly successful examples of the processes and anecdotal evidence can provide plenty of examples of peer and self assessment strategies that did not achieve their intended goals. However, in many of these cases it is reasonable to ask how the strategy was conceptualised, how students were inducted into or prepared for the process, how was the scheme evaluated in relation to the intended outcomes?

These are teaching and learning process issues. Any scheme of involving students in the assessment process through peer assessment must be well worked out. Are we concerned primarily with ranking and grading (summative assessment) or are we interested in enhancing learning (formative processes)? Are we imposing criteria upon the students or are we involving the students in setting the criteria? There are strong parallels here with the concept of peer observation of teaching. Are we imposing/enforcing upon staff a requirement to engage in peer observation of teaching for the purposes of performance management/quality assurance (summative processes) or are we encouraging a developmental approach for the purposes of enhancement of learning (formative processes)?

Are we imposing upon staff a set of 'rules' by which they must teach, looking primarily at content, quality of visual aids etc. or are we concerned with student engagement in the learning process as the primary focus of observation?

In a peer observation scheme widely used at the University of Strathclyde and developed primarily by Soden (Soden & Stefani, 2001), the observed and the observer essentially engage in a contract. This contract is not imposed but rather it is developed in partnership between the participants engaging in the process. This means that the 'observation' is context specific. The observed will discuss with observer the key aspects of classroom practice on which he or she would like feedback. These points are documented, the observation occurs and a time is set for engagement in constructive dialogue and feedback. This scheme was a key aspect of an accredited professional development programme for academic staff and the participants were expected to write a reflective report on three different episodes of peer observation. The partnerships were switched around such that each person was both an observer and an observed.

The important point is that participants had ownership of the process. The 'contract' has similarities to a peer assessment process whereby students are involved in the setting of the assessment criteria for any given assessment task. There are several examples of peer assessment strategies being more successful (reliable) if students are involved in the setting of the criteria (e.g. Stefani et al., 1997; McDowell & Sambell, 1999; Falchikov & Goldfinch, 2000). It seems not unreasonable to suggest that peer observation schemes will be more successful in achieving the goal of enhancing reflection on classroom practice if staff have a sense of ownership, if the scheme is developmental, and the 'criteria' for observation are context specific and determined by the participants.

Peer observation of actual classroom practice is not the only possible medium for peer input. If there was more engagement in developing and maintaining a teaching portfolio, the portfolio itself could become a powerful means of sharing experience. In many universities there is much more emphasis on providing mentoring support for new staff. While the role of mentor is subject to context and there are a variety of ways in which mentoring occurs, a collegial approach to sharing and discussing ideas on curriculum development and design, assessment strategies, evaluation strategies etc. could be through the sharing of information contained within a portfolio. The University of Auckland e-Teaching

Portfolio prototype lends itself to this purpose and has a parallel with the Electronic Learning Portfolio which has been developed by Stanford University (<http://sll.stanford.edu/consulting/tools/efolio/>). The purpose of which has been stated to be for: individual students to capture, organise, integrate and re-use the results of their formal and informal learning experiences over time, as well as allowing students to take advantage of this accumulated information to plan and assess the progress of their learning career with peers, faculty advisors and future employers. Once again one could slightly alter the wording of this to state the purpose of an e-Teaching Portfolio, with the primary emphasis being on reflection and feedback.

5. Summary

Both teaching and learning should be conceptualised as collaborative rather than competitive activities. This however requires a shift in the mindsets of both teachers and learners. There are obvious tensions inherent in this assertion given that students will ultimately, as graduates compete within the employment market and staff may see themselves competing with their colleagues for rewards, and thus engage more deeply in activities considered to carry the most prestige.

However, if we are to acknowledge the overall shift in emphasis that is occurring at the level of society whereby knowledge is transient and new skills, aptitudes and attitudes are required for economic success, the ability to continually enhance current practice, the skills of reflection and self and peer assessment may well become the new cultural capital.

In the context of tertiary/higher education whether the medium or the format for reflection and enhancement of practice is linked to teaching or to learning, neither students nor staff will be encouraged to engage in these processes if they are not supported and they don't see the 'rewards'. Engagement in peer assessment is highly problematic if students feel that assessment is not their job or that staff are abdicating their responsibilities. A

major task is to raise students' awareness of their responsibility for their own learning and to develop their understanding that self and peer assessment procedures are for the purpose of enhancing their learning.

Likewise, academic staff are unlikely to wholeheartedly engage in any developmental form of peer input, evaluation or assessment if they do not feel that teaching is a valued activity and is as likely to count towards the reward system as any other activity.

This paper has attempted to draw out the parallels between the processes in which we claim we wish to engage our students and to argue that our success may be limited unless we as academic staff ourselves understand, engage in and model these same practices for our students.

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Sustainable Assessment and Lifelong Learning: Standards for Excellence and the Development of Teacher Identity

Steve Thornton
Division of Communication and Education
University of Canberra, Australia

Sue Wilson
Faculty of Education
Australian Catholic University, Australia

The Australian Association of Mathematics Teachers has recently developed Standards for Excellence in Teaching Mathematics in Australian Schools. Current research suggests that assessment should be sustainable in that it equips students with the skills and attitudes that will enable them to meet and monitor their own future learning. This paper describes how the Standards for Excellence were used to develop an assessment methodology in the context of teacher education that has the potential to develop a powerful and robust sense of teacher identity for exit students; and examines the extent to which it met Boud's (2002) criteria for sustainable assessment.

1. Introduction

This paper outlines how an innovative approach to an assessment task, built around the Australian Association of Mathematics Teachers (AAMT) *Standards for Excellence in Teaching Mathematics in Australian Schools* (2002), both contributed to pre-service teachers' development of a strong sense of teacher identity and shed light on their journeys as pre-service teachers. The assessment task was the culmination of a course of instruction in mathematics pedagogy, during which time these pre-service teachers created a strong and cohesive learning community. It required students to compile a targeted portfolio of work and to present it as evidence in an interview situation. The questions that students were required to address in the interview challenged them to address issues about their practice, their beliefs and their professional ethics, by linking theory and practice in a structured way. The goal of the study was to develop a framework that promotes the crucial practice of reflection among pre-service teachers, and hence contributes to life-long learning by being a first step along the way to becoming excellent teachers of mathematics.

(NCTM, 1991; Ingvarson, 1995; Ramsey, 2000; Commonwealth of Australia, 2003).

The AAMT *Standards for Excellence* outline what teachers believe are the characteristics of highly accomplished teachers of mathematics, and provide both a framework against which teachers can be assessed and for teachers' on-going professional learning. They outline three domains in which excellence in teaching mathematics is evident: professional knowledge, professional practice and professional attributes. Professional knowledge includes knowledge of mathematics, of students and of how children learn mathematics. Professional practice includes creating an effective learning environment, planning for learning, teaching in action, and incorporating appropriate assessment in teaching. Professional attributes include personal attributes such as enthusiasm for teaching mathematics, a commitment to personal professional development and adopting community responsibilities such as promoting mathematics.

The *Standards for Excellence* are intended to serve at least two major purposes: enabling a transparent and defensible method of accrediting teachers of mathematics as highly accomplished teachers, and providing a framework for effective professional development. They thus provide a description of one high-level step along a teacher's professional journey, and a vision of teacher identity at this point.

2. Framework of the study

2.1 Standards for excellence

The Australian Association of Mathematics Teachers (AAMT) *Standards for Excellence in Teaching Mathematics in Australian Schools* (AAMT 2002) were developed over a period of three years as a Strategic Partnerships with Industry Research Grant, in which Monash University was the research partner and AAMT was the industry partner. The methodology involved extensive consultation with teacher focus groups, with input and advice from the broader mathematics and mathematics education community. The development of the *Standards for Excellence* is set within a national and international context in which professional standards have become an increasingly important element in describing and promoting excellent teaching

2.2 Sustainable assessment

Boud (2000) describes the existing paradigms of formative and summative assessment, arguing that summative assessment does not equip students well for the processes of effective learning in a learning society, and that we need to develop a new focus on formative assessment. He argues for a new paradigm termed "sustainable assessment", that has the potential to equip students as life-long learners. As the AAMT *Standards for Excellence* make clear, life-long learning is a key attribute of highly accomplished teachers of mathematics.

Boud argues that assessment always does "double duty", in that it both judges achievement and transmits what we value; that it is assessment both for learning and for

certification; that it has a focus on the immediate but that it also equips for life-long learning; and that it attends to both content and process domains. He suggests that sustainable assessment attends to these dichotomies, and that it enables students to evaluate their on-going learning and development without being dependent on formal, external feedback mechanisms. He sees sustainable assessment as an integral part of this life-long learning.

2.3 Teacher identity

Teaching is a complex profession. As recognised by teachers themselves in developing the AAMT *Standards for Excellence*, excellent teaching is dependent upon knowledge, action and beliefs. These three aspects of teaching excellence do not exist in isolation; each influences and depends upon the others, and they are intricately woven to form the complex fabric of teaching. It is the teacher's motivations for, and feelings about, the complexity of teaching that we call teacher identity.

Twenty years ago Shulman (1986) discussed the distinctive kinds of knowledge necessary to be a teacher, identifying pedagogical content knowledge as a key aspect of excellent teaching. More recently he has articulated a taxonomy of learning, culminating in commitment and identity, which are realised as values are internalised and character developed. He argues that an educated person's "commitments always leave open a window for sceptical scrutiny, for imagining how it might be otherwise" (Shulman, 2002).

Mayer (1999) distinguishes between role and identity in self-formation as a teacher, suggesting that core beliefs constitute one's teaching identity. Students' reflective journals indicated that teaching personalities were privileged over pedagogical and subject knowledge, and that pre-service teachers often felt that what they were learning in their university studies, and what they were asked to do in schools during the practicum, were contradictory to their personal feelings about what it meant to be a teacher. Drake et al. (2001) describe teachers' identity as their sense of self as well as their knowledge, beliefs and orientations to work. They describe the many influences on primary teachers' sense of identity, in particular some of their feelings of failure as students in school mathematics and their struggle

to make sense of and incorporate new ways of teaching.

Building on Lave and Wenger's (1991) influential study of five apprenticeship learning situations, Adler (1998) emphasises that knowledge about teaching is tied to the context of teaching, that it is dynamic and that it is "simultaneously personal and social". She suggests that this knowledge is not acquired in the academic study of teaching, but that it evolves through "legitimate peripheral participation in a community of practice" (Lave & Wenger, 1991), of which pre-service education is one ingredient. For Adler this knowledge is tied to pre-service teachers' identities, and is built through discourse and through making the hidden assumptions of teaching transparent. Mayer (1999) also stressed the need for pre-service teachers' personal theories to be made explicit, deconstructed and problematised through reflection and discourse.

Thus it would appear to be essential to construct learning and assessment opportunities in pre-service teacher education that promote the formation of habits of mind that enable pre-service teachers to link theory and practice (Ebby, 2000), through reflecting on their own teaching in a framework that makes explicit not "how to be" an excellent teacher of mathematics, but "what it is to be" an excellent teacher of mathematics. In Boud's (2000) terms, assessment in pre-service teacher education must be sustainable.

3. Methodology

Journal writing (Artzt, 1999; Brown, 2001), case studies (Hammermas et al., 2001), professional conversations (Britt et al., 2001; Thornton & Blain, 2002) and the preparation and presentation of structured portfolios (Frid & Sparrow, 2003) are all recognised as valuable tools to promote pre-service teachers' capacity to be reflective practitioners.

In the study described below pre-service teachers were required to reflect on their knowledge and to see themselves as active researchers of their own teaching

in the context of the *Standards for Excellence* described above.

One of the authors teaches a subject Secondary Teaching Studies (Mathematics) to students at the University of Canberra, Australia. This subject is a one-semester subject that forms part of either a one-year Graduate Diploma in Education or of the final year of a four-year Bachelor of Education degree. Students enrolled in this subject hope to teach mathematics to secondary students, aged 11 to 18, in the following year. For most of these students this subject of 36 hours is the only one in which they look specifically at how students learn mathematics, at mathematics curriculum, and at different approaches to teaching mathematics. All students also undertake a four-week period of Professional Experience, during which time they work full-time in a school under the guidance of an experienced teacher of mathematics.

Assessment for this subject typically involves three assignments: an exercise in micro-teaching, the development of a set of detailed lesson plans, and the accumulation and presentation of a portfolio of activities, resources, lesson plans and reflections during the semester and particularly during the period of Professional Experience. While these assessment tasks have immediate and obvious practical value, it is debatable to what extent they meet the criteria of sustainable assessment, nor to what extent they promote the development of teacher identity, as described above. Yet for these students, this is their only pre-service experience in mathematics education, hence it is critical that they are well positioned to become life-long learners of the art and craft of teaching mathematics.

It is noteworthy that many, but not all, of the students involved in this class were mature-aged students, who already had varied life experiences and a strong sense of personal identity. Two of the students had left extremely well-paid careers to become teachers, others had experience as parents and community leaders. These students had a strong sense of why they wanted to become teachers and what they hoped to achieve. In general they "wanted to make a difference". They were also very aware of their own experiences as students in mathematics classes, and while they had been successful, they felt that their school experiences had

not engaged them, and had not promoted the development of deep mathematical understanding. In the words of one student, "I don't think I will make a very good maths teacher, because I have just begun to realise that I don't really understand anything I learned at school - I was just good at it."

One author, the lecturer of the subject, had been concerned for some time that the portfolio presented by students tended to be little more than an unfocused collection of resources, journal articles and lesson plans with only brief annotations, but no apparent coherence. While it told me something about the pre-service teachers' capacity to collect resources, it told me little about their capacity to thoughtfully weave these resources into the complex web of teaching mathematics, nor to make sense of their teaching experiences in the light of what they had read and discussed in their academic studies.

In an attempt to make the portfolio assessment more focused, it was decided to reframe it in line with the AAMT *Standards for Excellence* described above, and to add a 20-minute individual interview, during which time pre-service teachers were asked to explain their rationale for including parts of the portfolio, and to evaluate their knowledge of, practice of, and beliefs about teaching. Each pre-service teacher was asked to answer three questions, segments of which were:

1. The AAMT *Standards for Excellence in the Teaching of Mathematics in Australian Schools* list three aspects of being an excellent teacher: professional knowledge, professional practice and professional attributes. From your own Professional Experience describe a situation where one of these aspects was evident. Use your portfolio to provide concrete evidence to support your answer.
2. With reference to the readings discussed during the semester, describe the characteristics of a classroom in which high levels of engagement with mathematical ideas are likely to be present. Refer to a class that you taught during Professional Experience and describe how you attempted to create and/or sustain such an environment. Use your portfolio as evidence.
3. Discuss one of the quotations below. Refer to readings

during the semester, a class you taught during Professional Experience, and your portfolio to support your answer.

"Of course setting is advantageous for instruction. It's just not advantageous to the students in the lower classes."

"(Children) are bored because the things they are given and told to do in school (mathematics) are so trivial, so dull, and make such limited and narrow demands on the wide spectrum of their intelligence, capabilities and talents."

John Holt (1965)

Each student was then asked to bring their portfolio to an interview, to answer the three questions above, and to refer to their portfolio as evidence. Two mathematics educators interviewed the students, made notes during the interview, referred to the portfolio for any further clarification, and provided feedback within thirty minutes of the completion of the interview. Students were informed that the interview process was an experiment, and that it was being used as an attempt to make the portfolio more focused. Each student also agreed to have the interview taped for future reference.

4. Results and discussion

As might be expected in any assessment task, there was a wide range of student responses and levels of performance. A few students were unprepared, had done little reading, and did not focus their answers or portfolio. At their best, however, the interviews were remarkable. They showed a capacity to be reflective of their own teaching, to be critical and constructive and to ask informed questions of the status quo. They provided a vivid and tangible image of pre-service teachers developing a very strong sense of teacher identity.

4.1 John

John focused on professional knowledge in his

discussion of the *Standards for Excellence*. He drew parallels between a constructivist approach to teaching and his background in human communication theory. He noted that a key principle of communication was that "the receiver makes the message", and concluded that it was thus the teacher's role to know his students, their culture and their idiom well enough to enable each student to make the message in a productive way.

"By the third week (of Professional Experience) I was much better able to recognise the diverse requirements of the students in the class. The girl who did not listen felt she understood most of the topic and was bored. The boy at the front was being continually distracted by his girlfriend who sat next to him. The girl at the back had developed lots of go-slow tactics to hide the fact that she did not understand most of the topic. The boy in the middle needed more challenging problem to keep his interest...I began to make progress with most of these students but I have a lot to learn before I can manage appropriate learning opportunities for most people in the class most of the time."

John saw learning as problematic and dependent on a range of factors beyond transmission of information. He was able to incorporate what he had observed in practice with what he had read and discussed in his academic studies, and to incorporate his prior knowledge and experience. His sense of teacher identity would thus include a strong appreciation of diversity.

4.2 Malcolm

Malcolm reflected upon a singing observation sheet he had seen used in an early childhood setting. The teacher observed how each child sang, using prompts such as whether the child was opening her mouth, or moving her lips. Malcolm put a "productive mathematics behaviours" (Corkill, 1999) checklist on his list of things to do, so that he would be able to more effectively monitor changes in students' behaviours. This was at least partly in response to his observations that many students came to class unprepared both in terms of having the appropriate physical resources for learning and a productive frame of mind for learning. Like John, Malcolm saw knowledge of students as critical for effective learning, and recognised that he would need to take practical steps to continually develop that

knowledge.

4.3 Linda

In her response to the second question Linda chose to focus on the characteristics of classrooms with high levels of engagement. She described how teachers at the school at which she was teaching told her to "never have discussions, and always give short, sharp comments". She felt that such advice was contrary to a classroom environment in which high levels of student engagement would be evident. She noted that her plans to be creative and to engage students in solving problems "did not really pay off" in the school where she was teaching.

Linda was particularly interested in looking at mathematics learning in context. She described a journal article (Nicol, 2002) she had read in which pre-service teachers had visited workplaces, but often been unable to recognise the mathematics being used. She felt that this lack of capacity to see and appreciate mathematics in a workplace context militated against creating an engaging and relevant environment for students. She described one class in which students who had a history of failure in mathematics were given "real-life maths, not that stuff you get in other classes." Yet the real-life maths was restricted to questions such as "How many days are there in May?", or "If I spent \$1.50 from a \$10 note, how much change would I get?". Linda was wrestling with the very complex issue of what relevance really means in a mathematics classroom, and recognised her own lack of knowledge of mathematics beyond the school classroom.

4.4 Melissa

In thinking about an important issue in mathematics education (Question 3), Melissa reflected on her experiences with, and reading about, setting students based on their perceived ability levels in mathematics. She discussed the pros and cons, noting that setting students into ability groups made life easier for the teacher, but asked whether the students were really being provided with differentiated learning opportunities, or whether they were just being given more (or less) of the same at a faster or slower pace.

Melissa described how, in teaching fractions to a year 7 class, her supervising teacher had asked her to split the class into three groups based on results in a pre-test. On reflection she felt that, while they had worked diligently through the work assigned, the most advanced students had not been challenged in any significant way, and that, in general, the lowest achieving students remained the lowest achievers. However one student who had been placed in the lowest achieving group was able to complete the post-test with only one error. This was exciting for both the student and his teacher, who had not expected such a result.

Melissa commented on the immense volume of literature on ability grouping, and asked why the practice continued to be widespread when there was significant evidence of negative social impact and limited academic impact. She expressed her disappointment that teachers at the school where she was teaching used the expression "Zoo" class to describe the lowest achieving group, saying that the grouping practice tended to concentrate students with behavioural problems into the one group. However she also recognised that, for one student in her year 7 class, being given work at a level with which he felt comfortable had completely changed his attitude towards mathematics, and she wondered if such a change would have taken place had the students been taught as a whole class. Melissa concluded by saying "I haven't got an answer, I'm still sitting on the fence".

As noted by my co-interviewer these, and most of the other students in the group, had thought deeply about their teaching, about what they had read and talked about in their academic studies, and about how it related to their practical experience. They did not provide glib answers, but saw knowledge of teaching as developing through reflection over a long period of time. Melissa noted that "by putting it all together (for the interview) it's touched on layers of other issues". The task built connections between the pre-service teachers' understandings of theory from their university studies and their practical experiences during professional experience in order to support the development of professional identity.

4.5 Student and teacher reflections

Both authors commented upon the maturity of the students, and on how articulate they had been. We were impressed by their "willingness to expose and consider their weaknesses in an interview." We noted that this task had assessed higher order thinking skills such as critical reflection, and had put into practice much of the rhetoric of the teacher education course. We felt that the interview process and portfolio preparation had modelled professional excellence in a very powerful way, by respecting the pre-service teachers' background, knowledge and experiences, and their right to reserve judgement where they had not yet arrived at a firm opinion. We felt that, in this way, the process had been unusual in its value to the students.

The interviews provided strong evidence of developing teacher identity, in particular characteristics such as scepticism, the capacity to reflect on experience to link theory and practice, and a sense of self as a learner. The pre-service teachers' core beliefs about teaching, and about themselves as teachers, were challenged. They recognised their existing professional knowledge and highlighted their shortcomings; they evaluated their own and their supervising teachers' practice honestly and critically; they revealed a developing sense of what they valued in learning.

However the most surprising outcome was the sense of community generated through the process. The pre-service teachers emailed each other after the interview to discuss their feelings about the task. This was an entirely self-motivated undertaking - we had not asked them to share their reflections and had expected that, like every other assessment task we had ever set, students would just be glad that it was over. On learning of this email exchange, we requested a copy with names removed, and the students were happy to provide their reflections.

"When the audience is sitting in front of you, there is more chance that you can adjust your presentation if they appear bored, confused or incredulous."

"Because the interview is so short and the time can disappear so quickly it is very important to be organised and be clear about the main messages in your

presentation (just like in a lesson)".

"I think it is a little dangerous to try and assess people on a 15-20 minutes interview, as it tends to favour those who are articulate rather than (necessarily) those who have reflected deeply. Of course every assessment will have its own bias (essays, after all, will favour those who write well), but I think the danger of assessing style rather than substance are greater in (a) short interview scenario."

"Probably the most I got out of the whole process was how analysing, reading articles and reflecting continued to challenge me about my teaching. Many of the articles I read had direct relevance to what I had been teaching and raised lots of questions, and provided some answers, in teaching these topics. While I was preparing for an assessment item, I think I got more out of the exercise than the mark Steve gave me."

These pre-service teachers saw the exercise as an important part of their on-going development as teachers of mathematics. They saw themselves as part of a community, and were keen to share their experiences and thoughts with others. Unprompted, they thoughtfully evaluated the validity of the interview process and made links with assessment practices beyond their current course. In this sense the portfolio and interview did "double duty" by focusing on both the immediate and the future, by transmitting what is valued as well as making judgements, and by giving students the reflective skills to attend to their on-going development as excellent teachers of mathematics.

4.6 Building sustainability

Boud (2000) outlines eight principles by which to build sustainability in assessment.

1. Confidence that new learning tasks can be mastered. The students interviewed were confident that the targeted reflections prompted by the interview questions would enable them to be reflective and critical teachers when faced with the day-to-day challenges of teaching in a secondary school.
2. Exploration of criteria and standards which apply to any given learning task. The students were aware of the criteria by which they would be assessed.

These were:

- Capacity to critically reflect on and improve your teaching;
- Capacity to use mathematics education literature and a range of resources to inform your teaching;
- Capacity to think critically about issues in mathematics education;
- Evidence of a coherent rationale for and philosophy of mathematics education.

During the subject, students explored what these might mean for the interview and portfolio, and raised questions about how they might address them effectively. In the process of doing this they gained a greater awareness of the role of standards and criteria in evaluating teacher knowledge, practice and attributes as outlined in the Standards for Excellence.

3. Active engagement with learning tasks in order to test understanding and applications of criteria and standards. As noted by Melissa, many of the students engaged with the learning task at a level that was much deeper than that which might have been required to obtain a passing grade. Rather than the focus being on marks, the focus was on questioning their own beliefs and practices.
4. Development of devices for self-monitoring and judging progression towards goals. By focusing on the Standards for Excellence the students were able to evaluate their current state of professional competence. This set them up to monitor their development in the teaching environment, and to undertake future assessment against the Standards. The assessment thus encompassed the knowledge, skills and predispositions required to underpin life-long learning, while still meeting the needs of the present as defined in the course of study at University.
5. Practice in discernment to identify critical aspects of problems and issues. By asking the students to target their portfolio and interview to specific, but broad and open questions, students were required to make judgments about what to include in the portfolio. The students' responses to the interview question discussing a critical issue showed that they were able to critically examine several aspects of an issue, and arrive at informed positions. In doing so they drew on the disciplinary knowledge gained through their University studies and the professional knowledge gained through their experience in schools. They saw

teaching as an on-going process of inquiry rather than as an exercise in reproducing the status quo.

6. Access to learning peers and others with expertise to reflect on challenges and gain support for renewed efforts. Many of the students spent several hours practicing their answers to the interview questions with their peers. In the process they built up a community of learning, as evidenced by the reflective discussion following the assessment.
7. Use feedback to find new ways of engaging with a task. While the students were unable to respond to the feedback given by their University lecturers as it was at the end of their course, it was clear that they used the feedback of teachers in schools to improve their teaching and to develop as reflective professionals. They did not necessarily accept and act upon every piece of feedback; rather they evaluated the usefulness of their teacher's feedback in the light of their own observations of student learning.
8. We should take care in our use of vocabulary to avoid creating closure on ongoing learning. Melissa's response "I am still sitting on the fence" showed that she had maintained an open mind on a critical issue. Students understood that the assessment task was very much a snapshot of where they were "at the time", rather than being an assessment of some final point in their development as teachers. In this way the task met the needs of the present (University accreditation) without compromising the students' future learning needs.

5. Conclusions

The AAMT *Standards for Excellence* provide a framework through which teacher identity can be developed and evaluated. While pre-service teachers cannot be expected to show highly accomplished practice, as described by the *Standards for Excellence*, the *Standards* can provide a vision of what it means to be an excellent teacher. The portfolio and interview assessment task described above enabled students to describe their own experiences in

the light of the *Standards for Excellence*. In the process it would appear that this assessment task met many of the criteria for sustainable assessment described by Boud (2000). In particular the students' unprompted reflections provided clear evidence that they were able to evaluate their on-going learning and development without being dependent on formal, external feedback mechanisms. The portfolio and interview assessment served both the immediate purpose of evaluating current knowledge and the long-term purpose of giving students a framework for their life-long journey as teachers of mathematics.

Of course this assessment task did not stand alone. It was part of a course that included extensive instruction, discussion, reading and reflection. Yet it appeared to pull together students' experiences in a very powerful and revealing way. The extent to which the developing sense of identity exhibited by these students grows and develops through their careers as teachers remains to be seen, and could profitably be the subject of further research. The AAMT *Standards for Excellence for Teaching Mathematics in Australian Schools* provides an ideal framework by which such a longitudinal study of teachers' identity could be conducted.

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Teaching with Group Work, Peer and Self Assessment

Peer Assessment among Students in a Problem-Based Learning Format

Steve Frankland
Department of Industrial and Systems Engineering
The Hong Kong Polytechnic University, Hong Kong SAR, China

This paper presents the findings of an interactive case study that uses a problem-based learning approach to examine a typical layout planning case whereby, students assess the work of other students which are then used as a part of their continuous assessment. After a brief introduction to the topic, students are formed into small groups of about five students and given the case to analyse. The introduction contains just enough information for them to tackle the case, they then submit and present their solutions. The case is then used to demonstrate further layout planning techniques used to find solutions to such situations. Finally, students are given an introduction to typical methods of evaluation, and each group evaluates the results of other groups. These are then amalgamated and used as part of the continuous assessment for the subject. The case study has been used on postgraduate students five times and the results consistently demonstrate its value both as a teaching learning activity and as an excellent example of peer assessment.

1. Introduction

This paper presents the findings of an interactive case study that uses a problem-based learning (PBL) approach to examine a typical layout planning case study. The case study itself comes from a simplified real industrial problem in a manufacturing company. It is given with the engineering experience detailed with background such as: authentic calculations and schedule limitations; availability of resources and technical requirements together with other important human elements. The scenario given here has several parts, each with some critical decision points.

Hence, the use of peer assessment in this case further allows students to fully participate in the teaching and learning process since they are very likely to be required to handle similar scenarios with such problem-solving skills in their current or future workplace.

Underpinning a peer-assessment process is giving and receiving feedback which aims to empower the learners and improve the learning quality.

Throughout the assessment reform movement, some educators and teachers (Cheng & Warren, 2005; Noonan & Randy Duncan, 2005) in the newly emerging formative assessment field are urging that students should be engaged and involved in the assessment process. They listed numerous benefits of allowing students to gain autonomy in the assessment process, which includes:

- giving a sense of ownership of the assessment process, and improving motivation
- encouraging deep rather than surface learning
- encouraging students to take responsibility for their own learning
- enhancing higher order thinking skills, e.g. critical evaluation
- facilitating student-centred learning
- increasing social interaction between learners

2.2 Group Work and Peer Assessment

Group work is usually very difficult for teachers to assess or assign individual grades to students, and they often award the same grade to every member of the group. However, some students may find this grading method unfair as there may be "free-riders" in their group who contribute little or nothing but receive the same grade as other members who have made a significant contribution (Cheng & Warren, 2005; Johnston & Miles, 2004). In some respects, the introduction of peer assessment to group work is seen as a possible way to deal with it because it enables teachers to learn more about the contribution of individuals to the task. Students may also feel more comfortable to work as a team since free-riders are less likely to benefit from the efforts of others (Johnston & Mile, 2004).

The benefits of using peer assessment have caused many teachers to experiment and adopt peer assessment as part of the assessment methods in their teaching.

2.3 Possible Problems

However, peer assessment must not be seen a magic

2. Implementation of Peer Assessment

2.1 Peer Assessment

Over the last decade, formative assessment has gained increasing attention and recognition as a better assessment strategy than summative assessment. Most educators and teachers believe that formative assessment is beneficial to both assessors and assessed because it encourages and guides students to understand subject matter more deeply in a non-threatening atmosphere and allows them to continuously monitor their learning progress. Peer assessment is indeed one of the best ways to operationalise the principles of formative assessment (Noonan & Randy Duncan, 2005). According to Wilson (2002), peer assessment is defined as "the assessment of the work of others with equal status and usually has an element of mutuality". Peer assessment has also been described as a strategy involving students' decisions about others' work that would typically occur when students work together on collaborative projects or learning activities (Noonan & Randy Duncan, 2005).

portion to such problems faced by many educators and teachers, because there are still some practical issues that need to be considered during the implementation process.

Firstly, as suggested by Boud (2003), assessing outcomes related to peer learning may not make students engage more actively in it. Students might be put off by the idea of assessment by their peers. They might not trust and feel confident about themselves and their peers' judgement. This may eventually lead to a series of other unforeseen problems. It should also be noted that peer assessment can easily inhibit the processes it is designed for if it is not being implemented successfully (Boud et al., 2003).

Secondly, peer assessment relies heavily on the judgment and objectivity of the students involved, and this may cause problems if it is not being implemented thoughtfully and cautiously. Much recent research on peer assessment has been focused on its validity. It is not uncommon to learn that undergraduate students may not have been critical and subjective enough when they get the opportunity to mark their peers' work. Stefani (1994) reported that some students may misuse their power by under marking their peers in order to give themselves an advantage or avoid competition. It seems that it is difficult for the two parties to have the same standard on the severity and leniency when marking various tasks. The author has seen numerous cases of strong peer support driving such situations where all students in the group give each the same very high grades, i.e., the "you scratch my back and I'll scratch yours' scenario".

Moreover, some researchers (Boud et al., 2003; Cheng & Warren, 2005) have reported that there were significant differences in the rating given by the teacher and peer. Lacking experience and confidence in marking the work may possibly be part of the reasons for contributing to the problem of marking discrepancy. Students often reported a low level of comfort and a low degree of confidence in their ability to fairly and responsibly assess their peers' proficiency (Cheng & Warren, 2005)

Peer assessment is very often influenced by the objectivity of students rather than the subjectivity of

the quality of work concerned. Peer assessment could be made more reliable if assessment criteria are given to students. Indeed, research has shown that how the assessors grade the work is highly dependent on the relationship between the learning outcomes and assessment criteria (Wilson, 2002). Teachers may consider giving the students an assessment checklist for them to use which can help to improve their ways to make fair judgment.

While this matter can to some extent be simply improved by giving students more training on peer assessment and to increase their understanding and knowledge of the criteria in order to make fair and critical judgments, it is also important to give students more practice on assessing peers' work so as to boost their marking confidence.

Another problem arises; the validity and reliability of Peer assessment is often compared and judged according to the grade given by the tutor. Moreover, how can one determine a fair and equitable standard or reference point? Falchikov (2000) reported that there is uncertainty about teacher reliability and validity. Thus, it does not seem appropriate to evaluate the reliability of peer assessment against tutor assessment if the teachers' ability to grade is under suspicion. A way to avoid such pitfalls may be to include grades from multiple teachers, average them out and then compare peer assessment against it (Langana et al., 2005). This however, can be a rather clumsy and time-consuming task.

In summary, the success rate of peer assessment is still quite unpredictable and varies from case to case. It is necessary to do more research to guide the widespread use of peer assessment.

In order to overcome the above mentioned problems, in this study, the use of peer assessment was purposely embedded into the teaching and learning strategy. The students were required to make use of decision making techniques they learnt from this subject for assessing their peers' work. Given a set of information and equipped with subject knowledge, students were requested to respond to a specified engineering problem in a prescribed approach.

The interactive case study requires students to examine a typical layout planning case study whereby, they assess the work of other students. During the process, just enough information was provided to students to tackle the case. They then submitted and presented their solutions for others to assess after comments by the teacher.

Throughout the two 3-hour face-to-face sessions in the classroom, the students, organised into groups, are requested to experience the decision making process described in the case. With case discussion, students had the opportunity to develop their independent thinking and decision making skills through practice. Instead of just receiving facts and knowledge on topics to be covered in the subject, they were required to go

further by focusing on what was learnt being put into the real practice.

Moreover, engineers like others professionals do not work alone. Real-life engineering problems are usually resolved by teamwork. The pedagogical design for peer assessment empowers groups of students to involve themselves in the decision making process which is likely occur in an engineering team. The design thus addresses the requirement of their workplace and the assessment component itself becomes authentic in its nature from the student perspective.

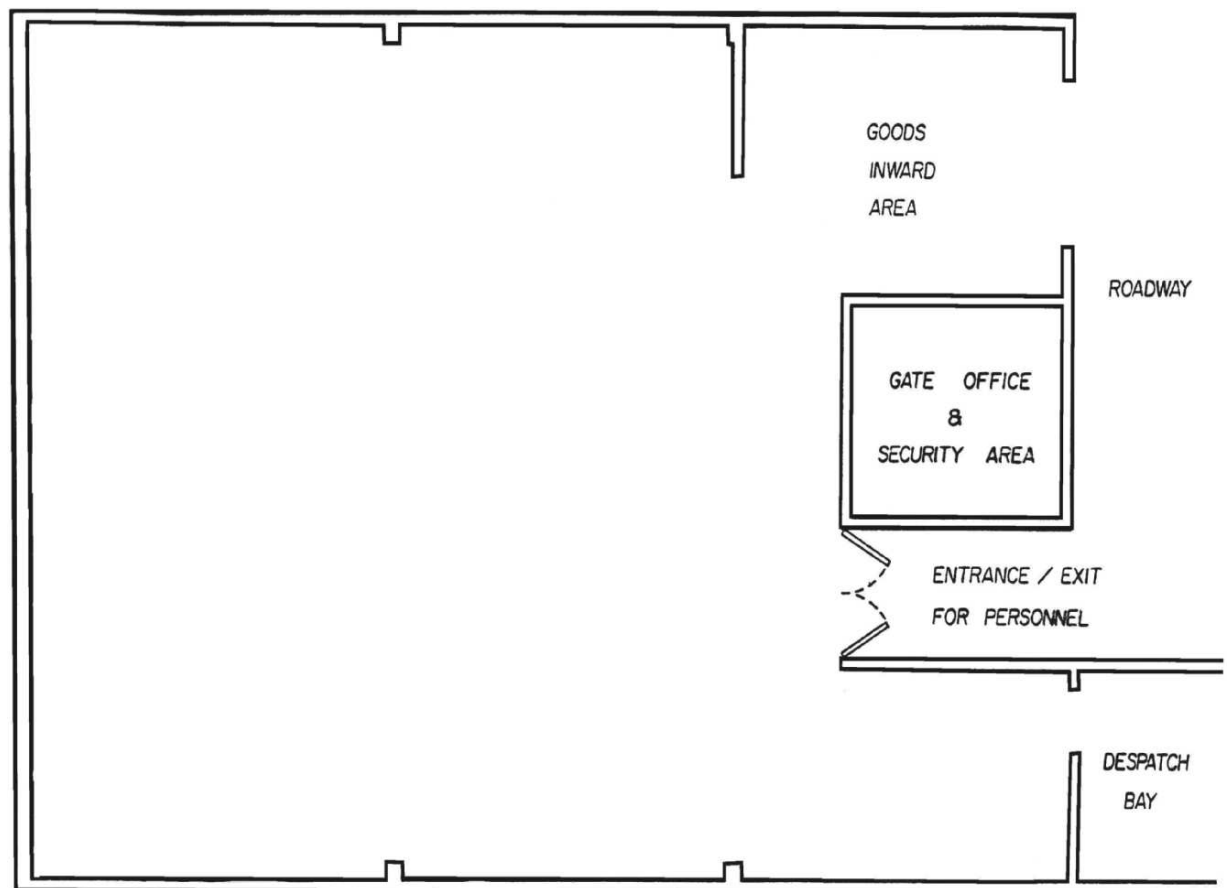


Figure 1. Layout Plan

3. Procedure

Firstly a brief introduction to layout planning was given whereby typical objectives of layout planning were explained followed by some elementary layout planning techniques. The purpose of this introduction was to set the scene and provide students with just enough information to be able to recognise, define, and analyse the case without actually explaining to them what to do. They were then divided into groups of about four to five students per group and given the case. This was briefly described to them so as to facilitate a thought-provoking discussion in the class. (see Figure 1 - Layout Plan, Figure 2 - Templates of Machines, Table 1 - Production Data, and Table 2 - Service Accommodation).

After each group completed their layout, they submitted and presented their results to the rest of the class and the teacher briefly commented on the advantages and limitations of each layout plan. The teacher then used the case as a vehicle to explain and demonstrate some further layout planning techniques that could be used in determining solutions to such situations. Basically, these comprise of techniques for the design of flow lines and the use of Systematic Layout Planning. After making use of these, another solution to the same case is determined. This was referred to as the "Teachers Solution", not necessarily the best solution.

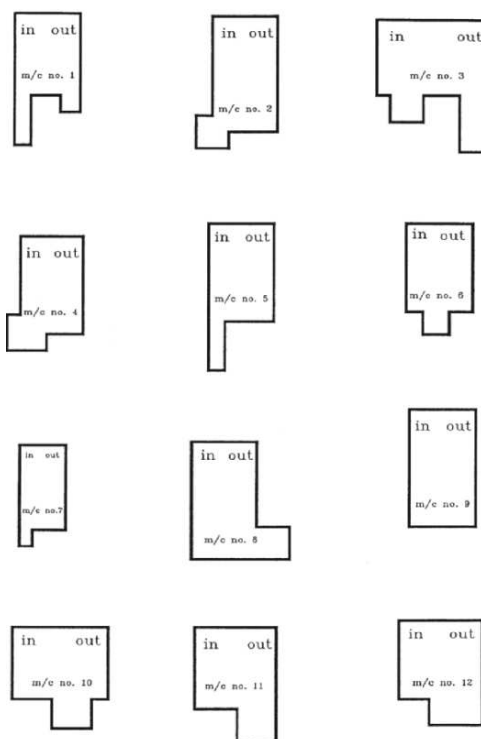


Figure 2. Templates of Machines

Product	Sequence of Operations											Quantity per Day	
A	2	8	2	5	1	8	7	9	10	11	12	60	
B	5	3	2	6	9	10	12					140	
C	3	7	8	4	9	10	11	12				80	
D	3	2	5	7	9	10	12					20	
E	5	2	5	2	7	6	9	11	12			140	
F	6	3	7	3	7	3	9	10	11	12		40	
G	5	7	6	1	8	1	3	8	9	10	11	60	
H	7	2	8	2	4	9	10	11				180	
I	3	2	8	5	3	8	9	10	11	12		20	
J	2	7	8	6	5	3	7	1	9	10	11	12	100

Table 1. Production Data

- Production machinery, 12 machines are required (Machine 1, 2, 3, etc.) Scale templates of these are shown previously
- A Tool Store, estimated space requirement about 45 square metres
- A Tool Repair and Maintenance section to house two toolmakers, estimated space requirement about 18 square metres
- Office space for a Foreman, estimated space requirement about 12 square metres
- The Production Planning and Control office, estimated space requirement about 30 square metres
- The Quality Control office for two inspectors and some special inspection equipment, estimated space requirement about 16 square metres
- An area for lockers, washing, and toilet facilities for personnel, estimated space requirement about 28 square metres

Table 2. Service Accommodation

Ranking Evaluation Sheet								
Company: ENGCOM Ltd			Project: <i>Layout</i>			Date: 21st Oct 2002		
Procedure:								
Step 1	Rank each alternative (Group 1, Group 2, etc. excluding your own) according to: 1st (best), 2nd, 3rd, 4th, 5th, 6th (last) for each of the criteria listed below (1. 2. 3. 4. 5.)							
Step 2	Total each alternative in the Summary row							
Step 3	The alternative with the lowest score is the one to be selected							
Factor	Alternatives	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
1. Material Flow		3		1	2	4	6	5
2. Access of personnel to and from work areas		1		3	5	2	6	4
3. Location of Supervision with respect to persons/area that they supervise		1		3	6	2	4	5
4. Location of Tool service between store and repair and To/From machinery		1		5	2	3	4	6
5. General Issues (see below*)		4		3	6	5	1	2
Summary		10		15	21	16	21	22
* Considerations such as effective use of space (overall utilisation of the available area, space to allow for maintenance and repair of machines), suitability of size and shape of office accommodation, acceptance by both foremen and the Production Manager, factory workers, overall appearance, etc.								

Figure 3. Evaluation Sheet

Each group then spent about five to ten minutes presenting their solutions and this included the teacher's comments on the relative advantages and limitations of each. It provided an excellent demonstration that in real life there is seldom any "best" solution to an industrial problem, and in reality there will always be alternatives that can be considered. After emphasising this, the teacher then briefly explained techniques that can be used to evaluate different alternatives. Some of which are Ranking, Paired Comparison, and Points Weighting.

Students were then presented with the solution of other groups and asked to evaluate them using Ranking technique. This is not necessarily the preferred method but one that can be handled effectively within the time limitation set by the class. Using Ranking, a numerical score was used, i.e. 1 being highest, 2 being next and so on against five criteria that were considered to be suitable of this case study, namely:

- material flow
- access of personnel to and from work areas
- location of supervision with respect to the persons/area they supervise
- location of tooling service between store/repair area and to/from machinery
- general issues such as space utilisation, suitability of size/shape of office accommodation, acceptance by both foremen and the Production Manager, factory workers, overall appearance, etc.

The Evaluation sheet used for this is shown in Figure 3.

The results were then compiled so that all students can see all the results of all groups. The Summary sheet used for this is shown in Figure 4. It has been found that there is a high degree of consistency whereby the stronger layouts are always ranked high and the weaker layouts ranked low. This demonstrates that students are able to recognise good solutions when they see them and there has never been any hint of confounding, i.e. some layouts ranked high by some groups and low by others. An example of a typical solution when eleven groups were involved is shown in Figure 5. A typical time schedule for the whole exercise is shown in Table 3.

4. Results

Using the results of the numerical scores, with seven groups in the class, each group would evaluate the six other groups, so the best case scenario would be if a particular group was ranked 1st on each occasion for each of the five criteria, i.e. 1st x 5 factors x 6 groups = a total score of 30. Conversely, worst case scenario would be if a particular group was ranked 6th (last) on each occasion for each of the five criteria, i.e. 6th x 5 factors x 6 groups = a total score of 180. Accordingly, a score of each group will range between 30 (1st for every factor by each group) and 180 (last on each factor by each group).

Finally, the numerical scores were converted to the University's grading system. i.e. A+ (Outstanding), A (Excellent) B+ (Very Good), B (Good), C+ (Wholly Satisfactory), C (Satisfactory), D+ (Barely Adequate) D (Weak) and F (Fail). This was done by the teacher who used subjective judgement by looking for natural breaks between the relative scores of groups. This is shown on the Evaluation sheet in Figure 3.

Within these two classes, students were introduced to various practical payout planning and evaluation techniques used in engineering, as well as other forms of management. A learning environment was created that allowed students to act as a group of engineers working together to solve a realistic problem. Without strong intervention from the teacher, this case provokes students to discuss and share ideas, identify priorities, and examine the materials in the limited time available.

Group Evaluating \ Group Evaluated	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Group 1		19	24	14	11	13	24
Group 2	10		15	21	16	21	22
Group 3	16	21		14	14	20	20
Group 4	12	15	24		16	16	19
Group 5	14	18	17	7		11	18
Group 6	16	26	21	8	13		18
Group 7	21	25	22	6	15	16	
Final Score	89	124	123	70	85	97	121
Rank	3rd	7th	6th	1st	2nd	4th	5th
Final Grade	B+	C+	C+	A	B+	B	C+

Figure 4. Summary Sheet

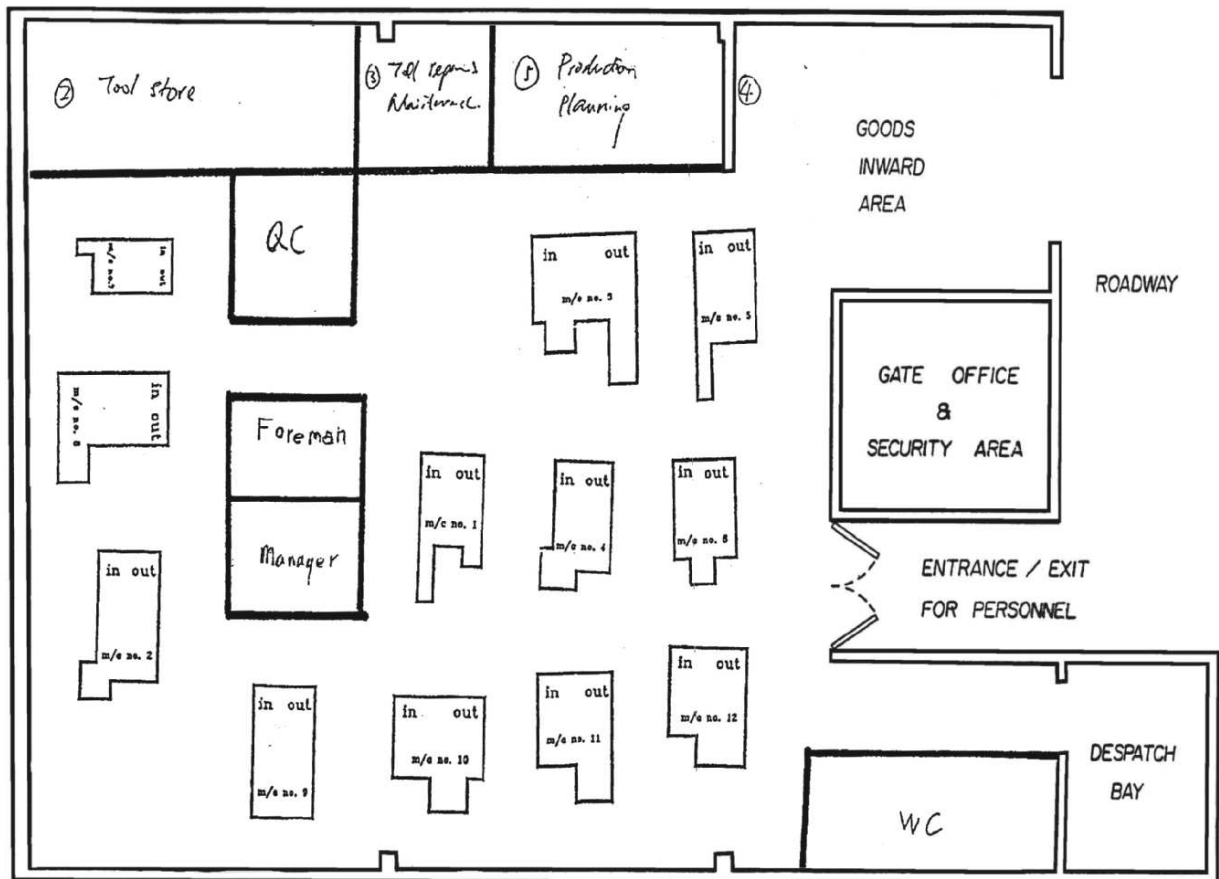


Figure 5. Typical Student Solution

	Step	Content	Time (minutes)	Duration
Class 1	1	Introduction to the subject	6.30 - 7.15 pm	45
	2	Case Study	7.15 - 8.45 pm	90
		Break during which student groups prepare transparencies of their finalised layouts	8.45 - 9.00 pm	15
	3	Presentation - students briefly present their layouts	9.00 - 9.30 pm	30
Class 2	4	Further development of Layout Planning techniques using the case as an example, finalised with the "Teachers Solution"	6.30 - 7.30 pm	60
	5	Brief description of techniques that can be used to evaluate the different solutions	7.30 - 8.00 pm	30
		Break	8.00 - 8.15 pm	15
	6	Student groups evaluate each others work	8.15 - 9.00 pm	45
	7	Convert of numerical scores to University grades	9.00 - 9.15 pm	15
	8	Student complete feedback Questionnaire	9.15 - 9.30 pm	15

Table 3. Time Schedule

5. Student Feedback

In order to ascertain the effect of this approach, a questionnaire was designed and given to students at the end of the case study, see Step No 8 on Table 3. The questionnaire is shown in Figure 6.

The Results of five classes where this type of approach was used are shown on Table 4 (Questions 1 to 6) and Table 5 (Question 7). They show a very positive response (Table 4); 83% favoured the approach adopted, 16% was neutral and only 1% did not favour it. In terms of the time spent on the case (Table 5), 72% considered that they had spent more time on the approach as compared to the more conventional approach, 27% were neutral, and 1% considered that they had spent less time.

students in around 40 groups in five separate classes have participated over a period of five years. These have ranged from classes where the number of groups was four up to classes where the number of groups was 11.

In terms of strengths, the results have consistently found that students:

- consider it an interesting, relevant, and effective method of learning
- working on a realistic problem makes them see the relevance of their studies
- has the advantages of PBL, i.e. students learn better by "doing" and this promotes deep understanding rather than surface learning
- promotes group learning, i.e. students learn from each other, particularly postgraduate students
- have the opportunity to Peer Assess (and grade) each other's work, which they find both very interesting and a useful learning experience in its own right.

6. Conclusions

The complete case study takes around six hours to complete and is used for two separate sessions of 3 hours per session. In total, about 180 postgraduate

Students often expect a "model" or "correct" solution to a problem. What has been done in this case is to change this problem into an experience where they were made to recognise that there are seldom such solutions. In real engineering situations, student must deal with an accumulation of both technical and managerial facts wholistically.

Dear Student,

You have just been given a case study, it was called ENGCOM Company Ltd. and was part of this subject. It was concerned with a case study on Layout Planning, taken from a real industrial problem.

The way in which this was treated used a Problem-based Learning approach (PBL for short), and is somewhat different to the conventional teaching-learning approach.

After a brief introduction of the subject area to give you some basic knowledge, the session gave the problem, allowed you to work on it in student groups, and report back with your findings (in this case it was a layout planning problem). Then this problem was used to explain and demonstrate further layout planning techniques. You were asked to assess other students' results and by so doing, a technique called "Ranking" was used. This is called Peer Assessment.

We are interested to know your views on this learning approach. Please therefore, complete the following.

Yours sincerely,

Steve Frankland
29th March, 2002

Please answer the following questions by **circling the appropriate number**.

- | | | | | | | | |
|---|-----------|---|---|---|---|---|------------|
| 1. Did you find the case study interesting and did you enjoy it? | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 2. Did you find that working on a real problem made it seem more relevant to your studies | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 3. Did working in a group mean that you learned from each other? | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 4. Did you understand the concepts of the case study better than if it had been lectured in the conventional way? | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 5. Do you think you have learnt as much knowledge by the PBL approach as you would have done using the conventional approach? | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 6. Considering the material you have learnt, do you think you have a deeper understanding of the topic than you would have obtained by the conventional approach? | very much | 5 | 4 | 3 | 2 | 1 | not at all |
| 7. Has this approach taken more than by the conventional lecture approach? (In your assessment of the time taken, you should include the time you will spend on revising the topic for the forthcoming subject's examination) | very much | 5 | 4 | 3 | 2 | 1 | not at all |

Thank you for your time in completing this questionnaire

Figure 6. Student Feedback Questionnaire

	5 Very much	4	3	2	1 Not at all	Class Size
2000-2001	29%	53%	16%	1%	1%	36
2001-2002	30%	50%	17%	1%	-	22
2002-2003	32%	50%	17%	2%	-	58
2003-2004	34%	50%	15%	1%	-	45
2004-2005 (Semester 1)	48%	43%	9%	-	-	15
2004-2005 (Semester 2)	25%	55%	19%	1%	-	30
Overall Average (All classes)	33%	50%	16%	<1%	<1%	206

Table 4. Overall Results of Questions 1 to 6

	5 Very much	4	3	2	1 Not at all	Class Size
2000-2001	11%	42%	44%	3%	-	36
2001-2002	18%	46%	36%	-	-	22
2002-2003	18%	47%	33%	-	-	58
2003-2004	22%	58%	20%	-	-	45
2004-2005 (Semester 1)	40%	60%	-	-	-	15
2004-2005 (Semester 2)	13%	57%	30%	-	-	30
Overall Average (All classes)	20%	52%	27%	1%	-	206

Table 5. Overall Results of Question 7

In terms of weaknesses:

- it's more work for the teacher, in preparation as well as execution, since it has to be well organised, especially with larger size classes - but it's worth it!
- it occupies considerable time - in this case it was 6 hours out of 42 hours class contact (around 14%), two topics were covered, namely: Layout Planning and Evaluation.

In summary, this case helps students to develop their thinking and decision making skills through practice on a real life scenario. They tend to do all of the thinking, originate their own ideas, learn from each other, organise the discussion, and establish priorities that covers the material in the time available without interference from the teacher. They learn by doing, promoting deep learning, rather learning by listening, which tends to promote surface learning. Moreover, they recognise that successful treatment of engineering situations often involves a compromise between both individual preference of group members depending on their way

of looking at a situation and subjectivity of deciding upon a particular solution as only one of many possible solutions.

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Enhancing Teaching and Learning in Group Projects through Poster Assessment

Pauline Cho
School of Optometry
The Hong Kong Polytechnic University, Hong Kong SAR, China

Poster assessment, with input from the teacher, peer and self, was introduced as an additional element of the assessment of a final-year project. Students were actively involved in the preparation of this element of assessment, including briefing, a trial poster exercise, trial peer-assessment, and in the development of an assessment criteria/rating checklist. Student feedback was solicited at the end of the year via a questionnaire and a focus group interview. Over 80% of the students found poster assessment useful in project assessment. Some students had reservations about the use of self- and peer-assessment, but the majority agreed that self-assessment prepared them to do peer-assessment in a fair and honest way, and helped them to be more reflective. Students had reservations about the fairness of marking their own work, but were not overly concerned about this issue in this study as the peer-assessment weighting was low. They concurred that poster assessment helped them to recognize and focus on the important issues of their work, was fun and allowed for creativity. Peer-assessment also helped learning by placing them in the marker's perspective. Most students agreed that they had learned to be more reflective, and were motivated to do better. They valued the pre-implementation preparation and the active role they played in the development of the assessment exercise, and emphasized the importance of these in helping students do their work better and learn effectively. So, with appropriate preparations by the teacher and/or students, poster assessment with self- and peer-assessment, can facilitate and enhance learning.

1. Introduction

In our *BSc (Honors) in Optometry programme*, the subject 'Project' is a 6-credit subject commencing in Year 3 and finishing in Year 4 (final year). Three students form a group, and each group is supervised by a supervisor. The assessment of this subject consisted of two components, one in each year - a literature review (Year 3) (30%) and a final report (Year 4) (70%). The former was marked by the supervisor, and the latter was marked by two staff (the supervisor and another staff). For each component, each student was required to submit a draft to allow his/her supervisor to give feedback to help the student to improve the final product. However, this assessment model gave rise to two main concerns - different supervisors providing different levels of assistance to their students, and fairness in assessing the students as no single report was assessed by the same two staff. This mode of assessment also required a lot of input from the supervisors and did not encourage student-centred learning. Some staff were also concerned that they were in fact marking their own, rather than students' work. The first concern is beyond my (subject co-ordinator) control, but the second concern was conceived to be addressable, in part, by introducing an additional element of assessment, Poster Assessment, where all posters can be marked by the same person or persons, and the same level of assistance can be offered to each and every student.

Why another element of assessment? It has been suggested that the 'most powerful criticism' against traditional assessment approaches is probably that these approaches were often too dependent on a limited set of abilities (Brown et al., 1995). As teachers, we need to remember that each type of assessment will discriminate against some groups of students in some way. Hence, as suggested by Brown and co-workers, if assessment is to play an important role in the learning experience of students, it would be useful to use a variety of assessment types and formats, to introduce variety to students' learning experiences. Project reports, including Literature Review reports, are traditional assessment tools well accepted by most educators, many of whom also preferred the status quo (either because they do not see the need for change, or to be blunt), changes are equated with more work. To be fair, it may

well be that some do not see why/how any change is going to make a difference, and, unfortunately, the increasing pressure for academic staff to produce more research just does not motivate academics to put in more time and effort on teaching. In this particular study, it was agreed that the additional element of assessment would be conducted by the subject coordinator (me) and need not involve any other staff, but nevertheless, they were invited to participate if they wished to.

Posters are commonly used to present information, particularly in conferences, and are also increasingly being used as an educational tool (Sorensen and Boland, 1991; Pelletier, 1993; Wharrad et al., 1995; Moneyham et al., 1996; Moule et al., 1998). Posters can be an alternative to assessment and written assignments (Akister et al., 2000) as well as being a teaching resource (Pelletier, 1993). Also, with poster assessment, it is relatively easy to incorporate self- and peer-assessment.

The purposes of this paper are to describe the implementation of Poster assessment, and to present the results of feedback from students to determine, from students' perspective:

1. if the additional assessment component, poster assessment, is useful to facilitate and enhance learning
2. if self-assessment and peer-assessment can complement each other to further enhance student learning

To enhance students' acceptance of and confidence in this poster exercise, and to increase the fairness of this assessment, particular attention (1.1 - 1.7) was paid to the implementation of the exercise.

1.1 Briefing of changes in the assessment mode of the subject "Project"

At the beginning of the academic year, as an introduction to the subject, the concerns of previous students and the teacher about existing mode of assessment, and the benefits of using poster assessment were explained to the students. Students were informed that the existing assessment model of Project had been changed to include a more student-centred exercise, Poster

assessment. So, apart from the Literature Review and Final Year Report, each student had to submit an A3 size poster, and for the poster assessment, the students had to do self- and peer-assessment. The pros and cons of posters, self- and peer-assessment were presented. Students were allowed to raise concerns, and there were discussion on how to minimize concerns and increase effectiveness of this exercise. It is worth noting that the students were actually against peer-assessment due to previous bad experience ('unfair' procedures) with this mode of assessment, but after clarification and assurance of how it would be conducted, students agreed to give it another go. At the end of the meeting, the teacher and students came to a compromise on the weightings of this element of assessment, and of teacher vs. student grades.

1.2 Preparation of documents needed (by the teacher)

Before implementation of poster assessment, the following documents or forms were prepared for the students:

- a. objectives of poster assessment
- b. draft assessment criteria/rating checklist (to be further developed by students and the teacher)
- c. two examples of effective and ineffective posters
- d. one short article for a mock poster exercise
- e. guidelines (itemized list) on what to look for when assessing a poster

1.3 Briefing before implementation

Before implementation of the new assessment model, a meeting was held with the students to brief them on what they were expected to do, and to allow them to play a direct role in decision-making in some of the assessment issues. At this meeting, the students were also given the chance to confirm the weighting of the poster assessment in the overall assessment of the subject 'Project' (decided on 20%), as well as the weighting of teacher to peer-assessment (decided on 70:30).

1.4 Training sessions

Training sessions were also provided for the students

to allow them to discuss examples of effective and ineffective posters (see 1.2c), drafts of assessment criteria (see 1.2b) and a rating checklist. They were also given a short article (see 1.2d) on which they needed to produce a mock poster for mock peer-assessment before they actually commenced on the 'real' exercise. Feedback about the mock poster was given immediately after the mock peer-assessment, and the students were also encouraged to think about the important elements of a poster and to provide feedback on how the assessment form/rating checklist could be improved. (These criteria and checklist were then circulated to all supervisors for comments before use.) Guidelines on how to design effective posters (1.2e) were also given, and students were also encouraged to give feedback about the guidelines, and changes were made where necessary.

These sessions also served to minimize disagreement between students. To increase agreement between peers (and between teachers if more than 1 teacher assessor*), all assessors (students as well as teachers) were required to attend the training session on how to grade a poster using the agreed rating checklist to prepare them to do the final poster assessment. The students were briefed on the purpose and how to do self-assessment.

*(*In view of the heavy workload of other staff, my Project Assistant and I were the only 'teacher' assessors)*

1.5 Assistance

For their final project report, students were encouraged to submit a draft first to allow their own supervisor to give them feedback about their work. Based on this feedback, they were required to design their posters *without* any input from their supervisor to minimize supervisor's input in the poster exercise, and to avoid increasing the workload of the supervisor (as agreed among all supervisors). However, all students may seek help from me if they needed any (general) help or advice on their poster. This was to ensure that all students were offered the same level of assistance for this element of assessment, at least, within the department. Obviously, if students sought help outside, that would be beyond my control.

1.6 Poster assessment

Three (averaged) grades were obtained for each poster:

1. teacher's grade (combined grade from grades given by the Project Assistant and me)
2. students' grade (peer-assessment) (50% of the students)
3. student's grade (self-assessment)

In total, 27 posters were produced. Each student was required to assess about half of the posters produced. That is, 50% of the students would assess posters from four randomly selected groups of students (each group consisting of three students) and the other 50% will assess those from the remaining five groups of students. They were not allowed to assess posters from their own group (apart from their own in self-assessment). This was to ensure that the students were exposed to a wider range of topics and hence their knowledge contents.

All posters were graded blind (by students and the teacher) to minimize bias, and were compared to the teacher's grades. That is, each student was asked to submit his/her poster with a personal code number instead of his/her name. Although the assessors would know which group of students did the posters on a particular topic, none of the assessors would know which poster belongs to which student in the group. If a significant difference was found between the teacher's and a student's grade of a poster, the teacher would discuss the grade and go through the poster again with the student to come to a compromise (this served to ensure that students would do their assessment properly). (The same procedures were followed for the two 'teacher' assessors and among peers).

Self/Peer-assessments were carried out in a supervised session (to avoid discussion among students resulting in influenced decision) where students graded the randomly assigned posters on their own without discussion.

1.7 Motivation

To motivate the students to put effort in the poster assessment, poster assessment was conducted and feedback given to students before their final report was

due, to allow them to use the comments and suggestions, where appropriate, to improve their final report.

Students were also informed that their posters would be presented at a regional (Asia) conference co-organized by the department, and there was also a cash award for the best poster.

2. Methods of soliciting feedback

At the end of the poster exercise, (a) a questionnaire was sent to each student, and (b) a focus group interview with eight students was also conducted.

2.1 Questionnaire

The questionnaire (Appendix 1) was emailed to all (27) final year (2003/2004) optometry students to solicit their opinion on the usefulness of poster assessment, and to give comments or suggestions on how the assessment could be improved. They were invited to complete and return the questionnaires towards the end of the academic year. The students were informed about the purpose of the questionnaire in the email message and also briefly on the first page of the questionnaire. This method of implementation had the advantages of allowing the students to complete the questionnaires at their own convenience and in a non-threatening environment. This also allowed them time to recall or reflect if they so wish. They were requested to return the questionnaire by email or they may download it and return the hard copy. The questionnaires were not marked and the students were not required to put down their names.

2.2 Focus group interview

Eight of the students were also invited to attend a focus group interview where they were asked to give feedback about poster assessment. This was followed by an exploration of the idea of incorporating poster assessment in 'Project' assessment to facilitate learning. To ensure that there would not be any bias, students

invited for the interview included those who did very well, did average and those who did poorly in their poster assessment.

The interview was held at the end of the academic year, after the questionnaire feedback. The aims of this interview were explained to the students, and they were given a chance to ask questions about this interview. All students were also given a pre-set list of questions (Appendix 2) to help them to focus on the issues of interest during their discussion. They were informed that these questions were only guidelines and they may deviate from these questions if they had other issues to discuss. Then they were asked to form two discussion groups (four students per group), and I then left the room. Soft drinks and snacks were provided. After 60 minutes, I returned to the room and went through each question (including any other issues raised by the

students themselves) with the groups collectively, and took notes on what the students said, clarifying issues or probing for further information where necessary or appropriate. The interview lasted 3.5 hours.

3. Results

3.1 Questionnaire

The response rate to the questionnaire was 48% (13/27). Figures 1 - 3 present the distributions of responses to the forced choice questions.

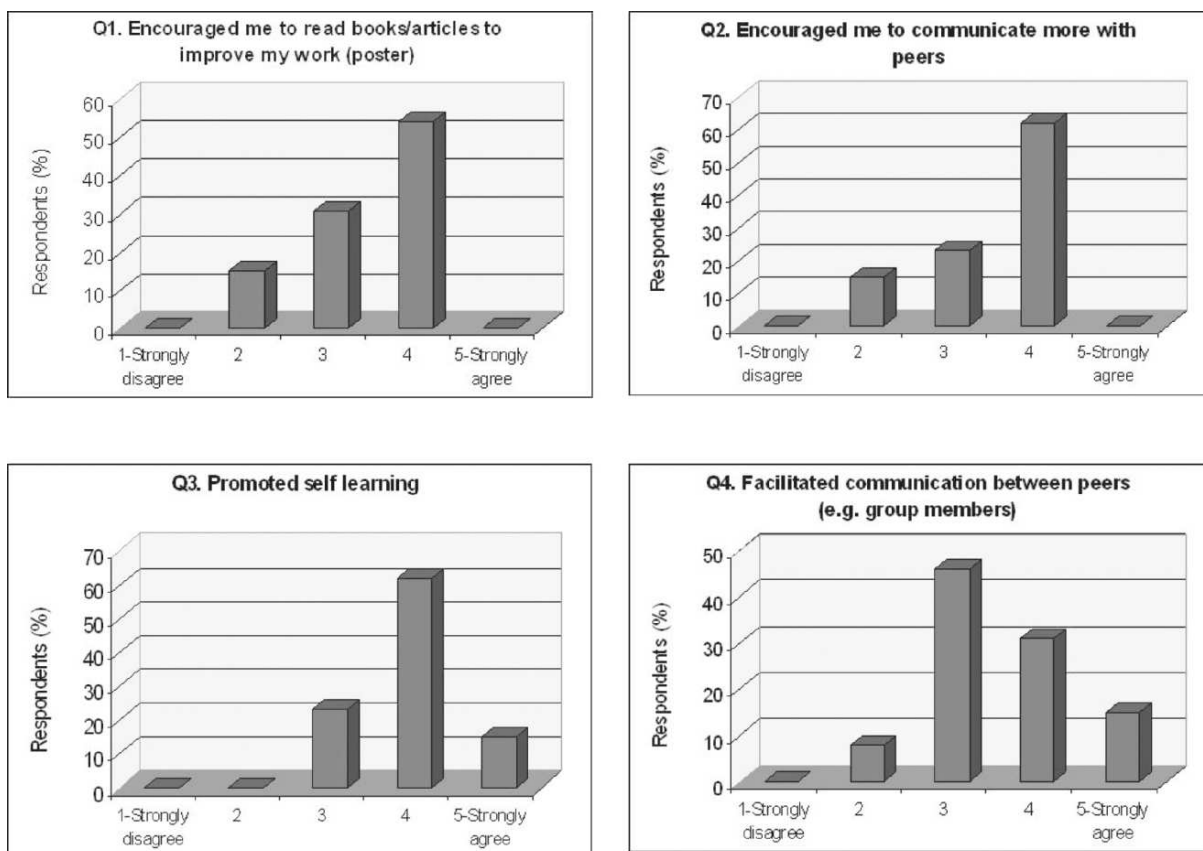


Figure 1. Student Feedback (questionnaire) on Overall Poster Exercise

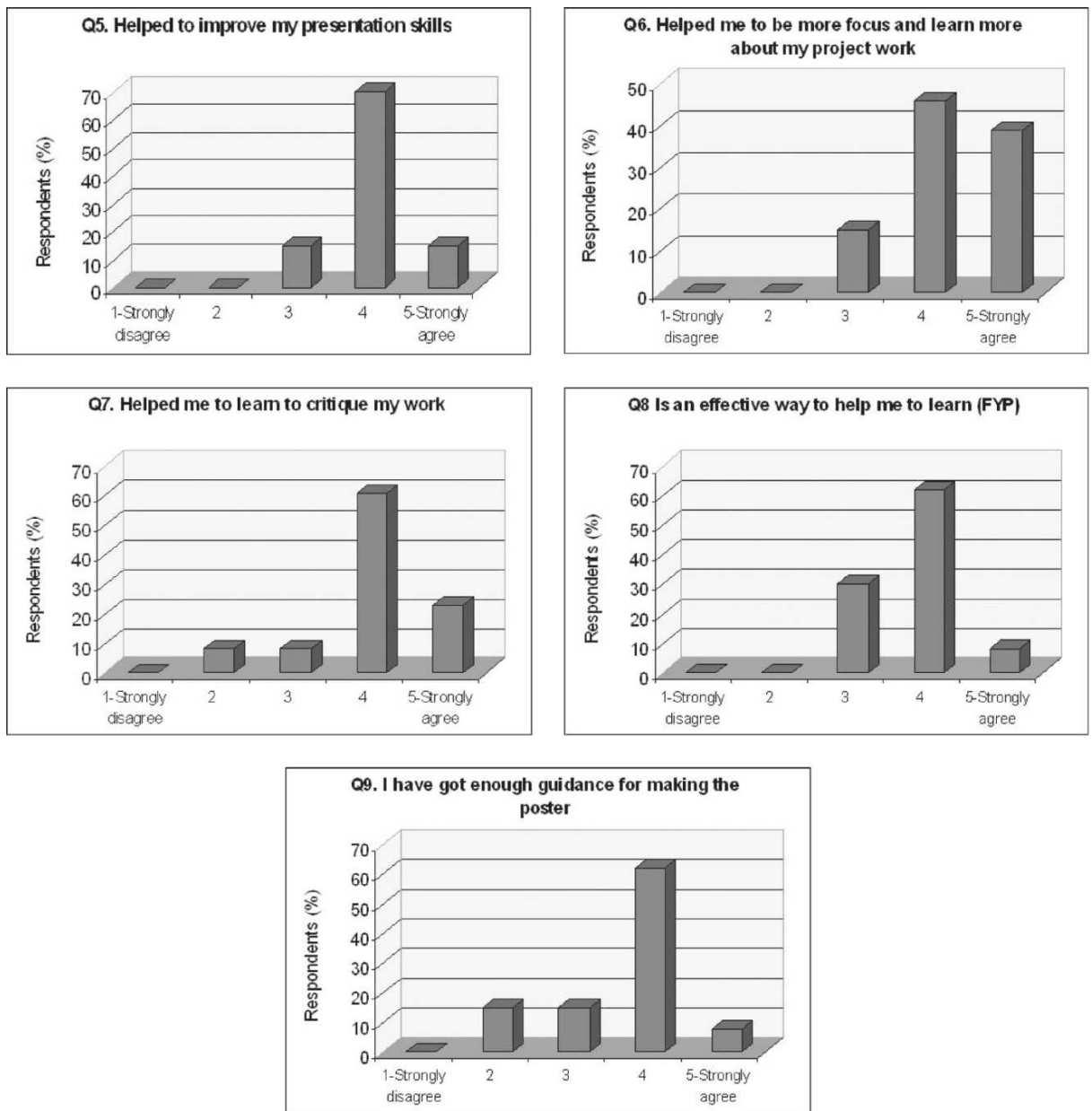


Figure 1. (cont'd) Student Feedback (questionnaire) on Overall Poster Exercise

Figure 1 presents the responses of the students to questions regarding the overall poster exercise. Over 80% of the students agreed/strongly agreed that the poster exercise helped them to improve their presentation skills, to be more focussed and to learn more from their project work, and to learn to critique their own work. About 70% of them agreed/strongly agreed that this exercise promoted self-learning and was

an effective way to help them to learn. While 62% agreed/strongly agreed that poster assessment encouraged them to communicate more with peers, only 46% agreed/strongly agreed that the exercise facilitated communication between group members. Only about 50% of the students agreed/strongly agreed that this exercise encouraged them to read books/articles to improve their work (the poster). With regard to guidance

provided for making the poster, 70% of the students agreed/strongly agreed that there was adequate guidance, but 15% disagreed.

From their responses to the open-end question on the aspects of the overall poster exercise that students liked best, students commented that the exercise allowed creativity, provided a chance to learn how to organize and present their findings, offered them a sense of achievement when their posters were exhibited at a conference co-organized by the department, and facilitated discussion among project groups. Some students also commented that the peer-assessment element allowed them to know more about how their work were being assessed, and helped them to improve their own work, and increased understanding of their own project. To improve the poster assessment exercise, students suggested a group poster instead of individual submissions, as they preferred team work and cooperation rather than "competition between members of the same group". They also found it difficult to keep their own work confidential. Some students also suggested more time to make their posters (that the

posters be submitted after their final project reports instead of before). A couple of students also suggested increasing the number of awards (for the best posters), reducing the weighting for peer-assessment, and increasing feedback on the mock poster assessment exercise.

On the usefulness of poster assessment, the two students who were negative commented that the workload was too heavy and the time inadequate. They queried the fairness of peer-assessment as they felt that students did not have adequate experience to do assessment, and that guidelines provided lacked clarity and detail. The six students who gave a positive response to this question felt that poster assessment gave them a chance to learn a new method of presenting their final year project work, and provided them with another channel for presenting results other than report writing. The exercise was interesting, allowed creativity, provided an avenue for students to better understand their own projects, and helped them to learn how to critique other student's work objectively.

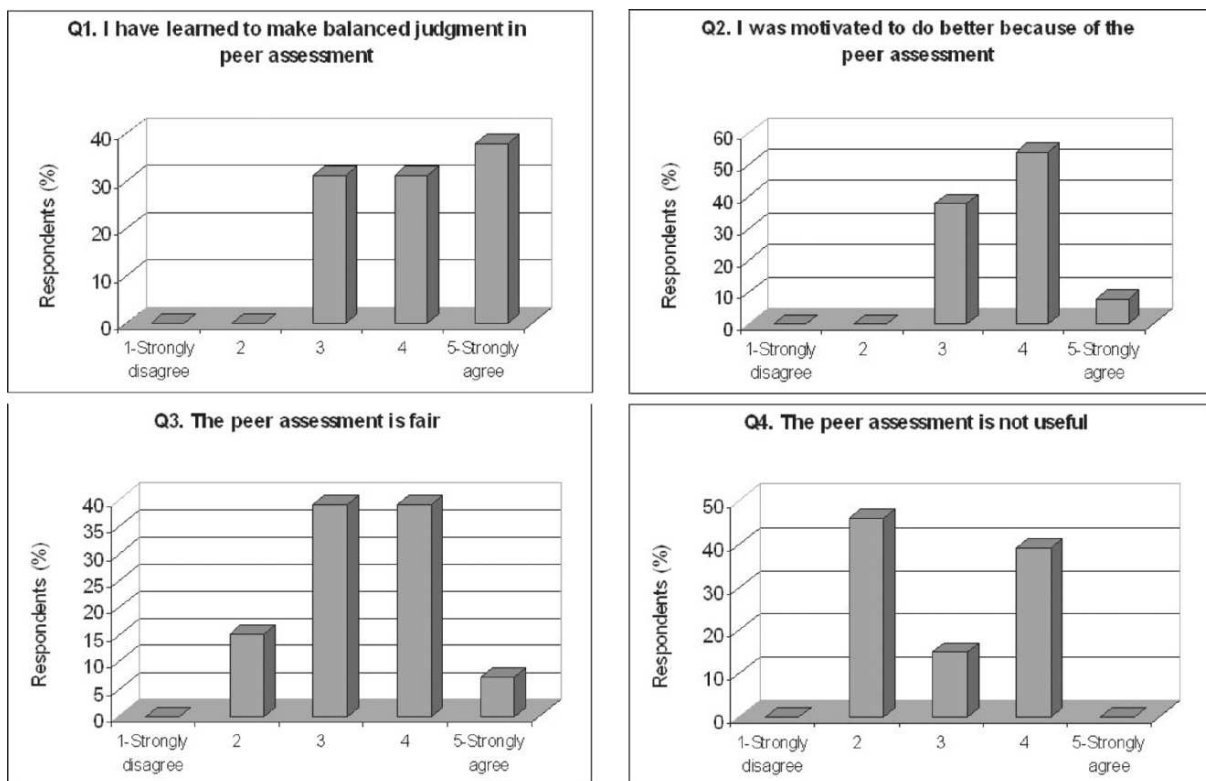


Figure 2. Student Feedback (questionnaire) on Peer-assessment

On peer-assessment (Figure 2), 69% of the students agreed/strongly agreed that peer assessment helped them to learn to make a balanced judgment, and 62% agreed/strongly agreed that they were motivated to do better because of peer assessment. However, only 46% agreed/strongly agreed that the peer assessment was fair (39% were neutral, and 15% disagreed). Only 46% of the students agreed that peer assessment was useful (39% did not find it useful, and the rest were neutral).

On the aspects of peer-assessment that they liked best, students appreciated that in peer-assessment, they learned from each other and shared experience. They were given a fair method of assessment with a useful set of assessment criteria. On the aspects that they found lacking, a couple of students suggested that a more detailed marking scheme and guidelines should be provided. Two students also commented on the difficulty of not letting other students know about their posters. Other suggestions included increasing the scale used to rate the poster, allowing peer-assessment between close friends, and assessment of posters of the same group for better comparison, and a group poster to 'increase fairness', and to reduce the number of posters assessed by each student.

The responses of the students to questions on self-assessment are presented in Figure 3. Over 60% of the students found that it helped them to develop self-evaluation skills (62%), helped them to critique their own work to do better (69%), and prepared them to do peer assessment in a fair and honest way (62%). Only 15% of the students found self-assessment not useful, while the majority were neutral (77%).

In their responses to the open-ended question on aspects that they liked about self-assessment, students commented that self-assessment allowed them to recognize their own weaknesses better, allowed them to better understand their project work, and that it was simple and easy to do. There were also comments that the detailed assessment checklist given and self-assessment conducted before peer-assessment allowed them to have a better understanding of the assessment. On the negative side, students commented on the difficulty of doing self-assessment as it was hard for them to eliminate their bias and to discover their own mistakes. One student also commented that self-assessment was not as useful as peer-assessment.

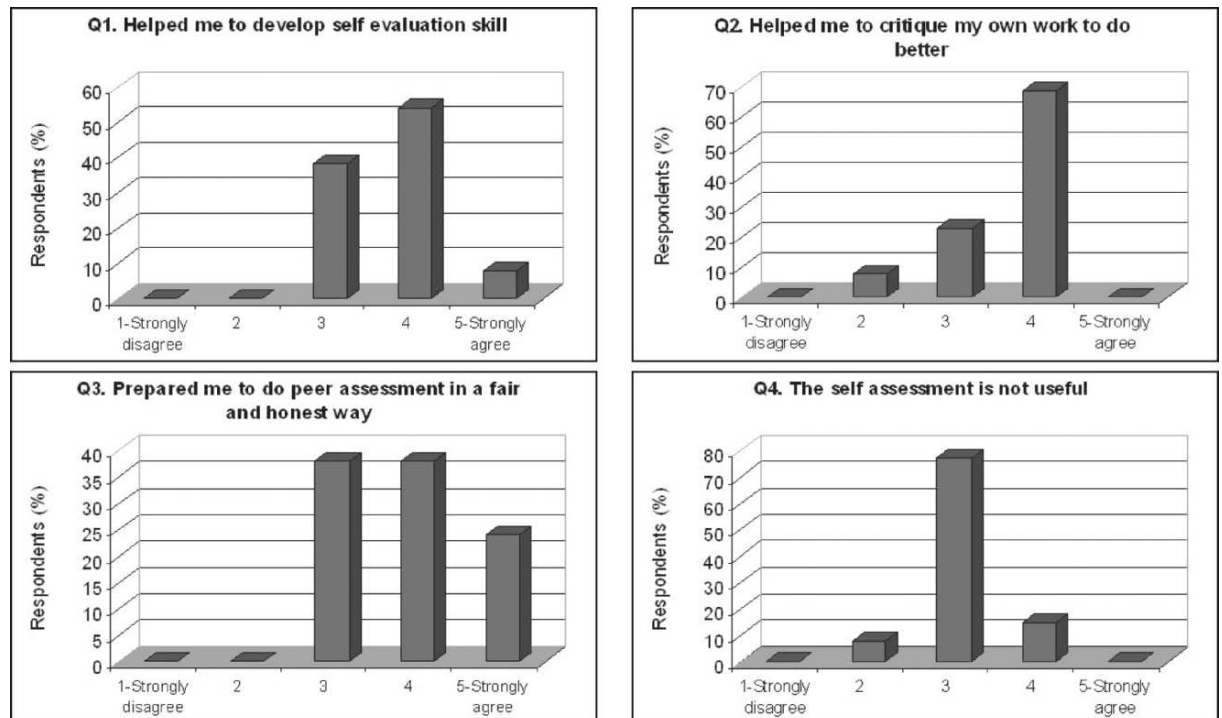


Figure 3. Student Feedback (questionnaire) on Self-assessment

3.2 Focus group interview

In general, the students agreed that peer-assessment was good for them as it helped them to learn in another way by "changing their point of view as a marker". Poster assessment helped them to recognize and focus on the main issues of their work, and the time spent on the exercise was rewarded by what they learned. They also suggested that peer-assessment be used in other subjects.

The students found the preliminary (preparatory) work very useful and important (they were able to gain experience though practice before marking their own poster). They asserted that the normal practice of being provided with guidelines and criteria only was passive and inadequate. Active participation kept them 'well informed' of what they were expected to do and how to do it. However, some students commented that the discussion on how to set assessment criteria could be more useful if there was a follow-up discussion on the final assessment checklist, and a couple of students preferred the assessment criteria to be set by the teacher.

All students interviewed found poster making to be fun, and they appreciated that they were given a chance to learn how to use computer software to design their posters. Although most students agreed that it was an 'honour' to have their posters exhibited at a conference, some were disappointed that not many delegates actually spent time to read their posters. It was noted that the students' main concern was time constraints (in order to allow them to exhibit their posters at the conference, the deadline for submission of posters was brought forward), and although the students were given advance notice, most of them did not appreciate the reduction in time allowed for them to make their posters. The students also commented on the difficulty in printing A3 size posters, as there was only one printer that could print A3 size in the campus.

For peer-assessment, students were unanimous about it being a useful exercise which helped them to learn to be more objective and fair. The main concern about peer-assessment was that the students were not convinced that they had adequate ability to conduct the assessment properly, especially with regard to the content of the

projects of other students. They were concerned about bias and inconsistencies between markers. They therefore agreed that masking was important and required, though they had difficulty in not letting other students know about their posters. They also suggested that the weighting of this element of poster assessment should be kept low.

Students were agreeable to the suggestion of incorporating a briefing session for each group of students to introduce their own project before peer-assessment. They felt that a formal presentation by each group of students would be helpful to allow their peers to understand what they were doing (in their project), and hence, when doing the peer-assessment, students would be in a better position to give marks more accurately. They were also agreeable to the suggestion that junior students (Year 3 students who had started their Project work) be invited to attend these briefing sessions, as this would be a good learning opportunity for them (the junior students).

Although students understood that bias would still exist even if different teachers marked the posters, they felt more confident that teachers usually have better understanding of students' work and hence could make better judgment about their work (than peers). The students preferred that their own supervisor be involved in the assessment of their poster with another teacher. This is because they felt that their supervisor would be in the best position to understand what they were doing in their project. They also recommended that there should be at least one teacher who would mark all posters to ensure consistency.

Although some students were of the opinion that the literature review was the most important element of the assessment of Project, the majority agreed that all three elements (literature review, poster and final project report) were of equal importance as each element helped the students to learn "different area in different ways". The students suggested that a group poster can be used instead of individual posters as this would cut down the workload of the students (in peer-assessment). However, they were also concerned that in a group poster, there may be a problem of different degrees of contribution and expectations from group members.

4. Discussion

The response rate was quite low due to the fact that many students went on holiday once they had completed the requirements for their final year of study. Although an attempt was made to encourage the students to return their feedback (by sending the questionnaire and a reminder before the end of the term), it was not totally successful as some students completed the year earlier than the rest.

Posters are increasingly becoming popular as an educational tool for teaching, learning and assessment purposes (Sorensen and Boland, 1991; Wharrad et al., 1995; Moneyham et al., 1996; Moule et al., 1998; Akister et al., 2000; Smith et al., 2002). The use of posters can offer a variety of advantages:

- a. is less intimidating than an oral presentation and hence encourages discussion (Crooks and Kilpatrick, 1998)
- b. gives students an opportunity to learn from each other's work, hence enabling them to see a range of topics and to engage in a number of dialogues with respect to the topics (Akister & Kim, 1998)
- c. encourages students to be reflective and creative (Moneyham et al., 1996; Barcher et al., 1998)
- d. encourages students to learn to organize and re-conceptualize their complex work into an easily assimilable form and thus gain a deeper understanding of their work (Wharrad et al., 1995)
- e. allows for self- and peer-assessment which would help students understand what or how other students are doing (Smith et al., 2002)

In the current study, the majority of the students experienced most of the above advantages. They reported that the poster exercise was an effective way to help them to learn, and that self- and peer-assessment also helped them to be more reflective (to make balanced judgments and to critique their own work in order to do better). Some students however had reservations about the use of self- and peer-assessment. Overall, over 80% of the students agreed that poster assessment was a useful element of assessment for 'Project'. From the focus group interview, the students' main problem was the time constraints, and they had reservations about the fairness of marking their own work (see later).

Nevertheless, they all felt that the poster exercise helped them to recognize and focus on the important issues of their project work. Poster making was fun and allowed them to be creative; and peer-assessment helped them to learn by placing them in the marker's perspective. They suggested that all three elements of assessment (literature review, final report and poster) were useful as they complemented each other, and each element helped the students to learn in a different way. This is in agreement with the concept that where possible, multiple assessment tools should be used in assessments (Akister et al., 2000; Orsmond et al., 2000). In the current study, the students also had a chance to receive recognition for their efforts from other sources, as expressed by Moneyham et al. (1996), "beyond the classroom". They were allowed to display their posters at a conference co-organized by the department, and students saw this as an 'honour', though some students expressed disappointment that delegates did not spend much time reading their posters.

From the students' perspective, the incorporation of poster assessment as an element of assessment for project work facilitates and enhances learning. Although a number of students had reservations about the use of self- and peer-assessment, the majority agreed that from these exercises they had learned to be more reflective, and were motivated to do better. They also commented that the exercise gave them a sense of ownership and achievement. Similar positive (and negative) comments have been obtained from students in other studies on posters (Pelletier, 1993; Moneyham et al., 1996; Akister & Kim, 1998; Barcher et al., 1998; Moule et al., 1998).

Many educators used group posters instead of individual posters. If a group poster is used, the approach can also foster reflection, discussion, empathy, group discussion and coherence (Sorensen & Boland, 1991; Wharrad et al., 1995; Orsmond et al., 2000). Indeed, in the current study, some students envisaged these advantages, and proposed the use of a group poster instead of individual poster as it would encourage team work and cooperation rather than "competition between members of the same group". This may be the reason why only 46% of the students agreed that this poster exercise facilitated communication between group members. Hence, posters can be used not only as an alternative assessment tool, but also to encourage development of

a variety of desirable skills in students.

Self-assessment is an important learning process which can help students to develop critical reflection, as they have to evaluate their own and other students' work, to learn responsibility towards others via assessment, and to learn to make critical judgments. It is therefore seen to play a fundamental role in all aspects of learning, simulating what Beard and Hartley (1984) described as "real life situations, where individuals and groups have to be accountable for their work". It is therefore necessary for students to participate if assessment is to be a part of the learning process. The importance of self-assessment is perhaps best presented by Boud and Lublin (1983) who stated, "one of the most important processes that can occur in undergraduate education is the growth in students of the ability to be realistic judges of their own performance and the ability to monitor their own learning". According to Falchikov (2005), self-assessment can be a way:

1. to involve learners in the assessment of self development and learning, hence motivating or requiring them to think about what had been learnt so far, what/where the gaps are, and how to fill up or minimize the gaps
2. of introducing the concept of individual judgment to learners
3. to facilitate communication among teachers and peers
4. to involve learners to reflect on the meaning of good work

In the current study, our results also indicate that self-assessment complemented peer-assessment. Peer-assessment has been shown to be a dynamic and interactive process. The main advantages of peer-assessment are that it allows a more student-centred learning under a non-threatening environment, and the students participate actively in the assessment process where they are involved in critiquing and making judgment on the quality and standard of the work of their peers (Orsmond et al., 2000). Peer-assessment also allows feedback to peers to enable them to improve their performance. The students in the current study commented that peer-assessment allowed them to know more about how their work were being assessed, and helped them to improve their own work, thereby increasing their understanding of their own work. It may

well be that, as the students helped to develop the assessment criteria, they had a better understanding of the criteria which facilitated their work and helped them to perform better. Indeed as asserted by Orsmond et al. (2000), students can be expected to have a greater understanding of criteria if they were developed by the students themselves.

Smith et al. (2002) reported that, "a minority of students remained resistant to the principles and process of peer marking despite the intervention, due mainly to a lack of confidence in the ability of their peers to award fair and unbiased marks." Not surprisingly, in the current study, there were also students who had concerns about the fairness of peer-assessment as they felt that students do not have adequate experience to judge work by peers. What was perhaps unexpected was that only two students raised this concern in their response to the questionnaire, although at the focus group interview, this was one of the major concerns raised. One possible reason could be because the weighting for this element of assessment was not high, and the poster was marked blind, so most students, weighing the pros and cons, decided that this mode of assessment was worth the time they invested in it. Only about 50% of the students felt that peer-assessment was fair. This was again not surprising, taking into account, as mentioned earlier, their previous bad experience. What was positive was that only 15% thought it was unfair. Another reason why students in this study were not overly concerned about peer marking was the use of a self-developed assessment checklist (a detailed checklist (see Appendix 3)) which helped the students to focus on what they were supposed to assess, hence facilitating consistencies among students, and between students and the teacher.

Only about 50% of the students thought peer-assessment was useful, and the majority of the students (77%) were neutral about the usefulness of self-assessment. This was perhaps the first time that the students did self- and peer-assessment under such setting, so, perhaps what we need is time. According to Orsmond et al. (2000), students need time, experience and support to work through different assessment processes ("Time to reflect and develop skills and understanding, experience to be able to make qualitative judgments and support to reassure the student during the learning process.") No doubt, the time and effort put into the preparation

of students for this assessment, and the assurance made to students contributed to their acceptance, as commented by the students at the focus group interview.

For an assessment to be done properly, to address specific intended learning objectives, both the teacher and the students have to be prepared for the process. It is not realistic to expect students to know how to do proper assessment simply by giving them a set of guidelines. In the current study, the process of poster assessment was explained in detail before implementation to allow students to understand why this mode of assessment was implemented. It was believed that if the students understood the rationale behind, they would be more willing to do the exercise and to take it seriously. Students were assured that self- and peer-assessment were not implemented to make them do the work which should be done by the teacher. It was not an exercise to reduce the teacher's workload as the teacher (and another assistant) had to mark all the posters. Guidelines and examples were prepared and given to students to allow them to prepare for the process. Meetings were held to go through the guidelines with the students, and the objectives of peer-assessment were clearly explained. The students were also given the chance to develop the assessment criteria after doing a mock (peer) poster assessment. Left to themselves, not all students would read the guidelines carefully or remember them. Going through them together with the students, with a mock assessment, was more likely to leave a stronger impression and would help students remember them better. Indeed, many authors have reported the importance of allowing the learners to have ownership of the process, i.e. of involving learners in the setting of criteria (Stefani, 1994; McDowell & Sambell, 1999; Falchikov & Goldfinch, 2000). To assist the students to do the assessment accurately, the assessment form was also fairly detailed (see Appendix 3). However, despite all the preparation work done before the assessment exercise, there were still two students who felt that there was inadequate guidance. It is probably inevitable that no matter how much guidance is given, there would always be students who want more, but then again, it may be that these students referred to other forms of guidance. Unfortunately, in view of the anonymity of the feedback exercise, it was not possible to find out what more could be done in terms of guidance from these students in the current

study.

In their study, Smith et al. (2002) reported that some of their students had a concern about the lack of anonymity of the peer assessment. In the current study, there was an attempt to make all peer assessment anonymous and to mask the 'marker' - although the students would know which group of three students the posters on a certain topic belonged to, they were masked as to the individual ownership of the poster. However, as students commented, total anonymity was not achieved and was difficult. To increase the confidence of the students on this mode of assessment, as well as to serve as a gentle warning to them to do the assessment properly, students were informed that if the grades they gave were significantly different from those given by the two teacher assessors for the same poster, they would be invited to meet with the teacher to discuss and to come to a compromise after going through the poster again. It was, however, also made clear to the students that there were bound to be some cases of significant discrepancies. Students were also assured that they would not be penalized in any way should their marks, which they fairly awarded, be different from the teacher's. Students agreed that this requirement was important to assure them that the marking would be as 'fair' as possible. In this study, there were about five students who were required to 'meet' with the staff about the grades given. All were due to some misunderstandings or misinterpretations.

Improvement to the implementation of this element of assessment will no doubt engender a more enthusiastic response from the students. Suggested improvements to this mode of assessment include:

- Group instead of individual posters
- Allow more time to prepare the posters
- Involvement of own supervisors
- Briefing on projects to peers (by each group of students) before commencement of poster assessment
- Masking of assessors (though this would not be possible with group posters)
- Must have at least one marker who marks all the posters to ensure consistency and minimise bias
- Improvement of the assessment form (rating checklist) to ensure heavier weighting on content

An important point is that since students learn from developing their own assessment criteria, it is therefore necessary for each batch of students to develop their own criteria rather than be given the criteria developed by the previous year's students. Hopefully, the assessment exercise involved will increase students' confidence in making assessment for their peers and for self, hence increasing the motivation, confidence and ability to be a lifelong learner. As teachers, we need to ask ourselves, every now and then, why we assess our students. We need to remind ourselves that assessment should not only assess the content of the work submitted by a student, but it must also prepare the student for future learning. Traditional assessment tools, depending on how we use them, can be used to achieve these purposes. In this study, I chose to introduce another assessment tool, the poster (which, as some may argue, is also a traditional assessment tool), to incorporate self- and peer-assessment. As cautioned by Barcher et al. (1998) and Akister et al. (2000), posters or reports or any other assessment tool, may not be suitable for all student in view of the various styles of learning among students. I believe therefore, that to minimize stress and potentially disadvantaging students, it is important to use multiple assessment tools wherever possible.

In her new book, "Improving Assessment Through Student Involvement", Falchikov (2005) presented excellent discussions on assessment and student involvement, and practical solutions to aid learning in higher and further education. She asserted that in recent years, the main reason teachers gave for involving students in assessment "is the benefit the experience brings to learners". On the question of *How well are students able to judge their own work?* and *How reliable or valid are student peer assessments?*, she wrote, "... a quick, and somewhat flippant answer to both might be, 'Quite well (or quite reliable) mostly, if they are taught how to'". The keywords are of course, *'if they are taught how to'*. She stressed that, "Good self- or peer-assessment requires transparency and openness..... It seems that the need to be explicit helps teachers as well as students."

To conclude, the majority of students in the current study reported that poster assessment was effective in helping them to recognize and focus on the important

issues of their work. Students found poster making fun, and the exercise allowed for creativity, although some students had reservations about the use of peer- and self-assessment. Most students agreed that self-assessment prepared them to do peer-assessment in a fair and honest way, and helped them to be more reflective, and peer-assessment helped them to learn by placing them in the assessor's perspective. The main problem that students had with this assessment element was time constraints. If used correctly as an additional element of assessment, poster assessment in conjunction with self- and peer-assessment can be effective in facilitating and enhancing learning.

Acknowledgement

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Appendix 1 Questionnaire

POSTER EXERCISE	STRONGLY DISAGREE			STRONGLY AGREE	
Encouraged me to read books/articles to improve my work (poster)	1	2	3	4	5
Encouraged me to communicate more with peers	1	2	3	4	5
Promoted self learning	1	2	3	4	5
Facilitated communication between group members	1	2	3	4	5
Helped to improve my presentation skills	1	2	3	4	5
Helped me to be more focus and learn more about my project work	1	2	3	4	5
Helped me to learn to critique my work	1	2	3	4	5
Is an effective way to help me to learn (FYP)	1	2	3	4	5
I have got enough guidance for making the poster	1	2	3	4	5
PEER-ASSESSMENT	STRONGLY DISAGREE			STRONGLY AGREE	
I have learned to make balanced judgment in peer-assessment	1	2	3	4	5
I was motivated to do better because of the peer-assessment	1	2	3	4	5
The peer-assessment is fair	1	2	3	4	5
The peer-assessment is not useful	1	2	3	4	5
SELF-ASSESSMENT	STRONGLY DISAGREE			STRONGLY AGREE	
Helped me to develop self evaluation skill	1	2	3	4	5
Helped me to critique my own work to do better	1	2	3	4	5
Prepared me to do peer-assessment in a fair and honest way	1	2	3	4	5
The self-assessment is not useful	1	2	3	4	5

Your comments are valuable to help us to improve this method of assessment. Please let us have your honest opinion.

What aspect(s) do you like most about peer-assessment ?	What aspect(s) can be improved in peer-assessment ?
What aspect(s) do you like most about self-assessment ?	What aspect(s) can be improved in self-assessment ?
What aspect(s) do you like most about this poster exercise ?	What aspect(s) can be improved in this poster exercise ?

Do you think poster assessment is a useful element of assessment for FYP in the future years (i.e. instead of just one final year report)? Please give reasons.

Yes / No

Reasons: _____

Appendix 2 Focus group meeting-question list

A. Discussion:

Base on your own experiences in this exercise have a group discussion on the following:

Overall exercise

- The purpose and nature of this poster assessment exercise
- Advantages and disadvantages of this exercise
- Time spent on this exercise
- Suggested application(s) of this exercise in other subjects

Preliminary meetings (preparatory)

- The making of mock poster (Useful? Why?)
- Mock peer-assessment (Useful? Why?)

Poster making

- Difficulties that you have faced
- Guidelines and instructions given (Useful? Enough?)
- Advantages/disadvantages of the making of poster
- Things you have learnt through the making of poster
- Suggestion(s) for improvement

Peer-assessment

- Difficulties that you have faced
- Guidelines and instructions given (Useful? Enough?)
- Comments on assessment form
- Advantages/disadvantages of peer-assessment
- Things you have learnt through assessing other's work
- The weighting percentage of peer-assessment (30%)
- Suggestion(s) for improvement

Staff assessment

- Advantages/disadvantages of staff assessment
- The weighting percentage of staff assessment (70%)
- Suggestion(s) for improvement

B. Questions (Modification to poster assessment)**1. Please choose one:**

- a. Poster assessed by your own FYP supervisor
- b. Poster assessed by two other staff (not including your own FYP supervisor)
- c. Others (please specify) _____

Please specify with reason(s) _____

2. Which of the following sound fairer to you:

- a. Each poster to be assessed by different staff
- b. Each poster assessed by same staff

3. If we want to introduce a briefing session (introducing your FYP to your classmates as a group), which of the following format do you prefer? Please specify with reason(s).

- a. A formal presentation
- b. A casual briefing

Please specify with reason(s) _____

4. If we want to introduce a discussion after the session in Q4, which of the following format do you prefer?

Please specify with reason(s).

- a. Just only including 2 staffs and members of your own group
- b. 2 staffs and your classmates
- c. 2 staffs, your classmates and also open to year 3 students

Please specify with reason(s) _____

5. Which element(s) is(are) are useful for the assessment of Project?

Poster vs Literature Review vs Final Year Project Report?

6. Do you think individual or group poster should be used in the future for Poster Assessment? Give reasons for your answer.

Appendix 3 Assessment form developed and used by students (Rating Checklist)

	tick if present	
Title		Deduct 1 mark if absent
Author's name and affiliations		Deduct 1 mark if absent
Name of the department & University		Deduct 1 mark if absent or not correctly presented
References		Deduct 1 mark if absent or too few/many
Acknowledgments		Deduct 1 mark if absent

Appearance	Poor/bad _____ Good/optimum	weight	COMMENTS
Style (Font size, line spacing etc)			
a. Title	1 2 3 4 5	x1	
b. Body text	1 2 3 4 5	x1	
c. Authors' name	1 2 3 4 5	x1	
d. Headings	1 2 3 4 5	x1	
e. Captions	1 2 3 4 5	x1	
f. Axes & Legends	1 2 3 4 5	x1	
g. Tables	1 2 3 4 5	x1	
h. Consistency	1 2 3 4 5	x1	
Figure size	1 2 3 4 5	x1	
Legend size	1 2 3 4 5	x1	
Use of space	1 2 3 4 5	x1	
Tidy	1 2 3 4 5	x1	
Contrast	1 2 3 4 5	x1	
Overall presentation & organisation	1 2 3 4 5	x2	
Professional impression	1 2 3 4 5	x2	
		(90)	
Contents in Figures/photos/pictures/tables			
a. Capital letters used appropriately	1 2 3 4 5	x1	
b. Axes labeled appropriately	1 2 3 4 5	x1	
c. Legends used appropriately	1 2 3 4 5	x1	
d. Spelling	1 2 3 4 5	x1	
e. Numbering	1 2 3 4 5	x1	
f. Captions are descriptive in own words	1 2 3 4 5	x2	
g. Abbreviation/acronym defined	1 2 3 4 5	x2	
Contents	Too brief/ _____ Excellent		
	irrelevant		
Introduction	1 2 3 4 5	x4	
Aims	1 2 3 4 5	x4	
Methods	1 2 3 4 5	x4	
Results and Discussion	1 2 3 4 5	x4	
a. clear and justified	1 2 3 4 5	x4	
b. relevant to aims	1 2 3 4 5	x4	
Conclusion	1 2 3 4 5	x4	
References	1 2 3 4 5	x4	
Spelling	1 2 3 4 5	x4	
Grammar	1 2 3 4 5	x4	
		(180)	

Calculation

Mark will be calculated as follows:

Final marks: _____ x 50 = _____

(total marks)

Introducing Computer-Aided Peer Assessment (CAPA) in Engineering

Neil James
Mike Miles
Cheryl Burton
Chris Ricketts
Faculty of Technology
University of Plymouth, United Kingdom

This paper presents a strategy for the introduction of computer-aided peer assessment (CAPA) for marking of, and giving feedback to students on, individual assignments. It illustrates the implementation of CAPA in engineering management and engineering design. It outlines the various roles that computers can play in mediating the peer-assessment process and highlights difficulties in moving to CAPA. These difficulties can best be overcome by influencing the e-learning strategy of the University and developing IT systems that are fully interfaced with the managed learning environment (MLE). These systems then provide commonality across many subject areas and allow bespoke solutions with only minor system variations. The incentives to achieve this are considerable, as CAPA can have a highly beneficial impact on the student learning experience, leading to better rates of student retention and progression.

1. Introduction

This paper presents a strategy for the introduction of computer-aided peer assessment (CAPA) for marking of, and giving feedback to students on, individual assignments. It outlines the implementation of CAPA in engineering management and engineering design. It will discuss the various roles that computers can play in the process and will highlight difficulties in moving to CAPA. The engineering management module was given to a small number (≈ 20) of first year BSc Mechanical Engineering students, whilst the design module was given to a large multidisciplinary first year group (≈ 140). Engineering design is particularly suited to trialling computer-aided peer assessment, because successful design rests on reflective practice (Adams et al., 2003) and high level skills in analysis and synthesis. These are attributes that appear well suited to inculcation through supportive learning via carefully structured peer assessment.

This project was ambitious in nature, complex in technological and administrative details, and took place over two academic years. It demonstrated significant student learning and the assessment advantages of CAPA, but also threw into clear relief computer-based technological difficulties in the wider implementation of CAPA. This has allowed us to identify a route towards implanting more routine use of CAPA in the Faculty of Technology and across the University. There are strong drivers for this in terms of enhancing the student learning experience and their set of transferable skills, and in better use of staff time to achieve higher level learning outcomes rather than engage in mundane assessment.

The problem this exercise was designed to address arises from the increasingly multicultural and disparate backgrounds of entrants into engineering degree programmes. Engineering disciplines, of necessity, have to transfer a set of high level skills to undergraduates, and there is a strong tradition of activities that now fall within the ambit of authentic assessment (Mueller, 2003), problem-based learning and reflective practice. Traditional student intakes into engineering usually had a particular set of attitudes and abilities which were fairly well-defined and a 'one size fits all' approach to

teaching and learning and, in particular, assessment achieved acceptable levels of retention and progression.

With an increasing emphasis on widening access to HE, current student intakes do not have this uniformity of background. Thus retention and progression are now pressing issues in numerate and analytical disciplines. Alongside these concerns, the increasing use of sophisticated e-learning resources within Managed Learning Environments (MLE) (Joint Information Systems Committee, 2002) requires students to develop facility with these systems early in their HE experience. However, IT literacy sufficient to cope well with MLE's cannot be assumed in a multinational and multicultural student intake that spans all social categories. Issues around constructive alignment among curriculum, teaching and learning and assessment (Biggs, 1999), and the choice of appropriate assessment hence become critical to student achievement in the HE environment.

2. Introducing CAPA in engineering

It is well known that students benefit from involvement in the assessment process (Race, 2001). A potentially effective way of delivering this involvement in a systematic and uniform way across multiple modules is through the use of computer-aided peer assessment.

Introducing CAPA in the first and second years of degree programmes, as an integrated component within the MLE, provides an opportunity to support the following teaching and learning objectives:

- Familiarity with the MLE:
 - Email use
 - Student portal and on-line resources
 - Electronic submission and receipting of coursework
- Improve 'ownership' of module content by students
- Help students learn about:
 - Expectations of assignment content and level
 - Marking criteria and standards
 - Value of objective feedback
- Develop critical self-awareness and reflective practice

- Improve retention and progression

"The term Managed Learning Environment (MLE) refers to the whole range of information systems and processes of a college or university (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning." (Joint Information Systems Committee, 2002) At our university it provides a means of email communication, the ability to post messages on a discussion board and a repository for a host of electronic learning materials. For this study it also provided a means of securely submitting electronic documents (coursework) online. The use of computers offers additional benefits from the anonymity and security possible with digital systems, from the 24/7 nature of the self-teach training in marking and feedback, and through automated monitoring and mark analysis.

When introduced in a supportive and constructive way it can therefore work to the benefit of the students doing the assessment, the students being assessed and the academic staff involved. Nevertheless, both staff and students have considerable reservations about the use of peer assessment (Langan & Wheeler, 2003). Concerns expressed include:

- Loss of marking rigour
- Quality of feedback to student
- Identification of plagiarism
 - Difficult even with experience
- Difficulties in monitoring and implementation
- Anxieties around traditional staff/student 'roles'

We initiated this study to examine the extent to which these concerns are real and to identify ways to overcome them.

implementing the bespoke computer systems and digital media necessary to support CAPA. In this trial, the bespoke systems included adaptations of parts of the MLE. This required significant manual intervention and liaison with IT support staff. This issue will be discussed further in section 4. A unique aspect of this trial was that the only constraints on the format of the file submitted by the students were: i) it had to be a single Word document but any facility or attribute within Word was allowed; ii) it had to be less than 5Mb in size. Most other similar methods utilise submission from a screen into a text box of unformatted text.

James, M.N. (2005) provides a link to the web resources that were provided for engineering design students during this project. It is intended that this module (Design as a Generic Tool) uses web-based material both to support self-learning and the lecture programme; and CAPA represents a logical extension to this student-centred learning environment (Atsusi Hirumi, 2005). The CAPA resources on this web site indicate the additional support necessary to enable the majority of students to successfully complete all the steps of the assignment.

The initial step in the CAPA process was to persuade students to register with the University Computer Service to get a user name and password. After four weeks of repeating this point in lectures and emphasising that module resources were linked from the student portal (the login homepage) and that the assignment could not be done without completing registration, some students had still not attempted this process. In certain cases, the underlying reasons appeared to be inadequate knowledge of campus layout, coupled with cultural difficulties around acknowledging incomplete understanding of the task. This is mentioned as a reminder that what seem to be simple points can create major problems for individual students.

Critical steps in the implementation include:

1. Training students so that they understand assessment criteria and grade descriptors

This was done by providing examples of marked and annotated assessed work submitted by students in

3. Implementation and methodology

Success in a developmental project of this nature requires close liaison between module leader and lecturing staff, students, and the person responsible for

previous years. These were provided in advance of the assignment submission date as anonymised online Adobe Acrobat files demonstrating excellent, satisfactory and unsatisfactory assignments. Marking of the assignments was to be done online in the MLE using a template produced with Questionmark Perception software. Rather than expecting students to mark holistically, a set of 12 assessment criteria was developed. These criteria covered both the design and engineering content and the presentation of the report. A set of generic grade descriptors was developed which could be applied to each criterion. Full details can be found at (James, 2005). This marking template was provided in advance of the assignment submission date, and contained the description of grade classifications and the twelve criteria against which the essay was to be marked.

It also demonstrated typical feedback to the student and introduced the concept of a 'criticism sandwich' (Dohrenwend, 2002), where a specific criticism is 'sandwiched' between two specific praises. Students were encouraged to give written feedback to help other students improve. The marking template included the rubric *"Your feedback, which is very important, should be a minimum of 30 words identifying the strengths and weaknesses of this piece of work. Any suggestions on how it might be improved would be welcomed. Put yourself in the place of the student whose report you are marking - would you appreciate and learn from the feedback you are giving"*. These resources were introduced and discussed in class. If this training was assimilated by students, they would be equipped to understand the assessment requirements and produce a high quality assessment themselves.

2. Discussing fully the system of allocating marks in the assignment with the students during class and clearly answering their questions

Each submitted assignment would be automatically distributed on-line to three other randomly chosen students. The mark allocated to the assignment would be the average of all three, and the student would receive three pieces of feedback. Students who failed to complete the marking would lose one-third of their own marks for each unmarked assignment. Thus not marking any assignments, even if an assignment was

submitted, would yield a zero mark. In the event, this strategy achieved a highly successful marking outcome. In the first year design module, for example, 82% of 145 students marked all 3 essays and only two students marked < 2 essays. The final withdrawal rate from this module was 3% (5 students). Only two possible cases of plagiarism were noted by the markers and one of these cases was upheld on examination by lecturing staff.

3. Agreeing criteria for staff sampling of assessed work to generate confidence in results

A minimum of 10% of the essays would be sampled by staff. This sample would generally be randomly chosen but would include those where the average mark lay on a classification boundary (e.g. between 1st /2nd); failing assessments and cases of suspected plagiarism; cases where there was a large variation between assessors marks; and cases where the essay was marked by < 2 students. In practice 23% of essays fell within one of these categories, with the largest categories being those of 'classification boundary' (10%) and 'failing' (6%).

A very small number of complaints about mark allocation were recorded and the results obtained by the students in this assignment are shown in the bar chart in Figure 1.

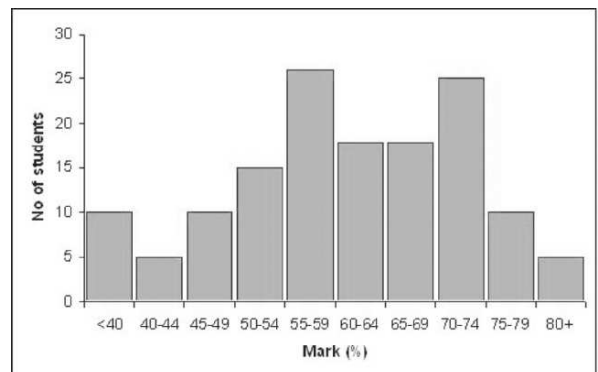


Figure 1. Marks in peer-assessed essay

The three marks for each essay were ranked from highest to lowest, and the mean difference between any two neighbouring marks was 9.6 with a standard deviation of 7.5. The mean difference between the highest and lowest marks for individual students was 18.8 with a standard deviation of 9.9. Whilst these

differences might seem relatively large, in the essays sampled the average values were generally close to the mark that lecturing staff would have awarded.

In the smaller engineering management group all scripts were checked by the lecturer and the average marks given by the students were within approximately 10% of those that he would have awarded.

4. Discussion and student feedback

This trial of CAPA in engineering modules was intended to gather information on the benefits to staff and students and on the difficulties in implementing an automated system within the MLE. These objectives were both met, and very positive feedback was received from students on their experiences using CAPA. It was also clear that virtually everyone registered for the first year module had become far more conversant with the capabilities of the MLE and student portal than in previous years. This is an important outcome, as the final piece of coursework in this design module was a group project where private folders on the MLE are used to exchange files, to communicate between group members and with the tutors, and to arrange meetings. In previous years, overall success in the module could be loosely correlated with frequency of the use of the MLE as a communication vehicle for the design group.

It became abundantly clear, however, that ad hoc programmes and macros to perform tasks such as anonymising the Microsoft Word documents submitted by students could not be interfaced with the secure MLE except through very significant manual intervention. For instance, whilst one can email an essay template with uniform document properties, there was no simple system to ensure that the template was used and returned. Equally, students often used personalised headers and footers, despite clear guidelines on essay layout. The system of randomly allocating essays to students for marking was another difficult process to automate and required extracting the files from the MLE, working on them and then loading them back onto the

student portal.

The solution to this problem is to drive the e-learning agenda of the University towards software development of the MLE to support CAPA. This is likely to be a two year project involving several software development staff, and has already taken around two years to motivate and demonstrate the effectiveness of the experience in student learning.

With the present computer systems, the benefits to the staff are indirect, in the form of students who are better equipped to use IT systems, and who can exercise critical self-reflection in essays for other modules. The lecturer of the engineering management group reported that the requirement to provide students with the explicit and detailed marking criteria necessary for peer assessment had made him reconsider the structure of assignments he set on other programmes. The direct time benefits are marginal, although once a suitable system and assessment resources are developed, some 75% of marking time might be saved (based on sampling around 25% of submitted essays).

The feedback provided by the peer markers to individual students was generally very constructive, apposite and supportive. Certain examples could not have been bettered by an academic member of staff, and also provide evidence that the University support resources have been properly made known to, and used by, many first year students.

The following quote shows one feedback comment: *"The report starts off with a good definition of your initial thoughts about the two terms, engineering and design. You have shown well what you have learnt in the last few weeks and how your understanding has improved. Your level of grammar and spelling is to a good standard but I would suggest spreading out your work a little more. It can be very hard going and it becomes very easy to lose interest when you have to read large blocks of text. Your references were a little vague and could have been expanded. The university provides a lot of help notes on such things as quoting references properly. A large percentage of the marks you did lose were due to the fact that you didn't cover the areas on which you were going to be marked on. The best way to overcome this in the future is when writing a report to always know*

what you are writing, and does that answer the question you were given. And when possible have a copy of the mark scheme with you so you know that you have covered everything which you will be marked on. Overall a good report and you have shown a good potential for the future."

An excellent example of a 'criticism sandwich' is seen in the feedback comment: *"A good solid essay with fantastic layout and structure. A few points: some of the issues were touched upon but not fully discussed such as modules taken and the environmental issues, the essay was on the short side and had much room to elaborate on. English and grammar were a little dodgy in places but otherwise a good essay."*

A feedback form was emailed to the students after the exercise and their feedback was uniformly positive. Some of the questions asked are given below with typical verbatim responses received from students. The percentage given indicates positive (Yes) responses and *n* is the number of responses received.

1. Did you learn anything from marking someone else's work?

(88% Yes, *n* = 101)

- *How important it is to read through the assignment criteria before beginning*
- *What a good and bad essay looks like*
- *I have learnt how to structure an essay and which type of language to use to build it*
- *It has given me the idea on how to check my own essay for mistakes next time*
- *The level of my peers, and my own faults*

2. (Why) Do you think this peer assessment exercise will help you to write better reports in the future?

(72% Yes, *n* = 101)

- *I think I will have a different insight into writing reports*
- *Because I will consider the person reading it, the flow, etc.*
- *The process led to me re-assess my own essay and made me notice my own mistakes*
- *Hopefully, I will write them clearer so that they are easier to mark*

3. What did you like best about doing this peer assessment?

- *It was fun!!*
- *Was different and interesting*
- *Quick, educational*
- *Quick - good feedback*
- *I mostly liked the fact that I was given the opportunity to put myself in the position of a tutor, and see how the marking process is carried out*
- *Getting other students' views on my work*
- *That it was all electronic*

4. What did you like least about doing this peer assessment and how might it be improved?

- *Reading them all and having to give some bad marks to students. Although I thought they were justified*
- *Found it difficult to give students a bad mark (even if deserved) as we are all in the same boat and I felt bad 'failing' a student*
- *Classmates might not understand how to mark and assess properly*
- *The same thing I don't like about all coursework, the fact that it's coursework. But I don't think the peer assessment can be improved really*
- *It is difficult to criticise at the best of times. Fear of responsibility as a non-expert. It may not be objective enough*

5. Would you prefer a peer-assessed assignment to a tutor-marked assignment?

(30% Yes, *n* = 99)

As the positive responses to questions 1 and 2 far outweigh the negative ones, it is interesting to note that only 30% of the respondents would prefer a peer-assessed assignment to one assessed by tutors. There are hence issues of perception which must be addressed before wider implementation of CAPA with first year engineering undergraduates. The students on the engineering management module were more supportive of peer assessment.

5. Conclusions

This CAPA trial used computer systems and software within the University MLE, but interfaced them and performed most critical tasks through manual intervention. There are several IT-based conclusions that can be drawn from this experience:

- At present, CAPA is very labour intensive for academic and IT staff
- Making essays anonymous is not simple, because of digital media attributes like document properties and headers and footers
- Some students do not read instructions, even when these are very clear and explicit

The route forwards in wider implementation of CAPA therefore rests on motivating an appropriate e-learning strategy at the corporate level within the University. The incentives to achieve this are high, as CAPA demonstrably provides:

- A high impact on the student learning experience
- A high level of IT skills transfer
- A high degree of knowledge 'ownership' by students
- Better understanding of the purpose of assessment
- Inculcation of critical reflection on self-performance in assignment objectives

The authors believe also that the high initial time and cost investment in developing CAPA systems that are fully interfaced with the MLE will be recouped through:

- Use of common systems across a number of modules
 - Bespoke solutions with only minor system variations
- Improvement in student retention in a stage
- Improvement in stage progression of students

These outcomes would have a high teaching and learning impact, particularly in engineering disciplines, which often struggle to recruit undergraduates, and then fail significant numbers within the first six months of the degree programme. There is also likely to be greater student acceptance of peer assessment on first year assignments as these marks do not directly impact on degree classification. Race (2001) gives 7 reasons why involving students in their own assessment has educational value. The two main reasons we adopted

this approach was to deepen student learning and to provide more feedback to the students. Black and Wiliam (1998) have shown that effective formative feedback such as that provided here can improve student performance, and this study is one of the largest educational intervention effects ever reported in terms of number of students affected.

CAPA in the Faculty of Technology at the University of Plymouth forms one strand of a multi-faceted approach to revising the first year curriculum in certain degree programmes and its mode of presentation to students. The intention is to emphasise the excitement of the degree programme in a holistic way, via group project work that is linked across modules and assessed in ways that will better align curriculum, teaching and learning, and assessment.

The aim is to produce enthusiastic, motivated students who are empowered to believe in their own ability to succeed; rather than being swamped in detail and anticipating failure.

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Mapping Self-Assessment to Achievement

Sherria Hoskins
Department of Psychology

Carolyne Jacobs
Department of Curriculum Development

Heather MacKenzie
Department of Psychology
University of Portsmouth, Hampshire, United Kingdom

In line with Government recommendations (Tomlinson, 2004) the University of Portsmouth is introducing Personal Development Planning (PDP). PDP commences with the Individual Learning Profile (ILP); a paper-based, self-assessment of confidence in key skill areas, completed by students during induction week; in 2004 more than 3,300 students completed the ILP. This paper aligns strongly to the recently published Measuring and Recording Student Achievement report (Burgess, 2004) which highlighted the need for evidence-based research to support the introduction of self-assessment within PDP activities and is underpinned by the sound theoretical concepts associated with self-efficacy (Bandura, 1977). This paper reports on the early stages of a large research programme that focuses on the reliability, stability and predictive validity of the ILP. The outcomes of this research will have resonance for other HE institutions, which have implemented, or are implementing PDP. The research findings outlined in this paper also have significant theoretical implications for those involved with teaching and learning and/or curriculum development.

1. Introduction

The University of Portsmouth is introducing Personal Development Planning (PDP) within a three-year, staged programme. The programme commenced with the introduction of Level 1 activities in October 2003 and will culminate in 2006 by offering activities for postgraduate students, thus ensuring that PDP opportunities are in place for all awards. This strategy is in line with the UK Government agenda disseminated via the Tomlinson Report (2004), which stressed the importance of PDP in higher education (HE) and the Burgess Report (2004) recommending the continued introduction of PDP for all HE awards.

The strategy adopted at Portsmouth reflects the recommendations of a government-commissioned report and the Quality Assurance Agency (QAA). The 1997 National Committee of Inquiry into Higher Education, chaired by Sir Ron Dearing, recommended that all higher education institutions should introduce Progress Files for all awards comprising two elements:

- a transcript recording student achievement that should follow a common format devised by institutions collectively through their representative bodies;
- a means by which students can monitor, build and reflect upon their personal development.

(NCIHE 1997)

Following the publication of the Dearing report, the CVCP¹, Standing Conference of Principals (SCoP) and Quality Assurance Agency (QAA) produced Guidelines for HE Progress Files. These guidelines were designed to support universities and colleges of Higher Education in the development of progress files for all HE awards by 2005-2006. The guidelines defined PDP as:

...a structured and supported process undertaken by an individual to reflect upon their own learning, performance and / or achievement and to plan for their personal, educational, and career development.

(QAA, 2001)

The PDP element of a progress file aims to help students reflect on their own learning, set learning goals and plan how they are going to achieve them.

The team responsible for implementing PDP at Portsmouth considered that the most practical way forward would be to introduce PDP over a three year period, commencing with activities for Level 1 (usually first year) students and then adding activities for Levels 2 and 3 in subsequent years of the implementation. Level 1 activities would commence with an on-entry exercise to help student assess their skill levels and provide a base-line from which they could develop and gauge their progress in the future.

In October 2002, the University piloted a paper-based on-entry assessment exercise and over 1,000 Level 1 students across all faculties took part in the pilots. After favourable feedback from academic staff and students involved in the pilots, the exercise was renamed the Individual Learning Profile (ILP) and introduced for all new undergraduate entrants in October 2003. The ILP prompted students to assess their skills in a number of key areas including communication, time management, researching, etc. After students completed the questionnaire it was processed by optical mark reader and returned to personal tutors within 1 to 4 days. Subsequently, tutors and students discussed (usually in personal tutorial session) the areas that required development and how students could take advantage of the options available to them to maximise their learning potential. In 2003, and again in 2004, over 3,000 students completed the questionnaire, each representing approximately 66% of first year student registrations for that year.

The utility of the ILP questionnaire was rapidly established and received positive formal and informal feedback from staff and students. Tutors commented that they found the ILP questionnaire provided valuable individual feedback and enabled them to work with students to address any potential problem areas at the earliest stage. Course leaders stated that the group level reports, which were returned with processed forms, provided useful information that could be used in curriculum development and to enhance programme reviews. Students were generally positive about the questionnaire; many stated that it helped them reflect

¹Now Universities UK

on their current skill levels and think about the actions that they needed to take to support their learning at an HE level.

PDP is operationally sound at Portsmouth, but key questions regarding its value as an educational tool remain unanswered. A key research issue for current PDP practice, and all institutions involved in the implementation of PDP, is its impact upon learning. Jackson and Ward (2004) articulate this concern and propose three areas for investigation: synthesis of relevant scientific knowledge, synthesis of institutional evaluations and practitioner action research, and examining PDP against theoretical models of learning.

There has been some investigation of relevant scientific knowledge, but further work is required. In 2003, Gough et al. (2003) compiled a report evaluating and synthesising current research that focussed on the links between PDP and learning. A large number of relevant studies were considered for review; a number of key criteria were used to determine the quality and relevance of each study. A systematic map was developed which examined the various approaches to PDP, the context of the studies, methodology and the outcome measures. The majority of the studies originated in the USA with a smaller number in the UK; many examined PDP-like activity that focussed on course-specific outcomes and the use of learning logs. Study outcome measures generally related to learning approaches/learning styles, knowledge gain/attainment and, to a lesser extent, career outcomes. A subset of the studies, researcher-manipulated rather than descriptive cases, were subject to a more in-depth review. Findings indicated that where outcome measures related to learning approaches or styles, 9 of the 13 studies reported positive effects; where the outcome measure was student attainment all 10 studies reviewed reported positive effects. Only 3 of the studies used personal outcomes to measure the impact of PDP and the findings were respectively, positive effect, negative effect and no evidence of effect.

The second area for investigation proposed by Jackson et al. (2004) focuses on the experience of HE practitioners and institutions. Gough et al. (2003). have gathered data from a number of institutions and individuals. Higher Education Academy, in partnership with the Centre for Recording achievement, are

compiling a catalogue of practitioner experience, current practice and proposals for future direction which will be made available to interested parties through various mediums including published papers and national newsletters.

The third area for investigation centres on the relationship between PDP and theoretical models of learning. One such model is Bandura's (1977; 1997) concept of self-efficacy, which is adopted here. Bandura (1977; 1997) argues that self-efficacy is a key motivating factor in goal achievement. Outcome expectations i.e. the expectation that certain behaviour will lead to the goal (outcome) are a part of motivation. However, it is argued that outcome expectations alone are not sufficient to explain the behaviour of an individual. An individual may expect that certain behaviours will result in a desired outcome, but it does not necessarily follow that they will complete the necessary behaviour. Bandura (1977; 1997) argued that this could be understood in terms of efficacy expectations; an individual must be aware of the required behaviour and be confident that they have the ability to execute that behaviour. A person who has low efficacy regarding their ability to successfully complete a task and reach a goal may avoid the situation or expend little effort, whereas an individual with high efficacy may feel capable of tackling the situation and subsequently may use more effort. The ILP aims to measure students' confidence in key skill areas. It is possible that high confidence levels in an individual indicate higher levels of self-efficacy and the propensity to expend more effort in developing skills and subsequently may attain a higher level of achievement.

It is students' perceptions regarding their efficacy, rather than actual level of efficacy, that is important. Decisions regarding efficacy, according to Bandura (1977; 1997) can be made even in the absence of experience. Bandura (1977; 1997) argues that reference is made to performance accomplishments and vicarious experience. Performance accomplishments involve reference to the person's own experience in similar situations and are the most dependable source of efficacy expectations. More success results in an increased efficacy expectation. The effect of failure is temporal in that it is dependent upon the timing of the failure within a success/failure sequence. For example,

an early failure is liable to result in a larger decrease in efficacy than a failure that follows a string of successes (particularly if then followed by more success). In the absence of personal experience, efficacy expectations may be formed through vicarious experience i.e. observing other individuals' experience of a similar task. There is a larger increase in efficacy when i) the other individual displays characteristics similar to those of oneself *and* ii) they have experienced difficulty with the task but persisted and succeeded. This effect is heightened when more than one other person has been successful in achieving the goal. Discussion and reflection may influence efficacy judgements since verbal persuasion is another reference point for such judgements (Bandura, 1977; 1997).

Evidence would suggest that the type of goal-setting behaviour typified by PDP-style processes has an effect on achievement where goals are proximal (consequences are likely to be experienced in the near future) as opposed to distal (the consequences will not be experienced for some time). Bandura and Schunk (1981) argued that proximal goals motivate more than distal goals as they offer immediate incentives, allowing an individual the opportunity to assess their capabilities at an early stage, which combined success in achieving goals, will lead to an increase in self-efficacy. Bandura and Schunk (1981) tested this hypothesis and found that children who were set proximal goals had significantly higher self-efficacy than those who had been set distal goals. The research would suggest that there is only a nominal disparity between self-efficacy levels of those who set distal goals and those who were not set goals at all.

As self-efficacy arguably affects the amount of effort expended on a task and an individual's persistence, a significant body of research focuses on the use of self-efficacy for predicting achievement. In a review of the history of, and debates within, self-concept research, Pajares and Schunk (2001) describe the hierarchy of self-efficacy for predicting achievement where the various types of self-efficacy rank in the following descending order: subject-specific self-efficacy; academic self-efficacy, and global self-efficacy. They assert, "It is clear that self-concept becomes more empirically sensitive to, and more predictive of, achievement outcomes the more specifically that it is conceived and assessed." (p.

244). They also address the issue of causality: is self-belief determined by academic achievement or is the converse true, that self-belief determines achievement? The research indicates that the relationship is considered to be a reciprocal one.

Bong (2001) longitudinally examined various constructs of self-efficacy at two different time points. The research included self-efficacy for self-regulated learning, academic achievement, course-specific, content-specific and problem-specific self-efficacy and the perceived value of the course in female Korean undergraduates. Bong also examined the future course enrolment intentions and the performance of the students (at midterm and final exams). The various types of self-efficacy were not equally predictive. Time 1 course-specific self-efficacy failed to predict achievement (as measured by midterm exams) but did predict time 1 course enrolment intentions, as did the perceived value of the course at time 1. The perceived value of the course at time 1 was predictive of achievement (midterm exams). Time 1 course-enrolment intentions were predictive of time 2 self-efficacy, perceived value of the course and time 2 course-enrolment intentions. Time 2 self-efficacy was predictive of final exam performance and course enrolment intentions at time 2. This provides evidence that self-efficacy beliefs occur at varying levels of specificity.

Andrews (1998) researched the influence of previous experience of science i.e. the study of science during the final year of high school, upon self-efficacy for science and the predictive validity of this measure for achievement. Those who had studied science had a higher self-efficacy score than did those who had not, although this difference was not significant. Scores on self-efficacy for science were significantly correlated with academic performance.

Research has indicated varying factors that relate to the previous experience of the task influence self-efficacy. Mitchell, Hopper, Daniels, George-Falvy and James (1994), using a sample of Air Traffic Controllers, explored the factors used to establish self-efficacy beliefs during the acquisition of the skills. It was found that the more experienced an individual, the less they drew on task and contextual factors as a basis for self-efficacy beliefs and instead referred to past performance

and their feelings at that time. In the first trial, self-efficacy was shown to be a more effective predictor of performance than the scores that individuals expected to gain. In subsequent trials, expected and aspired scores were better predictors of performance than self-efficacy.

Vrugt, Oort and Zeeberg (2002) examined the differences between beginners and advanced students in terms of their self-efficacy and task orientation. It was found that for both advanced students and beginners a high level of self-efficacy led to the pro-active pursuit of personal goals, which subsequently had an impact on their levels of achievement. However, these relationships were more marked for advanced students than for beginners. Vrugt et al. (2002) hypothesise that this is due to beginners being less familiar with the demands of the task. Task orientation did not contribute to self-efficacy for beginners in the way that it did for advanced students and in fact had a negative effect upon achievement for beginners. It was argued that beginners had yet to understand the necessary skills for success.

Chacko and Huba (1991) tested a causal model of cognitive and affective variables upon self-efficacy, achievement, use of study strategies/self-monitoring and concentration/preparation for class-based group of first-year nursing students. They found a direct relationship between self-efficacy and achievement. Language and math ability, motivation and the individual's concentration/preparation for class impacted on self-efficacy. Concentration and preparation were directly influenced by self-monitoring and the use of study strategies. It was argued that there was a direct relationship between time dedicated to study strategies and effective self-monitoring, concentration, self-efficacy and subsequently, achievement.

If self-efficacy is argued to affect persistence in a given task, there is a noticeable lack of research about the predictive effects of self-efficacy and the relationship with withdrawal rates in higher education. It could be argued the effect is accumulative: low self-efficacy leads to poor achievement rates, poor achievement further reduces self-efficacy levels, which can lead to high withdrawal rates. However, in many cases withdrawals occur prior to the first semester exam and therefore it is important to investigate the relationship between self-

efficacy on-entry and withdrawal rates.

A 3-year longitudinal study of nursing students' attrition rates included the development and testing of psychometric tools to measure students' self-efficacy relating to their academic and clinical skills (Harvey & McMurray, 1994). The study compared the self-efficacy of those students who withdrew, those who completed and those who were continuing with the intention of completing at a later date; the three groups were similar in terms of age or gender. Two aspects of self-efficacy were investigated: academic self-efficacy and subject-specific (clinical) self-efficacy. Research suggested that there was minimum disparity between the levels of clinical self-efficacy for completers, continuers and those who withdrew. However, students who completed had the highest levels of academic self-efficacy, those who intended to continue exhibited a lower level of academic self-efficacy and those who withdrew displayed the lowest level of academic self-efficacy. Harvey and McMurray (1997) argue that withdrawal rates could not be attributed to achievement alone and that there is a case for the predictive validity of self-efficacy for retention. It is important not to overstate this case. Although there were significant differences between the groups as identified by ANOVAs, the lack of multiple regression or similar techniques means that the predictive validity of self-efficacy scores to predict retention cannot be determined.

While some existing research aligns strongly to current priorities in HE, further evidenced-based research is required to establish the theoretical implications of engaging in PDP activities (Burgess, 2004).

The extent of information generated by the ILP questionnaire (individual learning profile completed by students during induction week at the University of Portsmouth), offers a valuable data source for such evaluation. The project team have identified a number of interrelated and linked research topics with both internal and external and, applied and theoretical significance, to be investigated in four stages:

- Stage 1: evaluate the reliability, stability and validity of the ILP questionnaire.
- Stage 2: determine causal relationships between previous academic qualifications, age, gender,

motivation and ILP scores.

- Stage 3: examine the development of ILP data as students develop.
- Stage 4: determine the predictive validity of the ILP questionnaire, with retention progression, academic outcome and first destinations as dependent variables.

The current paper presents the findings from Stage 1 and preliminary analysis from Stages 2 and 4.

1.1 Stage 1: Evaluating the reliability, stability and validity of the ILP questionnaire

1.1.1 Method

Stage 1 of the research explored the psychometric properties of the ILP, utilising data from 1137 ILPs completed in October 2004. The PDP questionnaire consisted of six sections: Section 1: Speaking and Listening; Section 2: Reading and Researching; Section 3: Writing; Section 4: Time Management; Section 5: Numeracy; Section 6: IT - (see Table 1). Each section comprised a number of questions or items and students rated their confidence on a scale of 0-3, with 0 indicating no confidence and a score of 3 indicating a high level of confidence. It was also the intention that research findings would be used to improve and enhance the questionnaire.

During psychometric testing the six sections were described as domains. Domains are not statistical phenomena; they are simply groups of items/questions that display a perceived coherence. If the questionnaire is expected to generate meaningful data that has applied and theoretical relevance, it is important that the domain structure is based on sound psychometric principles. In order to establish the optimum structure, all the students' responses for each question or item in the ILP were subjected to Principal Components Analysis (PCA), which identifies statistical factors or groups of variables that have underlying characteristics in common.

If responses to three questions, 1, 2 and 3 correlate with each other (1 with 2, 1 with 3, and 3 with 2), there are

grounds for concluding that they are measuring the same underlying phenomena, and we can confidently identify and grade factors within the ILP.

1.1.2 Results, Analysis and Discussion

1.1.2.1 Evaluation of the Existing Tool

Initially, the ILP questionnaire was analysed using a 6-factor structure based on the existing domains or groups. The 6-factor solution accounted for 50.23% of the total variance in the ILP scores. Many of the items in the 6-factor solution mapped closely to the existing sections of the ILP, indicating that the intuitive sectioning of the questionnaire had been relatively logical. There were a limited number of questions/items that appeared or loaded in a different factor during analysis, indicating that questionnaire could be made more stable if some questions were re-located in an alternative group. The items loading in factor 5 were identical to those in the original Time Management section Information Technology section emerged as factor 1. Speaking and Listening emerged clearly in factor 6. However, item 1e (fifth question in the original Section 1: Speaking and Listening) correlated more highly on factor 3 and factor 4 than it did on factor 6, which included most of the other Speaking and Listening items. Item 1f loaded on factor 5 (same as the original Time Management section) and not on factor 6, which mapped closely to the original Speaking and Listening section. The Numeracy section was also clearly present in factor 2. Item 6g, from Section 6: IT also loaded unexpectedly but had a higher loading in factor 1. However, Section 2: Reading and Researching, and Section 3: Writing did not emerge clearly, items from these sections were spread across factors 3 and 4, indicating that these sections could be more stable if items were re-grouped.

1.1.2.2 Internal Consistency and Split-half Reliability of Existing Factors

The split-half reliability was calculated for each factor by checking the correlations between responses between items in one half of the factor and those in the other half. Thus checking the degree of similarity within the factor. Internal consistency is measured using Chronbach's Alpha - which correlates every item in a

Section 1: Speaking and Listening	
1a	Are you confident talking to people you don't know?
1b	Do you join in class group discussion?
1c	Do you ask questions when you don't understand something?
1d	Do you feel comfortable giving a talk or presentation to a group?
1e	Do you find it easy to explain what you mean (e.g. find the right words)?
1f	Can you listen and concentrate for long periods (e.g. in a lecture)?
Section 2: Reading and Researching	
2a	Are you confident about your reading skills?
2b	Are you able to read quickly and understand what you are reading?
2c	Are you able to make sense of a text on first reading?
2d	Are you able to judge the reliability of the information you read?
2e	Can you pick out information easily when reading?
2f	Can you confidently read out loud to a group?
2g	Are you confident about using a dictionary and/or thesaurus?
2h	Do you feel confident about using a library?
Section 3: Writing	
3a	Are you confident about your spelling?
3b	Are you confident about the use of punctuation and grammar?
3c	Are you confident about taking notes in lectures?
3d	Can you put information into your own words without copying large sections?
3e	Can you put your ideas onto paper easily, and find the right words?
3f	Are you confident about writing academic essays or reports?
3g	Are you able to write accurate references for a bibliography?
Section 4: Time Management	
4a	Do you consider yourself well-organised?
4b	Do you work to deadlines and hand work in on time?
4c	Do you know when you study best (e.g. early morning, evening, etc.)?
4e	Do you use a diary/timetable to help you plan your work?
4f	Do you leave time to check and/or proof read your work?
Section 5: Numeracy	
5b	Are you confident working with decimals?
5c	Are you confident working with percentages?
5d	Are you confident working with ratios?
5e	Are you confident working with graphs?
5f	Are you confident working with simple averages?
Section 6: Information Technology	
6b	Are you confident about using computers for word processing?
6d	Are you confident about using computers for spreadsheets?
6e	Are you confident about using computers for databases?
6f	Are you confident about using computers for presentations (e.g. PowerPoint)?
6g	Are you confident about using computers for statistics?
6i	Are you confident about using computers for graphics packages?
6j	Are you confident about using computers for word processing?
6k	Are you confident about using computers for accessing library catalogues and stock?
6m	Are you confident about using computers for using electronic journals?

Table 1. Items from the six sections of the existing ILP

	Speaking and Listening	Reading and Researching	Writing	Time Management	Numeracy	IT
Cronbach's Alpha	.67	.78	.79	.69	.91	.85
Spearman's Split-half	.66	.74	.76	.67	.88	.78

Table 2. Internal consistency and reliability coefficients for the sections of the existing ILP

factor with every other item and explores the homogeneity of the items within a factor. The internal consistency and reliability coefficients are presented in Table 2. A correlation of 0 represents the absence of a relationship and a correlation of 1 reflects a perfect match; in this case reliability and consistency are good across all factors.

1.1.2.3 Development of Revised Tool

The factor analysis indicated that the structure of the questionnaire could be improved. Therefore the exercise was repeated in order to identify the most convincing factor structure. In the first stage, item analysis, items were removed if they failed to discriminate between individual students, this included items where more than 65% of participants responded at one end of the scale (e.g. they all agreed with the item being presented). Items 2g, 6b and 6j were removed.

The amended data was subjected to Principal Components Factor Analysis, on this occasion without a pre-determined number of factors. A scree plot indicated the optimum factor structure and again a 6-factor solution emerged. The emergent factors were as follows:

Factor 1: Numeracy, mapping to the Numeracy section of the original ILP questionnaire.

Factor 2: Higher Level Academic Skills. Factor 2 was less clear to interpret as items included those from Section 1: Speaking and Listening, Section 2: Reading and Researching, and Section 3: Writing of the existing ILP. The research group felt that these items could usefully be grouped under the heading *Higher Academic Skills* - see Table 3.

Factor 3: Information Technology. This factor maps

directly to the IT section of the original ILP questionnaire.

Factor 4: Basic Academic Skills. Factor 4 again combines items from the Reading and Researching and Writing sections of the original ILP. The team entitled this section Basic Academic Skills (see Table 4).

Factor 5: Verbal Communication. Factor 5 comprised the majority of items from Section 1: Speaking and Listening of the existing ILP and one item from Section 2: Reading and Researching (see Table 5). This factor clearly identifies confidence in verbal communication skills.

Factor 6: Time Management. The time management section of the existing ILP was fully replicated in factor 6.

All factors show excellent internal consistency and split-half reliability (above 6 factors in all cases).

Clearly then, the psychometric analysis indicates that the structure of the original ILP is robust with strong internal reliability and consistency. The grouping of questions is borne out in the statistical analysis. However, this analysis also revealed where improvements could be made to the factor structure of the ILP (in other words the way in which questions are grouped and thus scored) by re-grouping a number of items in 6 new sections: Verbal Communication, Basic Academic Skills, Higher Academic Skills, Time Management, Numeracy and IT. The research team considered that the reference to academic learning in the new structure be more persuasive when convincing academic staff and students about the value of engaging in PDP activities.

1e	Do you find it easy to explain what you mean (e.g. find the right words)?
1f	Can you listen and concentrate for long periods (e.g. in a lecture)?
2d	Are you able to judge the reliability of the information you read?
2e	Can you pick out information easily when reading?
2h	Do you feel confident about using a library?
3c	Are you confident about taking notes in lectures?
3d	Can you put information into your own words without copying large sections?
3e	Can you put your ideas onto paper easily, and find the right words?

Table 3. Items in Factor 2: Higher Academic Skills

2a	Are you confident about your reading skills?
2b	Are you able to read quickly and understand what you are reading?
2c	Are you able to make sense of a text on first reading?
3a	Are you confident about your spelling?
3b	Are you confident about the use of punctuation and grammar?

Table 4. Items in Factor 4: Basic Academic Skills

1a	Are you confident talking to people you don't know?
1b	Do you join in class group discussion?
1c	Do you ask questions when you don't understand something?
1d	Do you feel comfortable giving a talk or presentation to a group?
2f	Can you confidently read out loud to a group?

Table 5. Items in Factor 5: Verbal Communication

1.2 Stage 2: Determining causal relationships between previous academic qualifications, age, gender, motivation and ILP scores

Preliminary analysis

1.2.1 Method

Establishing the reliability and internal consistency of the ILP and an evidence based approach to identifying and scoring undergraduates confidence precipitated the next stage of the research. Stage 2 aims to determine causal relationships between previous academic qualifications, age, gender, motivation and ILP scores. This is key to exploring the impact of previous experience on one element of self-efficacy (belief about one's own ability). This research programme is in its infancy and only part of the data is available for analysis at the time of writing. We have started to examine the relationship between the levels of confidence, as generated in the ILP questionnaires, and the student's age and type of course chosen. The new factor structure

was used for this stage of the research.

1.2.2 Results, Analysis and Discussion

Pearson Correlation Analyses were conducted to determine correlations between age and factor scores. Age was found to significantly positively correlate with the score on Factor 2: Higher Academic Skills ($r = .120$, $n = 1166$, $p < 0.001$, two-tailed). Correlations with Factor 5: verbal Communication were also positive ($r = .173$, $n = 1171$, $p < 0.001$, two-tailed). These relationships would suggest that as student's age increases they show higher confidence levels in areas designated as higher academic skills and verbal communication.

Students were then categorised as traditional age (aged 20 or younger, $N = 1005$) or mature age (aged 21 and over, $N = 168$). An independent t-test was undertaken to determine the likelihood that a difference between the two groups was due to chance (a significant result would indicate that the difference is unlikely to be due to chance). This test revealed that mature students

(mean = 24.45, s.d. = 3.42) scored significantly higher on Factor 2: Higher Academic Skills than traditional age students (mean = 23.78, s.d. = 2.92) ($t = -2.376$, $df = 210.191$, $p < 0.05$). Mature students (mean = 14.62, s.d. = 2.50) also scored significantly higher on Factor 5: Verbal Communication than traditional age students (mean = 13.79, s.d. = 2.38) ($t = -4.167$, $df = 1169$, $p < 0.001$). However, traditional age students (mean = 19.31, s.d. = 4.00) scored significantly higher on Factor 3: IT ($t = 3.494$, $df = 1164$, $p < 0.001$) than mature students (mean = 18.13, s.d. = 4.38). This indicates that mature students display more confidence about their higher level academic skills and their verbal communication skills than traditional age students, but are less confident in IT-related areas. However, existing research indicates that actual skills are not deficient in mature students, this appears only to be the case in adults aged over 60 who are not in higher education (e.g. Hoskins & Hoof, 2005; Chmielewski, 1998; Morrell et al., 2000).

Bandura (1977) suggests that although previous successful experience may inform greater long-term self-efficacy, if self-efficacy is low there will be correspondingly low levels of effort and performance. For example, self-efficacy relating to information technology skills varies significantly across populations; low assessment outcomes may be the result of low self-efficacy rather than actual potential ability. Similarly, the assessments that involve effective communication skills may be subject to similar influences.

A univariate ANOVA test was used to compare factor scores for different types of courses (Honours degree, Foundation degree, HND, CertHE) to determine whether the differences in factor scores between multiple groups were unlikely to have occurred by chance. The type of course had a significant effect on Factor 2 (Higher Academic Skills) scores ($F_{(3, 1162)} = 3.361$, $p < 0.05$). Foundation degree students (mean = 25.21) scored significantly higher than Honours degree students (mean = 23.83) on Factor 2 ($p < 0.05$), indicating that students on foundation degrees are more confident than honours degree students on these skills. It had been anticipated that the reason for this relationship was because most students studying Foundation Degrees are mature entrants. However, an ANOVA demonstrated that the impact of course type on ILP scores did not interact with the impact of age on ILP scores. Further research

is required to examine the factors that impact on levels of confidence and achievement for these particular students. Foundation Degree students generally have significant work and life experience which may have enabled them to develop their communication skills. However, there are other factors, which may impact on their levels of confidence in other areas and subsequently effect levels of achievement.

1.3 Stage 4: Determine the predictive validity of the ILP questionnaire, with retention progression, academic outcome and 1st destinations as dependent variables

Summary

1.3.1 Method

It is anticipated that Stage 4 of the research will explore the predictive validity of the ILP questionnaire, in relation to retention, progression, academic outcome and employment.

Current research and theoretical frameworks suggest self-efficacy impacts on effort and that belief about capability is a key factor in goal achievement. The ILP captures an individual's perceptions about their levels of confidence and ability and as such can be instrumental in establishing the relationships between self-efficacy and retention, academic achievement and graduate employment rates. The current research project includes a preliminary analysis of retention rates and academic achievement for a small sample of 70 first year psychology undergraduates. Retention and academic achievement were examined at the end of semester one.

1.3.2 Results, Analysis and Discussion

At this early stage the ILP is unable to predict more than 5% of variance in a multiple regression analysis. However, it is anticipated if a similar exercise were to take place later in the academic year, more conclusive findings would emerge. Related research undertaken by members of the project team would suggest that at an early stage social confidence rather than confidence in academic related skills is a more meaningful predictor.

Multiple regression and discriminant function analyses were conducted in order to determine the ability of the original and revised ILP factors to predict semester 1 achievement (continuous and categorical). Only one significant model emerged. A stepwise method multiple regression analysis using the revised ILP factors, age and special circumstances information produced a significant model where one predictor contributed significantly to the model; question 9a 'As you approach your studies, do you have any concerns about managing any other aspects of your life (for example, family commitments, financial difficulties, access to computing facilities, personal issues) that could affect your studies?' ($F = 4.788, p < 0.05$). However the adjusted R square value (0.057) indicates that this model accounts for just 5.7% of the variability in semester 1 mark. The standardised beta coefficient (-.268) indicates that question 9a has a negative relationship with semester 1 mark.

An independent t-test revealed a significant difference at the 10% level between the semester 1 mark for students who said that they did have additional concerns and those who said that they did not ($t = 1.863, p < 0.1$). Students with additional concerns were achieving significantly lower marks (mean = 53%) than were students without additional concerns (mean = 59%).

A significant difference in a small sample on this scale firmly underpins the impetus and rationale for further research and supports the theoretical framework discussed above.

2. Conclusion

This research project has had a number of positive practical and theoretical outcomes. Current activities have answered the call made by a number of national agencies for more evidence-based research relating to PDP and has supplemented the existing knowledge base, on which institutions and individuals in the HE sector can draw. The research has established the stability and consistency of the ILP questionnaire; at a local level

this has added credibility to the implementation of PDP, raised awareness about current processes and established links between operational activities and underpinning theoretical concepts.

However, beyond supporting the current implementation of PDP, there are indications that the research has sound theoretical implications and could have a wider application. Investigations to date would suggest that there is a relationship between levels of confidence and retention rates, progression and achievement. Establishing the impact of multi-variant factors, including self-confidence, on the student experience has profound pedagogical implications. Identifying the impact and weight of multi-variant factors more could lead to the emergence of a more effective curriculum, which supports all students in their learning, regardless of background or previous educational experiences.

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Designing Multiple Assessment Methods

Online Collaborative Learning and Assessment

Winnie Cheng
Martin Warren
Department of English
The Hong Kong Polytechnic University, Hong Kong SAR, China

This paper reports on a study which aims to investigate the impact of Online Collaborative Learning and Assessment (OCLA) on the learning and teaching of content subjects taken by first-year and third-year BA undergraduates. Specifically, the paper examines students' approaches to and attitudes towards OCLA and evaluates the effectiveness of OCLA in addressing subject objectives from the student and teacher perspectives. Findings obtained from focus group discussions and online forum discussions show that students found the learning experience positive and useful, contributing not only to better understanding of subject knowledge, but also improvement in such generic skills as critical and analytical thinking, problem-solving skills, team work and language and communication skills.

1. Rationale, aim and method of study

This paper reports on a study which aims to investigate the impact of Online Collaborative Learning and Assessment (OCLA) on the teaching and learning of academic content subjects (i.e. applied linguistics and communication studies subjects as opposed to English language proficiency subjects) in the English Department of the Hong Kong Polytechnic University, and specifically to evaluate the effectiveness of OCLA in addressing subject objectives from both the perspectives of the teacher and students, and to examine students' approaches and views regarding OCLA. Another aim of the study is to compare first-year and third-year students in terms of the effect of OCLA on their learning. In this study, OCLA was incorporated into the teaching of two subjects, Pragmatics for first-year and Intercultural Communication for third-year undergraduate students. Both the writers were involved in designing the syllabuses and teaching these subjects. The subject syllabuses were written to facilitate the learning and assessment of both subject specific knowledge and such generic attributes as critical and creative thinking, learner autonomy, collaborative learning, reflective thinking, and the confidence and ability to assess oneself and one's peers fairly and responsibly. The subject design was in line with the strategic objective of our university, The Hong Kong Polytechnic University, namely, "To enhance the all-round development of students, particularly in the areas of global outlook, critical and creative thinking, social and national responsibility, cultural appreciation, life-long learning, biliteracy and trilingualism, entrepreneurship and leadership". 'Online collaborative assessment' in this study is defined as the assessment of both process and product of assessment tasks from three sources: the teacher, the student, and peers. The online learning activities and assessment tasks were all carried out by students using the WebCT¹ as a platform of learning, teaching and communication.

The study systematically collected a range of data using a variety of methods, including focus group interviews that involved about 20% of the students, and textual analysis of the students' portfolios. Assessment was based on subject-specific criteria in combination with the more general SOLO taxonomy (Biggs, & Colins, 1982) in order to assess the quality of online collaborative

assignments submitted in the form of a portfolio by individual students. A development from the study, which will be described later, is the construction of an OCLA taxonomy to better reflect the nature of the assignments and distinguish between different levels of attainment of the learning outcomes of the subjects concerned, i.e. in line with the notion of constructive alignment (Biggs, 2003).

2. Online Collaborative Learning and Assessment (OCLA)

The major educational and learning theories that underpin the development and the educational value of online learning and teaching have been examined quite extensively in the literature (Parry & Dunn, 2000; Chang, 2001a, 2001b, 2003; Wong et al., 2001; Jones & Harmon, 2002; Beatty & Nunan, 2004). The theories are namely, constructivist learning theory and situational cognition. According to Chang (2001a, 2001b), constructivist learning theory (Dewey, 1916; Jonassen, 1991) maintains that knowledge should be actively constructed by cognition. The teacher plays two major roles: first as a facilitator and an adviser of instruction to help learners to create a knowledge construction environment and second as somebody to give guidance and support to help learners become actively involved in the learning process and construct their own knowledge. The theory of situational cognition states that learning should be applied to real-life situations and should emphasize students' involvement and understanding in the learning process (Bandura, 1977; Lave & Wenger, 1991).

Apart from learning theories, theories of assessments also make important contributions to online learning and teaching. Authentic and portfolio assessment, which represent new directions in assessment, have

¹ WebCT, Inc., based in Lynnfield, Massachusetts, is the world's leading provider of e-learning systems for higher education institutions. Thousands of institutions in more than 70 countries worldwide are expanding the boundaries of teaching and learning with WebCT (<http://www.webct.com/>).

become appropriate constructivist approaches to assessment, and have been effectively incorporated into real world, classroom, or virtual contexts (Reeves & Okey, 1996; Birenbaum, 2003; Gardner et al., 2002; Wagner, 2001), with an emphasis on co-operation between instruction and assessment. The former, authentic assessment, can show students' learning processes and the assessor can monitor their growth. The latter, portfolio assessment, involves learners submitting a portfolio for assessment purposes. A portfolio is a systematic, multidimensional and organized collection of evidence to monitor students' knowledge, skills and attitudes (Vavrus, 1990; Chang, 2001a, 2001b, 2003), a storage mechanism for student's work (Herman et al., 1992), a collection of a learner's work assembled over time (Feuer & Fulton, 1993), and focuses on process as well as product (Reeves & Okey, 1996). According to Chang (2001a, 2001b), portfolio assessment helps teachers to understand the learning that is taking place and the changes in learners, stimulates involvement and self assessment in learners through the interaction with the teacher which involves discussion of the portfolio, and provides true and rich information for reflecting and assessing the performance and achievement of learners. In a nutshell, portfolio assessment is considered an effective means of measuring the changes in students' cognition and learning process, involvement and interaction, and assessing higher-order cognition abilities and affective attributes.

The benefits of OCLA have been discussed by many teachers and educators (Curtis & Lawson, 2001; Roberts, 2004) and include changing the way students learn and how well they learn, changing the learning experience for students, making it student-driven and student-centred, it provides a new focus on the effectiveness of education, so that education becomes less impersonal. With OCLA there is also increased support for mentoring and guidance. With the building of a sense of community within the class, there is a feeling of inclusivity in the educational experience, building community within the class. IT becomes essential infrastructure costs are reduced, and so on. These values and benefits of OCLA were the motivating factors for the design and implementation of the learning and teaching of the subjects described in this study.

2.1 An integrated model of online courses

Mason (1998) presents an integrated model of online courses which consists of "collaborative activities, learning resources and joint assignments". Such a model has as its main characteristics students learning through online discussions, accessing and processing information, and carrying out tasks. Most important of all, the success or otherwise of a course that adopts this model is dependent on the creation of a learning community (Mason, 1998).

Mason (1998) discusses five major features of online learning, namely interactive course materials, online pedagogy, structure discussions, collaborative activities, and online assessment. First, interactive course materials refer to the major feature of online courses which makes use of a resource-based approach to promote learning-to-learn skills, i.e. facilitating knowledge management skills such as searching, selecting and synthesizing information, discovering how and where to find answers and solutions, and understanding, transforming and presenting ideas. Second, an online pedagogy, as outlined by Mason, can be characterized by interactivity in the learning process, the changing role of the teacher from imparting knowledge to facilitating student learning, the need for knowledge management skills and for team working abilities, and the move towards resource-based rather than packaged learning. Third, structured discussions, which refer to the "unlimited, interactive, time-independent discussion" among group members or between the teacher and learners, allow learners the freedom to input messages at their convenience. To generate good educational discussions online takes careful planning and structuring to give structure and to help the learner to take an active part in the discussion. This is usually done by having small groups (typically under ten), providing specific tasks, and setting timelines for discussion. Fourth, collaborative activities via a group Web site make it possible for peers to focus on their joint work, with their work being open to be viewed and critiqued by their peers. The last feature of online learning courses (Mason, 1998) is online assessment which allows for the devising of assignments and assessment procedures that promote IT literacy, team work ability and knowledge management skills.

2.2 Online Pragmatics and Intercultural Communication courses

A number of concepts served as the guiding principles when OCLA was incorporated into the design of the subject syllabuses. Reading and learning from materials online and doing assessed tasks online, compared to attending lectures and interacting with the lecturer, require a much higher level of independence in learning. Online learning therefore puts a greater demand on students regarding their cognitive, motivational and interpersonal abilities for learning. Assessment procedures and methods were also re-designed to better reflect the course aims, objectives, pedagogy and learning outcomes.

In addition, the peculiarities and uniqueness of web-based learning should be maximally exploited. The increased interactivity afforded by online learning and teaching makes online collaborative assessment feasible (MacDonald et al., 2002). MacDonald et al. (2002, p.10) review a number of sub-projects which have practised collaborative formative evaluation of learning and teaching, including peer review of students' scripts posted electronically (Davis & Berrow, 1998); model answers delivered to help students to see alternative approaches to written work (Mason, 1995); process writing of assignments or 'iterative assignment development' (McConnell, 1999); and students involved in online negotiation of assessment criteria (Kwok & Ma, 1999).

Group work and involving students in the assessment procedures are also important. The value of group work as a means to developing skills such as "communication, presentation, problem-solving, leadership, delegation and organization" (Butcher et al., 1995, p.165) is well established. The problem in an assessed course in which group work takes place is that the teacher needs to assign individual grades to the students rather than the same grade for every member of the group. In order to fairly measure individual students' performance in the group work, the contribution of the individual to the group project will be established. One possible way to deal with this potential dilemma is to introduce an element of peer assessment to determine the contribution of individuals to a group project (Conway et al., 1993; Cheng & Warren, 1999). In this study, peer

assessment refers to a system of assessment whereby students, through online discussion and negotiation, assess the peers' contribution to both the conduct and the outcome of group work. In addition to peer assessment, students perform self-assessment of their own contribution to the collaborative project, and the teacher assesses student effort in group projects shown in online feedback and discussion of the feedback.

Bearing in mind the issues and guiding principles discussed above, the syllabuses of the subjects Pragmatics and Intercultural Communication were written to incorporate OCLA in their aims, learning outcomes and assessment. Figure 1 shows the subject aims of ENGL277 Pragmatics.

Figure 2 shows the more detailed subject aims and objectives in the syllabus of ENGL461 Intercultural Communication, which shows that both acquisition of subject knowledge and development of generic attributes are emphasized.

Online delivery of Pragmatics and Intercultural Communication made use of the combination of computers and network technology, asynchronous group and individual messaging, and the real-time interactive features of the World Wide Web. Traditional face-to-face lecturing in two-hour slots was replaced by students' online study; the lectures were presented by means of online learning materials using the WebCT platform. All teaching materials (notes, exercises, examples and audio clips) were uploaded on the subject Website. Weston and Barker (2001) summarise the major reasons for using online learning materials: the shortening of distance between student and place of learning, ease of access to resources, interactivity and multimedia, student control of learning, and distributed communication or collaboration. Compared to attending two-hour lecture sessions, when learning the subject materials online, students could do things like repeating or changing the sequence of units, and manipulating and rewinding video and audio clips that formed part of the online learning materials. Built into the learning units were discussion forums on the WebCT which allowed students to respond to each other and the teacher, giving them the opportunity to revise and reflect upon their work and to engage in reflective discussion (Bonk & King, 1998; Brown et al., 2000).

The aims of the subjects are:

To develop students' knowledge of the form, meaning and use of language and the principles involved in the interpretation of texts, both written and spoken.

To develop students' awareness and knowledge of the contextual influences which affect English language in use.

Figure 1. Subject aims of ENGL277 Pragmatics

Aims and objectives

Aims:

Subject knowledge and skills

This subject aims to raise students' awareness of and develop their understanding of theories, patterns and issues related to intercultural communication in a variety of contexts, and help them to apply the necessary skills to conceptualise and deal with problems arising from intercultural interactions.

Generic abilities

This subject aims to encourage a deep approach to learning through engaging in:

- analytical and evaluative thinking
- online and face-to-face learning and teaching
- group assignment resulting in individual portfolios
- collaborative assessment of group assignment

Objectives:

Subject knowledge and skills

Students are expected to be able to:

- understand the current intercultural communication theories and their supporting research and the processes of intercultural communication with a view to understanding intercultural communication phenomena;
- understand the components and characteristics of cultural patterns and the importance of cultural patterns in differentiating among communication styles;
- understand the importance of cultural identity and the role of cultural biases in intercultural interactions;
- understand the effects of cultural differences in verbal and non-verbal coding systems in intercultural interactions;
- identify and examine the processes and issues of intercultural communication in contexts such as education and business;
- evaluate their competence in intercultural communication; and
- learn and apply the necessary skills to improve their intercultural communication competence.

Generic abilities

Students are expected to be able to:

- learn independently and assume greater responsibility for their own learning; and
- learn and work in teams through:
 - critically review, discuss the work of their group members and give their useful feedback for improvement
 - assess the contributions of their group members in the process of discussing their work and in giving feedback and suggestions for improvement
 - assess their own contributions to discussing their group members' work and in giving feedback and suggestions for improvement

Figure 2. Aims and objectives of ENGL461 Intercultural Communication

There were weekly one-hour seminars with groups of 20-25 students, whereby the concepts learnt through the online materials were consolidated through applying them to seminar activities. From the outset, it was made clear to the students that the weekly seminar must not be turned into a kind of 'WebCT user' discussion group, and that any problems or suggestions for the online learning should be discussed on the WebCT, or e-mail messages, in an office visit or by telephone.

In the first lesson, the rationale, procedure, instructional materials, teaching and learning activities, assessments and evaluation were explained to the students. The students were told that online learning means taking greater responsibility for their learning, experiencing a higher level of interactivity than attending lectures, and adjusting to greater flexibility and control in terms of when and how they learn. It was emphasised that in order to make the most of this new development, it was important that the students should approach it positively and enthusiastically, and that both their learning process and product would be closely monitored and fully evaluated.

2.3 Portfolio assessment

An important feature of online Pragmatics and Intercultural Communication which epitomises OCLA is portfolio assessment, which contributed 60% towards the final subject grade. The primary aim of the portfolio-based tasks was for the students to show their understanding of and to consolidate the concepts taught in the units of the WebCT learning materials and to show their ability to apply what they have learned to real-life situations, through analyzing naturally-occurring data using pragmatic and intercultural communication

theories, making suggestions to improve communication in those contexts, and reflecting on and discussing their experience in applying pragmatic theories in real world contexts. The secondary aim was for the students to learn and work in groups through critically reviewing and discussing the peers' data analyses and giving them useful feedback for improvement. Group work, which tends to be less popular among students due to its greater demands on initiative, time and dependence on others, has been found to be effective in online courses when group work is integrated with assessment and examinations (Mason, 2001).

Throughout the semester, students worked online in groups of four completing assignments from which they compiled a portfolio. The portfolio was individual work. Students could work on as many unworked examples included in each unit as they wished. They posted the drafts of their work online to show their group members, who would read them and give critical feedback on the appropriacy of analyses and interpretations and so generate further discussion.

Figure 3 shows a typical forum discussion task in Pragmatics through which students show effective application of subject knowledge.

Figure 4 shows a task in Intercultural Communication.

At the end of the course, each student finalised the discussed examples in each unit and selected finalized examples to go into the portfolio, justifying their inclusion. Reeves and Okey (1996) have found that when students make decisions on the content of a task, a project or an exercise, their motivation and acceptance of the assessment will be increased because the students

Discuss line 60 in terms of 'illocutionary force' and 'perlocutionary effect' (Austin 1962).

55 B: maybe the er people from Hong Kong and China

56 they don't eat as much as Ameri[cans

57 b: [yea

58 B: right

59 b: yea the consumption of American I think is much than the Asia people

60 B: we eat differently

61 b: yea

62 B: we we eat differently

Figure 3. A typical forum discussion task in Pragmatics

Study the two memos attached. The purpose of the memos is identical. The writers were asked to write a memo to the boss of their organisations to ask her/him to change her/his mind regarding Saturday afternoon working. Discuss these memos in terms of high-context and low-context cultures (Hall, 1976), and the possible implications for intercultural communication.

Figure 4. A typical forum discussion task in Intercultural Communication

feel a sense of ownership of a task, and this in turn can strengthen the authenticity of an assessment. Another piece of work to include in the individual portfolio is a reflective text about online collaborative learning and assessment experiences. To summarise, the portfolio contained:

1. A selection of finalised assignments with related group discussions.
2. Evidence that peer discussions and reviews were fed into the students' revisions of their assignments. (If peer input was not incorporated, the rationale for this had to be clearly explained).
3. Evidence of students taking part in critically discussing and reviewing the draft assignments posted by group members; and
4. A reflective text with high quality (200-250 words) based on the experience of online collaborative learning and assessment.

2.4 Procedures for portfolio assessment

Collaborative assessment involved the teacher, the students themselves and their peers. It was based on criteria clearly communicated and illustrated at the beginning of the course. Halfway through the course, students submitted the first part of the portfolio to the teacher for formative evaluation. At the same time when the students submitted their portfolios, they completed and included a Self-Assessment Form and a Peer Assessment Form for each of the group members.

Self and peer assessment, each contributing 15% towards the assignment grade, focused on the quality of the forum postings assessed by both the student and peers based on four criteria:

1. Frequency of participation in the discussion forum
 - Feedback given on all draft examples
 - Participation in all discussions
2. Timeliness of participation in the discussion forum

- Timely provision of feedback on all draft examples
 - Timely participation in all discussions
3. Quality of feedback and suggestions
 - Relevance to the requirements of the examples
 - Specific and clear comments and suggestions
 - Appropriate use of academic terminology
 4. Extent of feedback and suggestions
 - Covered most aspects of draft examples
 - Made comments and suggestions beyond draft examples
 - Encouraged further development of the discussion

Teacher assessment (70%) of the quality of the portfolio was based on five criteria:

1. Quality of analysis of examples (appropriacy of analysis and support with contextual reasons) (50%)
2. A critical review of discussion and incorporation of peer feedback (or rationale for not incorporating peer feedback) in these examples (20%)
3. Quality of feedback and suggestions (10%)
4. Extent of feedback and suggestions (10%)
5. Reflective text (200-250 words) about online learning and assessment (10%)

Only the students were involved in assessing themselves and their peers in terms of frequency and timeliness of participation in forum discussions, both criteria of which the teacher did not feel in a position to assess. The teacher and the students overlapped in only two assessment criteria that were related to the quality and the extent of student feedback.

The English Department has a general guideline that all content subjects are assessed using Biggs & Colins' (1982) Structure of the Observed Learning Outcomes (SOLO) taxonomy (Figure 5), which is a method to categorise students' responses to open-ended questions, and focuses on qualitative differences between students' responses. According to Biggs (2003, p.37), when students learn, they produce learning outcomes that

Grade	Assessment Criteria	SOLO Taxonomy Level	University Description
A	The answer generalises beyond the information given. It demonstrates a high degree of originality and ability to generalise and to apply in areas beyond the subject.	"Extended Abstract"	Excellent
B	The answer is integrated and coherent with good coverage of relevant and accurate information. There is also evidence that the content is understood and can be applied to practice.	"Relational"	Good
C	The information covering several features of the aspect is relevant and accurate but an integrative view of the topic is lacking.	"Multi-Structural"	Satisfactory
D	The information is basically relevant and accurate but there is a lack of meaningful response.	"Uni-Structural"	Marginal Pass
E	The information is irrelevant, inaccurate or misjudged. An F grade could also be awarded for 'disciplinary' reasons such as plagiarism or other forms of academic dishonesty, or failure to satisfy programme or subject-specific requirements.	"Pre-Structural"	Fail
Note: Fine grades within each category (A+, A; B+, B; C+, C; D+, D) will be used to reflect different levels of performance within each category.			

(Source: <http://www.engl.polyu.edu.hk/teaching.html>)

Figure 5. Assessment guideline for content subjects of the English Department, the Hong Kong Polytechnic University

display "similar stages of increasing structural complexity", and the SOLO taxonomy provides a systematical description of "how a learner's performance grows in complexity when mastering many academic tasks".

3. Focus group discussions about OCLA

This part of the paper summarises the major findings obtained from focus group discussions and forum discussion analyses. For each subject, about 20% of students, divided into three groups, were invited to participate in a focus group discussion. They were asked to talk about their experiences and views about OCLA.

3.1 Overall positive experiences

The majority of the students were very positive about the overall OCLA experience; very few students preferred the traditional way of learning and teaching. They all felt that the subject objectives, both subject knowledge acquisition and application, had been achieved, and the students' generic qualities had been enhanced in that they had developed critical and creative thinking, team building, language and communication skills, etc. They found OCLA providing a better learning environment, compared to the two hours lectures where they experienced having a short attention span. In addition, doing OCLA had saved time, and the time saved was used for reading and further study, and they felt that they had learned more as a result. In general, the students appreciated involvement in the assessment process, and particularly the value of critical peer review of their forum postings.

Regarding their views on the forum discussions, all

students thought that they had learned a lot from the online discussions with peers, and had followed the flow of the arguments in writing better and more clearly. They posted discussions, analyses and feedback regularly, and some agreed that they would have benefited much more from more regular participation in the forum. What they had achieved most included realising different perspectives from group discussions, and learning through critiquing peers and reading the critiques by peers. They were aware of the dynamics involved in successful critical peer review of assignments, and were demanding of peer contributions. Most students remarked that within their own groups, when they came across problems in understanding the online instructional materials or the worked examples, they would try to solve the problems by themselves through, for example, reading the set textbook and other books on Pragmatics.

However, a few students thought they lacked self-discipline to have fully benefited from OCLA, and so they felt that they had learnt less. A small minority of students feared troubling peers too much if they posted critiques or disagreements too often, and others found it difficult to involve all group members actively in the forum discussion, and preferred group oral presentations.

One student said that she would not keep on asking questions on the WebCT because she feared that her classmates might become tired of having to type in their answers on the forum to defend their original data analysis after having done it a few times. This particular student said that she might have asked her classmates more questions if the discussion had been carried out in a face-to-face meeting. Another student said that he thought that traditional oral presentations done in class were better than the online group discussions. One of the problems of this online discussion, as he perceived it, was the difficulty of having all group members actively engage in it. He thought he had a hard time fulfilling the requirements of the assignment throughout the subject.

The pattern of use of the forum also varied from one student to another. A couple of students admitted that they did not have real online discussions with their members all the time for each unit, and quite often they

had already had the discussion face-to-face or on the phone before they typed in the responses or data analyses. One student said that the discussions among the group members did not start until a few days before the assignment deadline. Sometimes, they would telephone other members reminding them that there were new postings on the WebCT, and that they needed to reply in order to speed up the data discussion and analysis process. Other than these instances, they would not visit the forum very often. However, these dissenting voices were very much in the minority; most students were very positive about the online discussions as a medium for deep learning. A student said that her group logged in to the discussion forums regularly and started posting up answers and giving feedback immediately after the first unit was covered. All the students, however, agreed that they would have benefited much more from more regular participation in the discussion forum.

3.2 Comparing first- and third-year students

First-year and third-year students were similar in their attitudes and perceptions regarding usefulness of OCLA. They, however, differed in that final year students were more appreciative of the value of peer critical review of assignments, more demanding regarding peer contributions to forum discussions, more aware of the dynamics involved in successful critical peer review of assignments, and more wary of the consequences of peer and self assessment (due to the heavier subject weighting and hence contribution to GPA in the final year).

3.3 Students' suggestions

Suggestions were made by some students to improve OCLA. First, disciplinary action should be taken by the teacher to penalize inactive group members. Second, a group grade should be awarded to all group members, the reason being that it would then help to maintain a harmonious relationship within the group. Some students, however, expressed the concern that it would not be fair if all group members were given the same grade as not all students worked equally hard and contributed equally to the forum discussion. Concerning whether to award an individual grade or a group grade, no consensus was reached. The students

Level	Description
1. Basic	The forum posting states only whether agreeing or disagreeing with the analysis of an example made in a prior posting, without giving any reasons or explanations.
2. Extended basic	The forum posting states whether agreeing or disagreeing with the analysis of an example made in a prior posting, supported with reasons or explanations. or The posting initiates new analysis of an example, with no or minimal explanations.
3. Particularized	The posting initiates new analysis of an example, with full and clear reasons and explanations. or The posting contributes to ongoing analysis of an example, stating agreement or otherwise, supported with full and clear reasons and explanations.
4. Extended particularized	The posting initiates new analysis of an example, with full and clear reasons and explanations. Support is also drawn from the literature (concepts, theories and previous studies). or The posting contributes to ongoing analysis of an example, stating agreement or otherwise, supported with full and clear reasons and explanations. Support is also drawn from the literature.
5. Relational	The posting draws a conclusion of the analysis of an example, providing a full analysis, supported with reasons and explanations, integrating the analyses of previous self and peer postings, and drawing from the literature.
6. Extended to real-life contexts	The posting draws a conclusion of the analysis of an example, providing a full analysis, supported with reasons and explanations, integrating the analyses of previous self and peer postings, drawing from the literature, and making associations with real-life experiences, own or others.

Figure 6. The Online Collaborative Learning and Assessment (OCLA) taxonomy

were reminded that it was the university policy to award grades to individual group members in a group work situation to better reflect the effort and contribution of individual group member of the group.

Most students suggested that the forums should be made accessible by the other groups because they were all very interested in knowing what the other groups were doing. However, they admitted potential problems; students might not post their own analysis to the unworked examples until the very last moment because of the fear that their work would be copied by the other groups. In other words, these students hoped that there could be a way to make the forums accessible by the other groups if the issues of fairness and progress of the assignments would not be affected. Other concerns were logistical, for instance, as there were almost 100 students divided into 25 groups, it would be overwhelming for students to read hundreds of postings.

3.4 Content analysis of forum discussions

Consequent to the implementation of online Pragmatics

and Intercultural Communication since 2002/03, we have developed a 6-level OCLA taxonomy, modeled on the 5-level SOLO taxonomy, to objectively and meaningfully assess the quality and extent of student input in the forum discussion (Figure 6).

In the following, examples taken from actual students postings are given to illustrate how each level might be realised. When the different levels are discussed, we are not solely concerned with a thorough and detailed critique, but also with how it is realised linguistically by the student. The reader can no doubt gather from the subjects being studied, Pragmatics and Intercultural Communication, that we would be concerned with the 'how' as well as the 'what' of effective online discussions, but we would argue that this should be the case for all those engaged in critiquing and discussing the work of others regardless of the subject under study. The abilities required to critique the work of others, and to contribute to meaningful discussions, are of limited value if they are not communicated in a manner which is appropriate in terms of the sensitivities of the other participant(s).

Level 1: Basic

Example:

I agree. Good work. :)

The example of the 'basic' level is a typical example of a student who has not yet developed a critical faculty and/or is reluctant to critique a group member's work. The student has simply stated her agreement and praised the work of her group member. Apart from the fact that areas for improvement are usually to be found, the source of agreement and the reasons for it constituting good work are not explored. Two to three weeks into the subject, students received formative evaluation on their initial online postings, feedback and discussions and they were encouraged to go beyond the basic level in order to effectively critique one another's work and to facilitate deeper learning within the group. Students were also reminded that online discussions that remained at the basic level would result in a fail grade.

Level 2: Extended basic

Example:

I'm not sure about your analysis. I think finish has a lexical presupposition, i.e. recording has started before this utterance is spoken.

The example of the 'extended basic' level shows a student disagreeing with the analysis of her group member, being introduced with the hedged disagreement marker *I'm not sure about ...*. The student then introduces her own version of the analysis with the hedged opinion marker, *I think*. This level of online discussion is a bare pass for a year one student, and is a fail for a third year student because of two serious lacks. First, the student has not detailed the perceived shortcomings in her group member's analysis backed with reasons of her own and/or from the literature. Second, the student has not explained in detail her analysis and how it differs from her group member's analysis. Again, this explanation could be supported with reasons and, preferably, with reference to the literature.

Level 3: Particularized

Example:

I partly agree with Connie's analysis. My analysis is different in the following way. For point 8 'could you get in touch with Ada' is a negative politeness. It is because 'could you' is a hedge. The speaker is trying to be more cautious with what he said. Instead of directly saying that 'Please get in touch with Ada' he is avoiding going straight to the point by using the word 'could'. Therefore, in this utterance, I think it is both a hedge and a question. Hence there are 2 negative politeness in this utterance.

The 'particularized' level is exemplified with feedback which begins with a hedged disagreement, *I partly agree*, with the group member's analysis. At this level, the student can be seen to more clearly distinguish her analysis from that of her group member. She provides an explanation for her alternative analysis, which is both clear and detailed with reference to the data under analysis. The student again hedges her own analysis with the opinion marker *I think*.

Level 4: Extended particularized

Example:

If you don't mind adding a few words, maybe you can add one or two sentences in the beginning saying that: the three concepts are highly interrelated (Lustig and Koester, 1999) and the consequences of the second and third terms are due to the magnifying of negative attitude/judgment of the previous term (stereotype > prejudice > discrimination). Although your example has shown this, adding supporting material from the literature will make it more salient, powerful and systematic. Also, if you want to go beyond the question, will you consider adding the term racism after your explanation of discrimination. Racism shows the magnitude of violence that evolves out of stereotypes and prejudice according to Lustig and Koester and I think it shows how important it is to know and understand other cultures and if we neglect other cultures the consequences may be terrible.

The example of the 'extended particularized' level shows a student suggesting that her group member improve her analysis by extending her initial discussion, and this student refers her to a useful reference. This suggestion is introduced by means of *if you don't mind adding a few words, maybe ...* which serves to soften the suggestion. The writer also explains in detail why this suggestion would improve the original work. Students are encouraged to pursue their analysis beyond the activity guidelines and the writer here encourages her group member to do so when she writes *if you want to go beyond the question, will you consider adding* This hedged suggestion is again supported with reference to a related study and a reason for adding this additional perspective is provided after a hedged opinion maker, *I think*

Level 5: Relational

Example

Thanks for your comments. Yes, you have mentioned a very good point and I agree with you that Hong Kong Chinese are westernized to some extent and thus, the effect of Confucius is somehow offset. I still think Confucius ideas are rooted in our minds and so I agree with Bond (1986) analysis of Confucian-based societies applies to Hong Kong as well ... So while our generation is more westernized, I would argue that we are still influenced by Confucius even it is weaker than for the old generation ...

The next level, 'relational', begins with the writer drawing a conclusion, by way of a summary, using the feedback that she has received in previous peer postings. The writer positively acknowledges the points raised by her group members before effectively rejecting them in favour of her own analysis. Her position is introduced with a hedge *I still think ...* (i.e. it is her own opinion), and she supports her position with reference to the literature which she further elaborates on. Her concluding statement again acknowledges the comments made by her group members, *so while our generation is more westernized ...*, before restating her own position introduced with a hedged opinion marker, *I would argue that*

Level 6: Extended to real-life contexts

Example:

Thanks for your suggestions. For part 1 I have added the point of racism which Mani raised. I also added sentences talking about the magnifying of negative feeling underlying these terms and quote Lustig and Koester as you mentioned.

In part two, both of you suggested the same point and I think it is useful to add a few sentences about how to counter cultural biases in a general sense and I find Tang & Kirkbride and Scollon & Scollon useful to quote on this.

In the first example, I still think that talking about the "facts" is necessary since they are points which made me change my attitude towards Indonesians and made me feel sorry for them. This is something even you and other readers may not know and I'm trying to impress upon the reader the surprising 'truth' as well. I agree with you that I felt the Indonesians were being noisy but from that incident onwards I stared(sic) to think from their aspect.

As Anna raised the point that I might talk about "know more about them and their cultures through having more contacts with these people", I want to make it clear that I did come into direct contact with them but what I found out is something other than their culture, which is related to their economy and their society. I believe my way to counter my cultural biases towards them is through knowing the reasons behind and think from their point of view instead of just knowing more about their culture. It is because my cultural biases towards them are simply based on first impression and prejudice before coming into real contact that resulted in cultural misunderstanding.

For example 2, from my point of view, Chinese are always suppressed and looked down on by foreigners and my first reaction toward being discriminated against is to protect my cultural values and uphold my culture. Maybe you're right that from the aspect of effective communication, it fails to build up a friendly atmosphere. However,

I believe the very first step for the minority group is not to be threatened by other culture and I think I did it successfully. Only after building up a confidence of one's culture, can an equal status communication be established.

The last level, 'extended to real-life contexts', is necessarily rather lengthy as this level is the most demanding for students. It can be seen that this writer is very skilful when it comes to concluding the discussion and summarising the feedback. She goes through the main points raised and provides reasons for both acceptance and rejection of the suggestions made by her group members. This process is sensitively handled with hedges (e.g. *I still think ..., I believe ..., from my point of view ...*) and softening prefaces (e.g. *this is something even you and other readers may not know ..., I agree with you in that I felt the Indonesians were being noisy but ..., Maybe you're right that from the aspect of effective communication, it fails to build up a friendly atmosphere. However ...*). The writer also draws on the literature and then, towards the end, goes on to make associations with her own real-life experiences which serve to underscore her arguments in a very meaningful and illuminating way.

3.5 Analysis of language used in discussion forum

We have argued that the form of online collaborative learning described here facilitates deeper learning in that students must learn to critique one another's work, critique and summarise these peer critiques, and finally assess their own and their peers contributions to the online discussions. We have provided evidence for this in a variety of ways, but it is also interesting to note that there is further evidence that this form of learning achieves these objectives when one studies the language employed by the students in the discussion forum. To demonstrate this, we have employed a simple-to-use method which is commonplace in a field known as Corpus Linguistics (see Sinclair, 1991, 2004) for more details). First, we collected together all of the online postings and generated a word frequency lists for single words and then combinations of words (from 2-word combinations to 5-word combinations). We then compared these frequency lists with frequency lists for general English language usage (Sinclair, 1991). The differences found may then be attributed to the

specialised nature of the online discussions versus general language usage. This comparison confirms our claims and a selection of the findings are detailed below.

When the frequency lists for the 110 most frequent words are compared, we find a higher frequency of words associated with the giving of opinions and the expression of causal and adversative relationships in the online discussions than in general English usage, for example, *think* (ranked 16th versus 69th) *agree* (ranked 40th versus unranked²), *mean* (ranked 104th versus unranked), *because* (ranked 48th versus 83rd), *therefore* (ranked 87th versus unranked), *however* (ranked 99th versus unranked), etc. Some of these words then recur in multiple-word combinations which serve to express agreement and disagreement, and others which tentatively introduce opinions (i.e. hedged opinion markers) or seek the opinions of others, which are unranked in the top 110 frequency lists for general English usage. Examples of 3-word combinations include *I agree with ...* (ranked 1st), *do you think ...* (ranked 4th), *I would like ...* (ranked 15th), *I don't think ...* (ranked 20th), *I agree that ...* (ranked 30th), *it seems that ...* (ranked 42nd), *but I think ...* (ranked 59th), *but I don't ...* (ranked 63rd), *it looks like ...* (ranked 77th), *it should be ...* (ranked 83rd), and *you haven't tried ...* (ranked 85th). Examples of 4-word combinations include *I am not sure ...* (ranked 21st), *I also think that ...* (ranked 56th), *I don't think you ...* (ranked 79th), etc. Finally 5-word combinations include as *I agree with you that ...* (ranked 7th), *I don't think you need ...* (ranked 37th), *but I don't think you ...* (ranked 60th), and *do you agree with me ...* (ranked 86th).

The frequency with which words and phrases associated with the expressions of agreement, disagreement, and the giving of opinions occur in the online discussions further supports the case that this learning and assessment methodology facilitates critical thinking, interpersonal skills and other attributes from the list in our students.

3.6 Analysis of reflective texts

An examination of the 200-250 words reflective texts contained in each portfolio has confirmed the value of

²'Unranked' means not in the top 110.

collaborative OCLA. Not only have the students effectively acquired subject knowledge and applied what they have learnt to practical and real-life situations of language use and intercultural communication, but also enhanced their generic attributes, in particular critical thinking, problem-solving, time management, interpersonal skills, teamwork and English language and communication skills, as shown in the following typical student comments:

"I think I could apply this self-learning to other subjects too"

"I learn how to improve my own work through critically reviewing that of others"

"I learned how to give critical comments and suggestions. It is a good opportunity for me to learn, interpret and implement theories"

"a valuable experience in which we can give critical feedback to others' work and raise problems concerning the subject matter"

"we are encouraged to be motivated in self-learning"

"I really love the way that we can discuss and exchange our ideas with others"

study has achieved the goals of encouraging greater collaboration and interactivity, developing particular learning skills which can be reinforced through online collaborative assessment, assessing process and product more fairly and consistently by providing opportunities for the teacher and students to negotiate ideas and comments, fostering skills of peer-assessment and self-assessment, encouraging active and flexible learning, facilitating a deep learning approach, and enhancing relationships within groups.

What is the way forward? First of all, this study suggests that this innovative teaching, learning and assessment methodology could be applied to other fields of academic study. Depending on the nature of the disciplines and subjects, the OCLA taxonomy would be modified accordingly; and once that is done, it could have wider applications in higher education. Second, the implementation of OCLA could be more carefully planned, for instance, to define and communicate to all parties at the outset the respective roles and expectations of teacher and learner in the OCLA process (Youngblood et al., 2001), the OCLA assessment framework illustrated with examples taken from previous portfolios, and so on. Third, more awareness training and closer monitoring of the implementation during the course of study would be necessary. Lastly, the affective and social aspects of OCLA manifested in group forum discussions and critiques as well as self and peer assessment would also need to be addressed, by means of involving students in the discussion of various ways of expressing opinions, agreement, disagreement, asking questions, debating, etc. to achieve different communicative purposes.

4. Conclusions and implications

In conclusion, the study has confirmed the value of interactive, engaging and assessed collaborative learning tasks integrated into the curriculum to promote online learning, not to mention that attendance in the online learning platform was 100%. Learning has been found to be independent, interactive, collaborative and active, and learners have become much more critical in applying subject knowledge to solving problems in the online discussion tasks.

Online collaborative learning and assessment in this

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The Impact of Assessment Modes on Collaborative Group Design Projects

Richard Tucker
School of Architecture and Building
Deakin University, Geelong, Australia

As student-to-staff ratios escalate, increasing numbers of undergraduate architects are finding the reduction to 'one-on-one' studio supervision an impediment to learning. Group design projects are becoming a widespread solution to this problem. However, little analysis has been undertaken as to their effectiveness both in terms of student assessment and as a teaching model.

The following describes the methodology, background to and preliminary results of a 2005 Strategic Teaching and Learning Grant project currently running at the School of Architecture and Building at Deakin University that aims to "Establishing Best-Practice Principles for the Teaching of Group Design Projects."

This research addresses the largely neglected question in design education of assessment. In the experience of design teachers at Deakin, the issue of 'fair' assessment in team design projects is one of great concern to academics and students alike. The success of these assessments often hinges on students' perceptions of whether the assessment accurately reflects their individual comparative performance. This project implements and evaluates two interrelated assessment models that have been devised to run in tandem at Deakin. The first is continuous assessment (of the process of team design), and the second, which is informed by the first, is on-line anonymous peer assessment that is being developed to allow students to assess one another's performance in a group, within the secure and anonymous environment of a web portal.

1. Establishing best-practice principles for the teaching and assessment of group design projects

Architects need collaborative skills to negotiate an infinite number of design options within a building design process that can include over fifty kinds of participants and consultants (Cuff, 1991). Yet while a significant body of research exists relating to the teaching of problem-based group work (Sanz-Menendez, 2000; Grigg et al., 2003), the focus of this research has rarely been the student design studio. Only the Clients and Users in Design Education (CUDE) project at the Sheffield University School of Architecture has looked at the issue of teaching team-working skills in the design studio (Fisher, 2000). The findings of the CUDE research are, however, untested elsewhere as a measure of student performance in team assessed design projects versus performance in individually assessed projects. A Strategic Teaching and Learning Grant (STALG) funded project at Deakin University that aims at "Establishing Best-Practice Principles for the Teaching of Group Design Projects" is attempting to redress this shortcoming by observing, recording and analysing student performance and feedback in group and in individual design units. The following is a position paper which describes the background, methodology and preliminary results of this research project.

The STALG project builds on collaborate research between the School of Architecture and a Deakin University teaching and learning support service (Deakin Learning Services) that in 2004 identified the need for additional resources to assist in group teaching (Anderson, 2004). The beginnings of the STALG group learning project were prompted by a situation likely all too familiar to those teaching design. Due to limited funds for sessional teaching staff, each member of the third-year 2003 cohort at Deakin could expect a maximum of eight minutes per week one-to-one teaching time. In common with many other schools across Australasia, Deakin students could not therefore rely solely on one-to-one contact time with tutors to advance their designs. There is of course one easy solution to this problem and that is for tutors to review fewer assignments, but in greater depth, by setting group design projects.

Rather than spreading their time thinly, therefore, over a large number of individual projects, an increasing number of lecturers are setting group projects. This allows them to co-ordinate longer and more in-depth review sessions on a smaller number of assignment submissions. However, while the group model may reflect the realities of the design process in professional practice, the approach is not without its shortcomings as a teaching and learning archetype for the assessment of individual student skill competencies. Hence, what is clear is the need for a readily adoptable andragogy for the teaching and assessment of group design projects. In the experience of design teachers at Deakin, the issue of 'fair' assessment in team design projects is one of great concern to academics and students alike. Here, the success of cooperative learning often hinges on students' perceptions of whether the assessment accurately reflects their individual comparative performance. Research at Deakin, therefore, is implementing and evaluating two forms of assessment. The first is on-line peer-assessment, which is being developed to allow students to appraise one another's performance in a group within the secure and anonymous environment of a web portal. The second is continuous assessment, namely the continuous assessment of the design process. Continuous assessment of process offers an alternative to the assessment model common to most student design projects where achievement is largely assessed by evaluating the end-product of design as represented by a final submission. As we shall see, peer assessment and continuous assessment are very much interdependent models; for as peer assessment evaluates the design process throughout the project rather than an end product, it is process too that is evaluated by continuous assessment.

The 2005 STALG funded group learning project addressed its principal research questions through three forms of evaluation: formative evaluation through questionnaires, summative evaluation through reflective portfolio assessment and analysis, and illuminative evaluation through focus group discussions, observation of tutorials and analysis of student work. Two cohorts were closely observed taking part in two group design projects with highly contrasting programs and structures. In the third-year studio the project observed was the Atelier Geelong studio - which was worked on by teams of five, compared to teams of three in 2003

and in teams of six and seven in 2004. The 2005 fourth-year Urbanheart studio formed a comparative cohort that operated a number of two, three, and four-person group projects. Nine teams in Atelier Geelong and Urbanheart were observed in order to evaluate communication between students in the studio using an observation template that recorded individual contributions. We shall, however, confine ourselves in this paper to an analysis solely of the 2005 Atelier Geelong project, for it is here where assessment has been a focus.

2. Atelier Geelong - The assessment of a group design project

Two major design projects were set for the 2003 first semester studio at Deakin. To use scarce teaching resources efficiently, the first was a team design project taught by two tutors largely through group tutorials, and the second was an individual project taught by four tutors seeing individual students for one-to-one tutorials lasting for twenty minutes. The third-year students were asked therefore to divide themselves into groups of three for their first major design project - "Atelier Geelong," a programme that has been running for three years and which has been the prime focus of our teaching and learning research at Deakin. What follows is an examination of the progression of this programme over this period, and of the models that have been developed to assess the design teams taking part in it.

The Atelier was to be designed by three students to provide living accommodation and studio schemes for Geelong graduates and a supervising tutor. The project was organised in such a way that the design could readily be subdivided into three distinct elements. The brief concluded:

"Of course, the design of your Atelier might counter this subdivision or even further it. This is unimportant, what is important is that at around three to four weeks into the project the design team must break their submission and presentation, and

hence the focus of each individual member, into three separately appraisable elements."

The submission requirement described in this paragraph highlights the problem of many in a taught team design project. For what is commonly desired is one design solution that reads as consistent and 'seamless', but one that allows for the separate appraisal of those who devised it. And of course this - the best of both worlds - is difficult to achieve and, moreover, it is fundamentally conflicting. In 2003, the solution to this problem was to award each team member the same grade for the product of the team design - this being an overall building scheme for the Atelier - and also to assess a product of each individual's contribution to this - which took the form of the detailed design of one element of the building.

This solution gave rise to a number of problems. Firstly, the requirement for separately appraisable elements proved difficult for students to satisfactorily fulfil. Many had to compensate in the team-design submission for poor performing team-mates so had little time to spend on their own individual submission. Even when teams where collaborating well, students tended to 'detail' a building element in isolation from their team-mates, whether it be a separate structure such as a studio or accommodation unit or a constructional element such as a staircase or cladding detail. The requirement for students to focus on an individual submission tended therefore to undermine team-work, which commonly led in the final stages of the project to piecemeal design with little cohesion.

It was subsequently suggested that for 2004 the requirement for separately appraisable work would only be introduced towards the end of the project - when presentation became the focus, for presentation by its very nature demands the delegation of tasks. Yet students rightly objected that an individual's comparative contribution to the team would then be assessed largely on presentation skills. The teaching staff concluded that if the desired outcome of team design was a consistent and seamless solution that reflected the type of collaboration demanded by professional practice, then the product of the design process could only be assessed as a team product. This suggested that the assessment of an individual's contribution to the project would have

to focus on the process of design rather than its end product. As teaching staff are party to only a fraction of this process then only the students themselves could accurately evaluate contributions to this process. Let us then briefly look now at how the peer assessment model was developed in light of this.

If the Atelier designs were assessed entirely as team submissions by awarding everyone in the team the same grade, experience suggested that the more conscientious students would be aggrieved by what they often saw in past group projects as an inequality in their workload. As one student complained in a questionnaire completed at the conclusion of the 2003 Atelier project by sixty-five students out of the ninety-three cohort, *"it is easy to free-ride in a group, and, unfairly, it is us the hard workers that have to carry the lazy ones."* Free-riding had in 2003 commonly led to resentment that in some cases led to conflict within the teams, thus undermining the collaborative process. Dissatisfaction with the assessment of the product of team-design was reflected in the questionnaire, for when asked *"do you think that everyone in your team contributed evenly?"* 82% of the 2003 students who completed the questionnaire answered *"no."*

It was apparent that a mechanism would have to be built into assessment that rewarded those who worked hard whilst penalising those who did not. In other group projects at Deakin, students were commonly asked to peer-assess each other's contribution to the team at the conclusion of a project. This model appeased those aggrieved with under-performing team-mates. However, the model suffered from one major problem, namely that the adjustment in grades from only one peer assessment process could be extremely inaccurate. If a number of students were feeling particularly vindictive, their exaggerated misallocation of marks could unfairly penalise team-mates. Peer assessment grades proved therefore unreliable, and this required assessors to readjust grades in line with their knowledge of students in the studio - a knowledge which was often a misleading indication of an individual's contribution to the process of design.

In 2004, it was made clear to students that peer assessment would be continuous throughout the project and would evaluate, therefore, an individual's

contribution to the process of design rather than its end product. Contribution here was defined in terms wider than merely time and effort to acknowledge imagination, creativity and team-working skills throughout the duration of the project. This system might have appeased those who felt aggrieved at free-riding had it not been for the choice of peer assessment that was offered to the teams. The students were asked to choose one of three options of mark allocation to be agreed upon in a team contract they signed at the beginning of the project; these were by either: round the table 'bargaining', by secret ballot, or by simply allocating marks evenly. Most complaints about unfairness in marking arose with the somewhat idealistic teams that perhaps rather naively chose the third option, and this was the majority, for many students abused the security of what was effectively a team grade to exploit their more conscientious team-mates. In contrast, the teams that adopted the assessment methods that allowed for penalty and reward saw the allocation of marks as less unfair. The vast majority of students in these teams described in their reflective portfolios the group project as a positive experience. The process of round the table 'bargaining', however, proved understandably stressful for all but the most harmonious of teams, for the conflict of 'bargaining' was poorly resolved and this undermined subsequent team-work. Anonymous peer assessment avoided these problems and was therefore further developed for the next cohort required to take part in Atelier. The problems faced by the teams who had not opted for anonymous peer review was reflected in a general dissatisfaction with the assessment process, for in the end-of-semester questionnaire, when asked *"do you think that everyone in your team contributed evenly?"* 67% of the seventy-two students who completed the questionnaire in 2004 answered *"no."*

In 2005, an online and compulsory peer and self assessment template was developed that allowed students to assess each others' contribution on a weekly basis within the secure and anonymous environment of the school intranet portal. Students logged in at the end of each of the six weeks of the project to complete a six-sheet Excel chart that asked each student to rate their team-mates using two quantitative measures and one qualitative measure. The first asked students to award their four peers a percentage of the team grade

such that any figure over a total of 400% was subtracted from their own percentage to make a total of 500% for the five team-members. This built self-assessment into the peer assessment. As students often awarded each other unrealistic multipliers of the team mark, this first measure was backed up by a second that asked students to rate each other on a five-point multiple-response Likert scale evaluation. This Likert evaluation also allows for the coding of responses and the subsequent statistical analysis of possible patterns of bias in student assessments. The purpose of the third quantitative measure, which asked students to comment on the performance of their peers, was to elucidate upon any anomalies or unexpected final evaluations.

3. The collaborative structures of Atelier Geelong teams

In order to find out the effect of assessment procedures on the learning of individuals within a collaborative design team, it is necessary first to know something about how the teams collaborated. In order to achieve this understanding we shall examine the teams in the three categories of organisation in which they worked together in 2003.

When, in 2003, students were allowed to choose their own team-mates, the team-working of approximately 40% of the teams could be described with the term 'democratic collaboration'. This resulted when there was no clear leader, and/or in most cases of this type when students were too polite, or of such similar ability that they felt they had no right to criticise at any depth. In such cases, those developed were those elected democratically. This often implied that the ideas selected had prompted the fewest objections, which frequently resulted in a product that in advertising parlance is commonly (unkindly) known as "lowest common denominator." This clearly was not a mode of collaborative working that encouraged risk for as Schrage implies, innovation is more often than not the product of a diverse range of skills and abilities (Schrage, 1995).

It might be appropriate to describe the groups driven by one or two high achievers, which numbered six - the least common of the three primary collaborative modes - as 'oligarchic collaborators.' Not only did these groups often produce the most accomplished and innovative designs, but they usually resulted in a positive learning environment for everyone. This included low achievers, who in these groups were often encouraged to develop previously unchallenged abilities.

If 40% of the teams could be described as democratic and 20% as oligarchic then, in turn, to describe the organization of approximately another 30% of the 2003 teams we might use another term with Platonic origins, namely 'timarchic collaboration.' For, in common with Plato's description (1955) of a society divided by internal strife and characterised by conflict and selfish ambition, this last type of group was born out of dissent. Often the result was piecemeal design with little cohesion. Most failures of teams to bond, due to either clashing personalities or other failures to communicate, led to this common solution; namely, a design of disparate parts defined merely by an allocated footprint. We shall consider in our conclusion what effect the use of different assessment modes may have had on the proportional distribution of these three collaborative modes.

4. A SOLO taxonomy of achievement in student design projects

The assessment of design, in common with all of the creative arts, is partly subjective. In order to counter some of the difficulties students have with this subjectivity we have developed at Deakin as part of the STALG project a taxonomy of design assessment. The five categories of learning outcomes - excellent, very good, good, acceptable, inadequate - for the five assessment criteria of Context Analysis (urban, physical/environmental, cultural, historical, and precedent), Design Concept, Design Development, Presentation (oral and graphical) and Teamwork are informed by the hierarchy established in the Biggs and Collis SOLO

taxonomy (Structure of the Observed Learning Outcome), and have been developed from a rubric previously suggested (Oxford Brooks University and CABE Education, 2004). Although the taxonomy tries to make it clear to students what levels of achievement inform the grades they receive, we have to tread a fine line between giving clear assessment criteria and being too prescriptive. For often students will see a set of criteria as a check-list that is merely to be "ticked-off," which, of course, can stifle innovation. The taxonomy is presented as an appendix at the end of this paper.

5. Conclusions

In recognition of the escalating financial and time constraints within teaching departments leading to an increase of group focused teaching models, this paper has proposed an enquiry into the effects of group management and the assessment of these groups in the student design studio. At the time of writing, the first of the questionnaires polling the 2005 cohort on their opinions of the success of the group and assessment models developed over the last three years has been completed by sixty-eight of the ninety-five students in their third year. From the findings of this survey some significant conclusions can be drawn. They can be summarised as follows: 80% of students felt that the reason for group projects within the architecture course was to help prepare them for collaborative working in the architectural profession, compared to 5% who felt that group projects were prompted by a lack of teaching resources. Encouragingly, 66% of students felt that the group design projects that they had been involved in prior to their third-year were good preparation for professional practice, and 70% of students found these projects a positive experience for reasons largely relating to constructive learning experiences. Yet this positive impression of group work is somewhat countered by students' preference for individually assessed assignments, for only 35% preferred group work over individual.

Given a choice of four types of assessment:

1. the same mark awarded to the whole team,
2. by open round-the-table student self and peer assessment of contribution of team members,
3. by anonymous self and peer assessment of contribution of team members and
4. by tutors assessing team members' contributions through individual submissions alongside the team submissions.

- the majority of students, namely 69%, preferred anonymous on-line peer and self assessment. This is not surprising in light of the fact that 70% of students felt that in previous group projects not everyone had contributed evenly.
- In contrast, in 2005, with six peer assessments of the relative contribution of team members, only 42% of students felt that not everyone had contributed evenly. When asked whether the 2005 peer assessment model "*was a fair way of assessing group design projects,*" the mean score on a 5-point Likert scale, where strongly agree is 0 and strongly disagree is 5, was keenly in favour of the model to produce a score of 2.145.
- This is not the only positive reflection of our revised assessment methods, for the collaborative working structures of the groups seem to have responded favourably too. We recall that 35% of the teams in 2003 could be termed as 'timarchic collaborators,' as their teamwork was characterised by conflict.

In 2004, groups were engineered to contain a range of different experiences and abilities, which resulted in many more timarchic teams, indeed 60% could be described as such - for grouping strangers rather than friends led to much more internal strife and conflict was a common occurrence. In 2005, the timarchic collaborative teams numbered only 20% of the cohort. In this case, the peer assessment process acted as a pressure valve alleviating many of the grievances generated by perceptions of unequal workload and unfair mark allocation. In our opinion, and in the opinions of those students who attended the focus groups, continuous peer assessment throughout the unit, which allowed for penalty and reward, significantly discouraged free-riding by team-members. By creating a non-confrontational forum for expressing dissatisfaction with under-performing team members, the continuous peer assessment

model also prevented disunity within teams and fostered, therefore, a more positive collaborative learning environment is created.

Let us now move on to consider what students felt of continuous assessment in 2005. The continuous assessment model this year had been refined from that of 2004 to only six assessed exercises, which preceded the six on-line peer assessments. As these exercises focused on the process of design rather than its end product, their assessment was in tune with how students operate upon and develop their design solutions. The cohort was asked to agree or disagree on a 5-point Likert scale with seven statements relating to continuous assessment. These were as follows:

Continuous assessment of the design process through assessed weekly tasks is better than assessing just the end product of design;

Continuous assessment throughout Atelier has more evenly distributed my workload;

Continuous assessment throughout Atelier has added to my workload;

The weekly assessed tasks throughout 3A (third year design) helped the development of our designs for the Atelier Geelong project;

The weekly assessed tasks throughout 3A were an obstacle to the development of our designs for the Atelier Geelong project;

Continuous assessment throughout 3A has enhanced my learning experience, and;

Continuous assessment throughout 3A has given me a greater understanding of what has been expected of me in the unit.

If we reverse the results of the two negatively posed questions, then we get an overall mean of 2.4 strongly in favour of continuous assessment (3 would be an average between strongly agree and strongly disagree). A summary of these conclusions on the assessment models discussed here is presented in the following table.

If we look at student outcomes as measured in grades there are further positive signs for continuous assessment happening in tandem with staged peer

Model	Problems	Solution
All team members assigned the same team mark for the end-product	Free-riding Assessing end-product outcomes related to peer learning may discourage students engaging more actively in the process Timarchic collaboration	Assessment reflecting individual contribution to process and end-product
Individual submissions assessed within team project	Division of team unity Individuals emphasised Barrier to peer learning Timarchic collaboration	Team submission assessed by tutor, contribution of individuals assessed by peers
Round-the-table peer assessment	Lack of group accountability skills Interpersonal conflict, resentment Division of team unity Timarchic collaboration	Anonymous peer assessment
Negotiated assessment	Most teams opt for a team mark, leading to Timarchic collaboration	Encourage peer assessment
Anonymous Single Peer Assessment	Inaccurate assessment of contribution to process Collusion to bias assessment of contribution	Continuous peer assessment of contribution to process

Table 1. Collaborative Design Assessment Models - Problems and Solutions

assessment. In 2003, with one assessed submission and no peer assessment, the average mark for each individual student for the team design project was 57.8%. In 2004, with nine assessed submissions and one peer assessment at the completion of the project, the average mark was 59.3%. Then in 2005, with six assessed submissions and six peer assessments the average mark was 69.5%, which is the highest average mark for a third year project at Deakin, and this for a cohort that has performed comparatively equally with other cohorts on previous projects and in other subject areas.

We might draw from the trends that can be seen in this data the following conclusions. Firstly, that students perform better in group design projects than in individual design projects - a finding confirmed by questionnaires we have received from unit coordinators in design schools world-wide that have shown that the average grade achieved by students is 5% higher for group design projects; secondly, that the quality of work as measured in grades increases with continuous assessment that is anonymously peer-assessed; thirdly, that students prefer continuous peer assessment of an individual's contribution to a team to other methods of assessing individual contribution; fourthly, that students prefer continuous assessment to design projects assessed largely on final submissions; and finally that students certainly see the learning value of continuously assessed tasks as a means of developing design solutions.

These preliminary findings have successfully advanced the aim of researching and developing an improved teaching methodology for group work in the design studio. This conclusion is supported not only by the theoretical and practical experience of the researchers and tutors involved but is moreover directly informed by the students' experience of the design studio - students who are the direct consumers of the different teaching, assessment and group models explored and developed here. Although these models still require further testing and development there are already significant findings allowing for improvements to be made to the teaching methodology and assessment models of the student design studio.

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Appendix - Taxonomy for Design Assessment

Context Analysis

Excellent - 5

Student follows a systematic approach collecting relevant data to meet the aims of the brief, making a range of observations on the physical, environmental, historical, cultural and theoretical context of the project. Quantitative and qualitative data is collected using a range of appropriate techniques. Students should also demonstrate an ability to identify, analyse and use precedents.

Student generates an effective, coherent and independent analysis and interpretation of data collected that is directly related to the aims of the project. All significant interrelationships and patterns are identified, developed and reflected upon.

Very Good - 4

The student makes accurate observations and measurements using organised data collection methods. Students should also demonstrate an ability to identify, analyse and integrate precedents.

The student produces some independent analysis and interpretation, referring to the aims of the investigation, using most of the data collected. A number of interrelationships and patterns are identified and explained.

Good - 3

The student lists a narrow range of data with a few accurate observations. Students should also demonstrate an ability to identify precedents.

The student makes some relevant analytical points, establishing a link with the aims of the enquiry, and referring to much of the data collected. Some interrelationships and patterns are described. The student may require some assistance or guidance with this area of the analysis.

Acceptable - 2

The student shows a limited ability to make observations and complete data collection. Student may require much assistance with data collection. Student has made reference to precedents with little understanding of their significance.

The student identifies what the collected data shows. Much assistance is needed to analyse interrelationships and patterns. The link between any analytical points and the aims of the enquiry is weak.

Inadequate - 1

The student shows no ability to make observation and requires much assistance to collect data. Student shows awareness of precedents.

The student's attempt to analyse or apply data is deficient. With much assistance no interrelationships and patterns are identified.

Very little work is produced - especially work of any architectural capacity or adaptability.

Design/Concept/Idea

Excellent - 5

The student generates and reflects upon imaginative and appropriate ideas which are clearly informed by the analytical observations on context and produce outcomes that are original and are taken beyond the confines of the original brief. The process of design from idea to outcome follows a coherent rationale clearly informed by an appropriate and imaginative idea.

Students have responded to supervisions with independent work and proposals, and demonstrate intent in design as well as an ability to exercise judgements that appropriately hypothesize supervision recommendations.

Very Good - 4

The student analyses a wide range of appropriate ideas which meet many of the aims established from the context analysis. The outcomes are original and appropriate to the brief.

The process of design from idea to outcome shows evidence of a rational clearly informed by an idea that is understood and applied to a design by the students.

Students have responded to supervisions with independent work and proposals, and demonstrate intent in design.

Good - 3

The student describes some meaningful ideas gleaned from the analytical observations on context. The outcomes are appropriate to the brief. The student may require some assistance.

The process of design from idea to outcome shows evidence of a rational, but one that may not have been understood or based on an appropriate idea.

Students have responded to supervisions with work and proposals informed largely by their supervision.

Acceptable - 2

The student identifies a few ideas which show some knowledge and understanding of the observations on context. Much assistance is needed to develop ideas and recommendations.

There is some evidence of a process of design based on an idea.

Students have responded to supervisions with work and proposals informed entirely by their supervision.

Inadequate - 1

The student produces a recommendations which show little knowledge and understanding of the observations on context with no clear idea informing a design.

There is no evidence of a process of design based on an idea.

Students have not responded to supervisions.

Students have resisted using input and critique from design staff and peers.

Design Development

Excellent - 5

The student generates creative and imaginative recommendations which are clearly informed by the analytical observations on context and produce outcomes that are original and are taken beyond the confines of the original brief. The process of design from idea to outcome follows a coherent rationale clearly hypothesised by the students. Each stage of the design has been critically appraised and reflected upon, and linked into a coherent informed argument evident in the outcome.

Students have responded to supervisions with independent work and proposals, and demonstrate intent in design as well as an ability to exercise judgements that appropriately challenge supervision recommendations.

Very Good - 4

The student analyses a wide range of appropriate recommendations which meet many of the aims established from the context analysis. The outcomes are original and appropriate to the brief.

The process of design from idea to outcome shows evidence of a rational clearly explained by the students.

Students have responded to supervisions with independent work and proposals, and apply intent in design.

Good - 3

The student describes some meaningful recommendations gleaned from the analytical observations on context. The outcomes are appropriate to the brief. The student may require some assistance.

The process of design from idea to outcome shows evidence of a rational, but one that may have been described but not necessarily have been understood by the student.

Students have responded to supervisions with work and proposals informed largely by their supervision.

Acceptable - 2

The student identifies a few recommendations which show some knowledge and understanding of the observations on context. Much assistance is needed to develop ideas and recommendations.

There is evidence of a process of design from idea to outcome.

Students have responded to supervisions with work and proposals informed entirely by their supervision.

Inadequate - 1

The student produces recommendations which show little knowledge and understanding of the observations on context.

There is no evidence of a process of design from idea to outcome.

Students have not responded to supervisions.

Students have resisted using input and critique from design staff and peers.

Presentation***Excellent - 5***

The student generates an appropriate and varied range of presentation techniques which may include computer generated material. They are executed accurately and with clarity and imagination. All material is suitably labelled and annotated.

The presentation is commensurate with the design sensibilities and intentions and expresses the intentions creatively and directly.

The oral presentation is executed in a well-organized manner and within the time limit.

A good range of appropriate design terminology is used, and there are few, if any, errors in grammar, punctuation, or spelling.

The presentation work engages and fosters critique and conversation.

Very Good - 4

The student selects and integrates appropriate presentation techniques, all of which are competently executed. All material is clearly labelled.

The relation between image and idea is clear with little verbal assistance.

The material is presented in a clear way and within the time limit.

Appropriate terminology is often used, but there may be occasional errors in grammar, punctuation, and spelling.

The work is strengthened by concrete critique and discussion.

Good - 3

The student combines a limited range of straightforward techniques, most of which are appropriate. There is sufficient labelling of material. The student may require some assistance.

The presentation is neatly executed but may run longer than the time limit.

Appropriate terminology is sometimes used, but there are some errors in grammar, punctuation and spelling.

Acceptable - 2

Simple techniques are used, some of which are appropriate. The student may rely on one or two methods. Labels may be incomplete. The student may require much assistance in organising information for presentation.

Appropriate terminology is used in a few places, and there are noticeable errors in grammar, punctuation and spelling.

Critique and discussion is largely pragmatic and prosaic and struggles to express idea.

Inadequate - 1

The student uses inappropriate techniques which do not present the material clearly.

The presentation is disorganised and there are intrusive errors in grammar, punctuation and spelling.

Critique and conversation is pragmatic and mostly taken up with clarification and discussion of extra material required and functional/structural inadequacies.

Teamwork

Excellent - 5

Student consistently demonstrates the communication skills of listening attentively; asking useful questions; negotiating and compromising; dealing well with conflict; offering constructive feedback and providing positive feedback.

Student is consistently active in demonstrating critical thinking skills of interpreting concepts accurately; identifying issues/arguments; thoughtfully analysing tasks; providing a sensible/fair evaluation of different ideas/viewpoints; and drawing appropriate conclusions.

Student always demonstrates innovation in showing creativity; stimulating and generating ideas that result in application.

Student consistently demonstrates the following leadership skills: coordinates; plans and allocates/organises; stimulates/generates ideas; keeps team on task; effectively delegates; and moves discussion to action.

Student demonstrates excellent time management skills.

Very good - 4

Student is mostly active in demonstrating communication skills by often asking useful questions; frequently negotiating and compromising; dealing well with conflict; usually offering constructive feedback and providing positive feedback.

Student on most occasions demonstrates critical thinking skills of interpreting concepts accurately; identifying issues/arguments; thoughtfully analysing tasks; providing a sensible/fair evaluation of different ideas/viewpoints; and drawing appropriate conclusions.

Student often demonstrates innovation in responding creativity to tasks; stimulating and generating ideas that result in application.

Student demonstrates a high level of the following leadership skills: coordinates; plans and allocates/organises; stimulates/generates ideas; keeps team on task; effective delegation; and moves discussion to action.

Student mostly demonstrates very effective time management.

Good - 3

Student demonstrates a moderate range of communication skills: listening attentively; asking useful questions; negotiating and compromising; dealing well with conflict; offering constructive feedback and providing positive feedback.

Student exhibits some critical thinking skills with concepts occasionally interpreted inaccurately. Some guidance may be required to accurately identify some issues/arguments and analyse tasks. A moderate degree of sensible/fair evaluation of different ideas/viewpoints is demonstrated and some appropriate conclusions are drawn.

Innovation in creativity and the stimulation/generation of ideas resulting in application occurs to some extent.

Some of the following elements of leadership skills demonstrated: coordination; planning and allocating/organising tasks; stimulating/generating ideas; keeping team on task; effective delegation; moving discussion to action. Student is more inclined to follow instructions than initiate action.

Student demonstrates moderately effective time management skills.

Acceptable - 2

Student may rely on a limited range of communication skills: sometimes listens attentively; occasionally asks irrelevant questions; has limited ability to negotiate and compromise; may not deal well with conflict; offers moderate feedback. Student shows a limited ability to think critically with concepts interpreted correctly some of the time. Guidance is required to accurately identify some issues/arguments and analyse tasks. Some difficulty in evaluating ideas/viewpoints and assistance is required to draw appropriate conclusions.

Limited evidence of innovation in creativity and stimulation/generation of ideas resulting in application.

Few leadership skills are evident. Student mostly accurately follows instructions but does not initiate action.

Acceptable level of time management demonstrated.

Inadequate - 1

Student demonstrates ineffective communication skills.

Student does not demonstrate ability to think critically.

Student does not demonstrate innovation.

Student does not demonstrate leadership skills.

Student demonstrates no evidence of effective time management.

Innovative Assessment and Learning in a Problem Based Environment

Larry W. Belbeck
Shucui Jiang
Nicoleta Nutiu
Departments of Pathology and Medicine
McMaster University, Canada

An enhanced problem-based Pathophysiology course examined the hypothesis that increased interaction with content increased the ability to solve problems and retain information. Group interaction was both inside and outside the classroom and online. Student ownership developed camaraderie, and collaborative problem solving skills. It also provided the motivation to do research, make presentations and do laboratory exercises without formal assessment. Assessment strategies, aligned with the course, included problem solving, retention, clinical reasoning, and professional skills. Evaluation included self, peer and professional evaluation of the ability to solve problems involving written cases, pathologic specimens, diagnostic procedures and medical imaging. Since the course had many novel aspects, a special questionnaire was used along with conventional course evaluation. The most telling success of this approach is reflected in the doubling of enrolment requiring extra sections and the adoption of this learning style in part or in total by other courses in the Health Sciences, and in other Universities.

1. Introduction

The overall hypothesis was to determine if traditional small group teaching with five or six students could be applied to a larger class size of approximately forty students while retaining the benefits of a small tutorial group.

The outcome was evaluated by retention of information, the ability to solve problems rapidly as a group, and to acquire the professional skills of practicing health professionals.

The challenges involved in developing this course and the rationale for it included the following: Students remember about thirty or forty percent of the information after a few months after initial learning; information becomes more meaningful when students see relevance to information (Bligh, 2000) and faculty were reluctant to make dramatic changes from either traditional lectures or small group tutorials.

The pedagogic format of the course was to provide students with as many opportunities as possible to interact with information, to interact with each other, and to provide a positive learning environment driven by a desire for excellence rather than by marks alone. In other words, to show that excellence can be achieved through other incentives besides marks.

Conversely, learning the clinical reasoning process can be shaped by a reward of marks to encourage both individual reflection and group discussion. This was achieved by awarding marks for information submitted after a more formal evaluation to provide an incentive to further pursue the case both individually and in groups.

This provided much greater learning than when the cases were simply reviewed for the students by an instructor.

The Medical School at McMaster University was the first to have a curriculum which was entirely problem-based studied in tutorial groups. Traditionally, tutorial groups comprised six or seven students with a faculty tutor and often a co-tutor. This was an extremely faculty intensive process especially when the same faculty were

involved in the clinical teaching and administration associated with the program.

The approach described here allows one faculty member to offer a very similar problem-based format to a class of currently seventy students.

Problem-based learning has been incorporated into the medical curriculum of most universities. In addition, the interpretivist approach has been used both at McMaster University and many others. These are often termed "Inquiry Courses" and are based upon students learning by dealing with more open-ended questions and problems.

Since the practice of medicine involves both specific information and a number of social and reasoning skills, a positivist or quantitative assessment is included in the final assessment of students. This combination of both positivist and interpretivist assessment is becoming the norm in medical education in North America, reflecting the diversity of knowledge and personal skills required by a practicing physician.

2. Methods

2.1 Themes of the course

The content themes of the course included normal physiology, what goes wrong when a disease occurs, how one measures this change from normal, and how one reverses or manages this change to benefit the patient.

Additional goals of the course were to promote innovation, to understand the disease process, to see the patient as a person and to understand population and political issues in health care.

In order to explore these themes and to develop content knowledge, the students engaged in specific activities either singularly or in tutorial groups. These were carried out in the classroom and the laboratory. An

electronic communication system called LearnLink (LearnLink FirstClass) was used to facilitate both tutorial group and class discussion, individual communication either asynchronous or real time chat and to disseminate problems, deal with administration or to transfer medical images to participants on the course.

Section 7.1 presents a student's evaluation of the course and provides additional insight into methods that were employed.

3. Organization of the course

3.1 Presentation

One week of the one semester course was devoted to each of the body systems e.g. cardiovascular, respiratory, etc. Sessions included either visits from interesting patients such as heart transplant recipients or field trips to technically sophisticated diagnostic laboratories.

The course consisted of two hours of presentation time and two hours of laboratory time. All students met together during the presentation time. In addition, students were divided into tutorial groups of four to five students. They met as a group either physically or on-line to prepare for activities outlined below.

During the presentation time, one of the instructors gave a ten-minute overview of a topic. This was followed by three problem-based presentations from tutorial groups in a rotating manner to cover each body system. The presentations consisted of a PowerPoint discussion of the case, a one-hundred-word case summary and the preparation of five multiple choice questions.

In addition to the presentation in class, all of these items were available electronically. Questions were answered in class or by posting to LearnLink.

3.2 Laboratories

The laboratory sessions were divided into two one-hour

blocks. During the first hour, students were asked to identify and describe pathology specimens, x-rays, ultrasound images, computerized tomography images and magnetic resonance imaging images related to the system studied that week. Instructors provided feedback and challenged students with wide-ranging questions.

During the second hour, students collected physiological data from each other using equipment similar to that used clinically. At the end of the physiology sessions, each group of students was provided with an abnormal study that they were required to analyse as a group.

The results of both the physiology and pathology exercises were discussed in class and posted on LearnLink. During these sessions and in the posted material, the logic of the pathological and abnormal clinical findings was discussed so that students learned to reason through the findings that were presented.

Short field trips throughout the course included an echo cardiology laboratory to understand how ultrasound images were generated and similar demonstrations or explanations of radiographs, computerized tomography and magnetic resonance imaging techniques.

3.3 Essays and presentation

Individual students were asked to prepare an essay on any disease process that attracted their interest. They were asked to provide their topic two months prior to the end of the course to prevent overlap and to submit a draft electronically one month prior to the end of the course. The students colleagues were required to comment on and offer suggestions to improve these essays.

Comments from the tutorial group were required, while comments from students outside the tutorial group were optional. The essays were submitted at the end of the course along with a PowerPoint presentation, a summary, and five multiple choice questions. In addition, names were chosen "out of the hat" for students to present their essays and answer related questions.

4. Evaluation of Students

4.1 Test and Retest

During the course, a multiple choice test was generated by using the questions submitted by the students to make up 80% of the questions while instructors generated 20% of the questions. At this time, a second set of questions was prepared that addressed the same content.

To assess the retention of knowledge, after a four-month period of extinction, the students answered the second set of questions. Assessment was based on the number of correct answers.

A comparison was made with the students taking another Anatomy and Physiology course. This group offered both similarities and differences to the Pathophysiology course.

4.2 Clinical reasoning exercises

The students would be presented with a one or two sentence scenario and expected to produce a list of possible reasons for the condition. These could also be in the form of possible answers to a question or the name of a disease likely to produce the physiological or pathological change.

The scoring was based on one mark for a relevant answer, no mark for a neutral answer and a deduction of one mark for an irrelevant or dangerous answer.

An example might be appropriate.

"A healthy sixty-six-year-old gentleman collapses with retrosternal chest pain radiating to the left arm."

Relevant answers would include myocardial infarction, aortic aneurysm and pulmonary embolism, all of which are sudden and catastrophic in onset. Neutral answers might be lung neoplasia which may remain silent for a long period of time and rapidly exacerbate. Answers such as chronic obstructive lung disease, most infectious diseases and congenital disease would result in the loss of a mark.

The test was carried out in an examination setting, where students received the problems and were required to write answers in a defined period of time without collaboration or additional resources. Thus part of their score was based on the information that they knew.

During the next twenty-four hours, students could submit electronically refined answers or additional reasons and receive sixty percent of the mark they would have received and presented the material during the first part of the examination.

Neutral and deductions for inappropriate answers were on the same basis as the first part of the exercise. The purpose of this was to encourage further refinement of the best possible answers. Since there were no restrictions on resources, inappropriate answers were penalized at the initial higher one mark rate.

4.3 Individual Essay

Individual essays were independently assigned a grade by three individuals. Grades were based on clarity of presentation, and description of current knowledge in the area. If there was disagreement between these individuals or in the event that one of us was not familiar with the area, an opinion was sought from a local expert. Educational literature suggests that marking of essays can be variable (McKeachie, 2002). The two teaching assistants were preparing for examinations and saw this and the verification of material as a valuable learning experience.

4.4 Final Triple Jump Exercise

The final triple jump exercise lasted one day. At nine in the morning, each tutorial group was presented with a problem scenario along with medical images and pathology specimens. For some of the stations, students were asked to use a monitoring device to obtain physiological information from a simulated patient. The patient was trained to assess whether the investigation was carried out in a competent way that would produce results. When the students were successful in obtaining the normal information from the simulated patient, they were provided with the results of that study from the patient in the scenario.

When the students received the case, they discussed it among themselves and devised a set of issues similar to those they would provide during the clinical reasoning exercises. In the case of the final triple jump, there were many aspects of the case that lead to several reasoning processes.

For example, using the cardiovascular case above, the student might explore such areas as hypertension, serum fat levels, and body weight. Each of these would represent reasoning steps or issues to be explored.

If students had a general understanding of the problem, they were allowed to leave to do further research to clarify the issues, or see new possibilities and refine their strategy for dealing with the problem. In the event that they had serious errors in reasoning, they would have been redirected at this point.

There was no restriction on resources and students were encouraged to do anything that they wished.

A final summary of the problem was submitted electronically by five in the afternoon on LearnLink.

This case was graded independently by three individuals and an average of these three marks was assigned to the student for the case (McKeachie, 2002).

4.5 Self and peer evaluation

The format of the course led to the students completing an educational dossier. The information in the dossier included all of the on-line tutorial discussions, the drafts and modifications in their essays, presentations and written comments on all aspects of the course. This was recorded on LearnLink.

Students were expected to contribute to the management of the course. The distribution of tasks within the group, the order of presentation each week, being sure the necessary resources were present were the responsibility of the students. This is similar to what is expected in the three problem-based medical schools with which the authors are familiar. The intent of this was to allow students to explore their feelings around being in a problem-based medical curriculum.

Tutorial behaviour was assessed by a questionnaire on self and peer evaluation. Marks were allocated for participation in class, tutorial, laboratory and on-line. Students were encouraged to make more subjective comments which reflected individual differences. Thus two individuals could be valued equally, but for very different reasons.

4.6 Items not evaluated

An additional hypothesis in the course was that students could be motivated to achieve excellence by an intrinsic drive based on a positive educational environment.

Three areas were not formally evaluated.

First were the group presentations that made up the content of the course. Second were the verbal individual essay presentations. In the case of the verbal presentations, names were chosen at random.

In both of these areas, feedback was encouraging and strengths noted. In cases where important topic areas were missed, questions by the instructor tried to bring these out. In many cases, an explanation was posted electronically by the individual or group for the entire class. In individual essays, students were free to incorporate suggestions.

The third area not evaluated was the week-to-week performance in the laboratory and the practice triple jump. Here people were encouraged to be spontaneous, to be willing to take risks and to learn from each other.

There was the expectation that students would have an intrinsic motivation to do well in front of their instructors and peers. Unconventional thinking and innovation were encouraged.

Since marks were not an issue, students felt comfortable in taking risks but were at the same time motivated to do well before their peers.

4.7 Professional Skills

Within the course this was addressed as self and peer evaluation using "The McMaster Medical School Guide to Professional Behaviour in Tutorial Meetings"

(McMaster University, 2002).

To provide a benchmark from outside of the course, the professional skills of the entire group were assessed in comparison to a group of health care professionals.

The method for comparison was as follows:

Students, in groups of five were recruited to be involved in a Problem-Based Learning Workshop designed to train current health professionals to become tutors in a problem-based learning environment.

During the first part of the workshop, these potential tutors were trained to monitor individual behaviours in groups.

These individuals scored both the health professional group and the student group and reported the behaviours that they observed.

Content issues were assessed by the facilitator using the criteria outlined by the planners who wrote the problem. These planners had specific issues in mind and they were clearly outlined on paper to guide the facilitator.

5. Course Evaluation

5.1 Conventional course evaluation

Conventional course evaluations were completed on both the course and on the instructors. One of the students undertook to summarize this in an organized way for this publication.

5.2 Questionnaire aligned to objectives

The instructors designed a questionnaire to outline their objective for the course. The responses from the students indicated how much they valued the objective and secondly, how well we did in meeting that objective.

6. Results

6.1 Retention of information

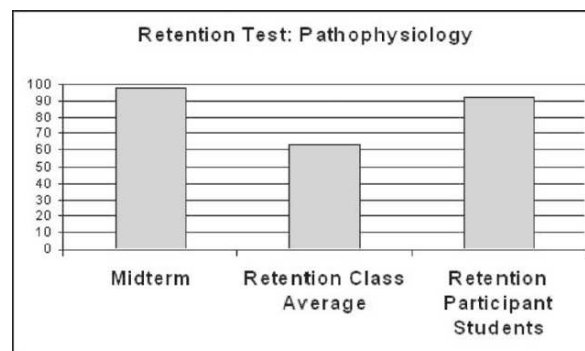


Figure 1. Retention: Pathophysiology

Figure 1 illustrates that at the time of the initial multiple choice test that all of the students had a complete recall of factual information (97.75%). After the extinction period the average retention was 62.74%. However, when questions were allocated to the groups that produced them and had high interaction with the content, the retention was 92.25%. The series consisted of 70 students.

Students found this type of learning to be fun (Belbeck et al.,2003; Belbeck & Nutiu,2004).

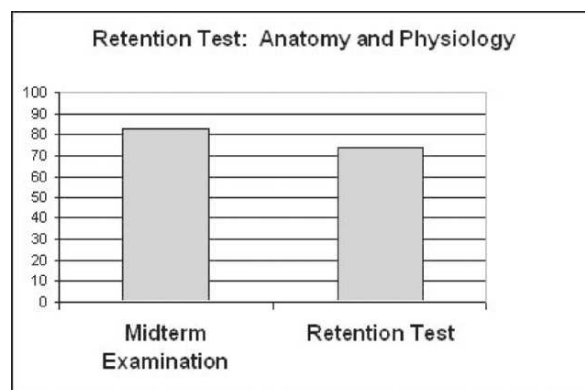


Figure 2. Retention: Anatomy and Physiology

Figure 2 illustrates the retention after a period of 4 months was 74.05 % following an initial score of 82.87 % based on a sample of 70 students. These students are from the second semester of a two-semester course and were self-selected out of interest in education

strategies. There was not a comparable period of extinction since some of the material discussed in the second term was dependant on material from the first term.

In the process of reviewing questions generated by students, it was easy to identify areas where students were having problems understanding the content.

6.2 Clinical Reasoning Exercises

Although the concept of clinical reasoning was new to students at the onset of the course, their scores rapidly improved. It became apparent that reinforcing discussion after the test with additional marks was a powerful teaching tool. This concept came from seeing the heated student discussion after any test. This usually occurs in the corridor where each individual strongly advocates their particular position. However, in most courses, this teachable moment is neither acknowledged nor rewarded and is lost.

The opportunity to look up answers after the test, again reinforced by marks, is a strong motivator to learn and to develop reasoning skills. Both of these assessment/reward systems are much more efficient then attempting to explain the concepts and illustrate them with examples. This is yet another example of assessment driving learning.

6.3 Professional Behaviour

It was noted during these discussions in the first year that the course was offered, that students were very competitive, defensive of their own position and were less likely to change based on feedback from classmates.

During the second year, students were presented with "The McMaster Medical School Guide to Professional Behaviour in Tutorial Meetings" (McMaster University, 2002). They were encouraged to follow these guidelines and this was part of the student self and peer assessment. Instructors encouraged positive behaviours during both classroom and electronic opportunities.

Table one is a summary of the professional qualities that we attempt to teach along with some specific examples.

Professional Qualities	Specific Professional Behaviour
Respect	Acknowledges others, not interrupt
Responsibility	Initiates group dynamics
Self Awareness	Identifies own strengths and weaknesses
Self Evaluation	Responds to comments with behavioural change
Communication Skills	Wide range of skills: question, clarify and support

Table 1. Professional Behaviours

When student behaviour was compared with a group of practicing health care professionals, the following differences were noted at the end of the first year of the course.

Students	Health Professionals
Interrupt and compete for airtime	Not interrupt, acknowledge and listen
Broad open-minded	Focus on a few issues
Draws heavily on experience	Aware of literature, clinical trials etc.
Wide range of information gathering	Uses few well-known resources
Emphasizes strengths and defends against criticism	Acknowledges strengths and weaknesses
Not acknowledge weakness and limited change	Responds readily with behavioural change
Singularly presents own knowledge	Wide range of skills: question, clarify and support

Table 2. Differences in Professional Behaviour

During the second year of the course, there was a much less noticeable difference in professional behaviour. The question of whether this conforming to an expected standard of professional behaviour interfered with reasoning or identification of issues was tested by comparing the pattern of issue generation between the two groups. Since problems varied in scope and complexity, the comparison was made between either the student or health professional and the planner who wrote the problem. The relevancy of the issues was determined by experienced tutors who ran the workshops. Similar issues were grouped so that there was no inflation of student numbers.

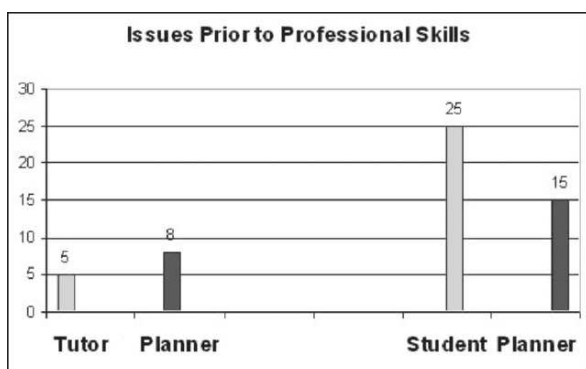


Figure 3. Issue Identification Prior to Professional Skills Awareness

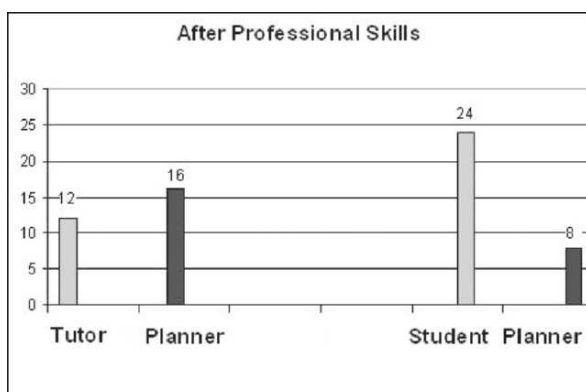


Figure 4. Issue Identification Following Professional Skills Awareness

In both trials, the students generated many more issues than health professionals and pursued these issues with a wider range of information resources.

Health care professionals focus on a few issues and use a limited set of references to confirm or review the essentials to manage the case. Most do not look for further problems, probably because they are used to working under time constraints in their practice.

Thus "early closure" or being too focused is a problem to be addressed in continuing education of physicians. The evidence of this in practice are the number of patients that once labelled with a particular disease are not investigated further or treated differently in spite of unusual findings or results being detected.

Students, in the academic setting think broadly and

explore problems to a greater depth. This is not surprising as these behaviours are continually assessed in the academic environment. For students, the more they portray these behaviours, the greater the reward.

For health care professionals, there is not a great reward structure, but rather change occurs because of complaints, practice standards committees or litigation. All of these are at the lower end of the scale and are likely punitive.

6.4 Self and Peer Evaluation

The summary of all of a student's written activity on the course was retained in a dossier or journal on LearnLink. Thus students could report this in any way that was useful to them.

For purposes of the course, students could advocate their contribution to presentations, on-line tutorials, editing the essays of other students and written contributions to the laboratory sessions.

The more subjective marks based on non-written communication such as tutorial meetings, acquiring information for the group or verbal presentations in laboratories were usually supported by specific comments.

As noted in the results of professional skills, these evaluation comments tend to cast the student in a positive light or offer a defence to critics.

This evaluation of peers would not only reflect the peers behaviour, but what comprised the students own intrinsic values.

A simple example might be appropriate.

If a student were always arriving late for meetings, the evaluator might comment on this behaviour. However, this comment also reflects the evaluators need for meeting time deadlines and organization.

6.5 Final Triple Jump Exercise

The final triple jump evaluates the student's ability to learn and to solve medical problems. It reflects the "real

world" where practitioners solve the case-based upon their interpretation of different "clues". Not everyone uses the same clues or has the same skills, or uses the same algorithm to solve the case, however at the end of the day most practitioners (now students) have an accurate synthesis of the case.

7. Course Evaluation

7.1 Course Evaluation

Numerical evaluations of all aspects of the course were high (Keshet, 2003).

However, the following was written by one student as a composite of student opinion of the course.

"The pathophysiology course has demonstrated an innovative and novel approach to applying problem-based, collaborative learning, and inquiry focused structures in an undergraduate 3 unit course.

The first lectures approach problems in a small classroom setting, using the PowerPoint slides as a "conversation starter". There is a dialogue with the class and an active demonstration, in each lecture, of the four themes. The process is one of structuring inquiry in a discreet manner by repeatedly applying it in a broad range of scenarios. The superficial difficulties in demonstrating 'transfer' on the part of learners is therefore overcome as it is 'transfer' that is directly and discreetly being taught.

There are no marks given directly for these presentations, which are curious at first, considering how important the presentations are to the course. Nevertheless, students put extensive time and energy into producing enjoyable, informative, and thought provoking presentations; shattering the notion that evaluation is the motivation for student participation.

Dr. Belbeck brought in a heart transplant patient to speak to the class, he did some lecturing on some

fundamental pathophysiological concepts, and generally put context into the presentations and served as an accessible expert. The effect of this general approach to the lecture portion of the course imparts a more personal experience to the class and sets up a dynamic and discursive learning environment.

The laboratory aspect to this course has been very positive and has made use of the laboratory setting in an engaging and appropriate manner. An example of the format of a given laboratory on a given week would go as follows: A number of specimens and blocks would be set out with no instructions given but to simply consider them. Each specimen may be pathological, or it may be a normal specimen. This fact was often concealed or not stated and it was up to students to assess and judge. After a period of time for free investigation, there would be an interactive explanation of each block by a small group, discussion-based, review of the pathology.

The discussions have been well-paced, affording ample opportunity for questions and clarifications. Laboratories were not evaluated in any way other than as a part of the general, broad participation mark given as a cumulative final grade. The effect of this lack of evaluation in the laboratory and small group discussion/investigation format was to engender a learning environment that was engaging, relaxed, enjoyable, and informative.

The effective use of problems, discussion, and tools such as ultrasound gave a real and tangible edge, in addition to the hands-on experience through specimens and blocks.

On the whole, the lab was viewed by students as an interesting and fascinating way to spend Friday morning. The processes of inquiry and discovery through investigating and interacting with physiological mechanisms were repeatedly visited in the lecture-based portion of the course. The reflection of this directed inquiry in the laboratory wove the experience into the rest of the course material and successfully reinforced the learning done in the group and class settings.

This evaluation mechanism stimulated learning from what we had been exposed to, and served to evaluate

more than just knowledge, but also the degree to which one was present and engaged in the group learning process of the entire class.

The final exam followed a similarly innovative pattern. Two rules were given: Submit the final report by 5:00 pm, and 'there are no rules'. This was a 'no holds barred' thinking/problem-solving exercise where knowledge acquisition and effective inquiry through the 4 themes of the course were being tested. There was a practice run in the week before the exam where sample problems were presented and submitted by groups to a main folder where they could be downloaded.

The underlying theme throughout every aspect of the course is that each facet must represent a learning opportunity. By writing the final exam, we learned and were examined based on our ability to learn and subsequently synthesize.

There is an individual essay component in the course where each student is provided with a folder that others can access. Students post drafts of their essays up to these publicly accessible folders where other students can download and critique their work. This shows that the product of individually assigned work can go towards enriching the learning experience of the class on the whole. Each person takes a different topic and therefore by reading a number of essays, one learns what other students have uncovered and, themselves, learned. The due date for the first draft of the paper is over 3 weeks prior to the actual due date of the paper, affording sufficient time for others to read and comment, for questions and open forum LearnLink discussion.

Throughout the course, students have repeatedly demonstrated the initiative that is required in order to make a model such as this work. Students demonstrated self-motivation and required neither carrot nor stick to learn and participate within the context of the course. This was because students were given the responsibility of ensuring the course had been a worthwhile learning experience while simultaneously being supported by a very involved and dedicated facilitator.

He is at each lab and takes a central role in the conception and administration of each lab activity. Furthermore, Dr. Belbeck is personable, approachable,

and inviting, and to all objective observation invests himself personally in the success of the course. This success is defined not by the results of the tests and evaluation mechanisms, but by the degree and quality of student participation in discussing, teaching, and learning. Students typically post up interesting things they find, ask questions in the forums, and share their experiences of the course, while Dr. Belbeck stands by and serves as an accessible and encyclopaedic source of experiential and factual knowledge.

The success of this model of administering courses depends on a dynamic and truly inspired facilitator that can engender a learning environment where students are empowered to learn and teach the course curriculum. Without students participating out of fascination and the joy of exploration and discovery, this model is not viable. This is why the offering of this pathophysiology should serve as an example of how this system can work, and its potential as an efficacious model that can be repeated in other courses and medium-sized group settings." (Bell, 2003).

7.2 Instructors

The questions are outlined in bullet form followed by first, the value of the objective to students and then by how well we met the objective.

- Provide as many opportunities as possible to interact with information, each other and to learn beyond the basics

Objective value	97%
Objective met	86%

- Provide a positive learning environment not driven by marks but by an intrinsic desire for excellence

Objective value	97%
Objective met	93%

- Stress quality, excellence and innovation both in content and electronic delivery

Objective value	97%
Objective met	93%

- Demonstrate that small group learning can be done on a larger scale without an increase in faculty

Objective value	67%
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- Objective met 86%
- Atmosphere of co-operation between groups and class
 - Objective value 95%
 - Objective met 86%
- Provide opportunity for teaching assistants and laboratory staff to develop
 - Objective value 73%
 - Objective met 73%
- Try new ideas that would benefit students and learning
 - Objective value 92%
 - Objective met 90%
- Provide ownership of the course and a positive environment to make changes based on student suggestions
 - Objective value 89%
 - Objective met 93%
- Provide an environment where everyone associated with the course can grow and develop
 - Objective value 97%
 - Objective met 86%
- Electronic communication
 - Objective value 100%
 - Objective met 100%

(Bell, 2003)

both this information and process to solving further problems.

There were the areas that we assessed in the course, consistent with the theme of alignment presented at the conference.

We strongly believe in the process of student-centred learning where students can have passion about some aspects of a problem. This compels them to find out more about the topic and to remember it and even to tell their colleagues about it.

This is reflected in our first retention test, where students who interact with material remember far more. The second set of retention data also support continued interaction with data aids in recall (Bligh, 2000).

This is in line with "real world" medical practice where there are many ways to manage a health care problem. Using the example of heart disease, one might do surgery, open blood vessels with devices inserted through the blood vessels, drugs, diet or exercise.

Thus the student can demonstrate a broad knowledge of a topic but focus and become and expert in what interests them.

It is also important for students to be able to document their interests, their progress, and their ability to solve problems in an area for many reasons. In the case of this course, people were able to define their interest with considerable written detail that they could put in an educational dossier.

This was used by students to ensure that their contributions were accurately assessed within the course. However, much more important, they had documentation to get personal funding awards, summer research jobs and even independent research funding.

Student ownership of the course moved away from "what the professor wanted to see" (Biggs, 2005).

The most empowering aspect of this approach is that all of the constraints introduced by an outline or a preconception of what the professor wanted to know. The problems were written to be open-ended and asked

8. Discussion

This course illustrates many of the concepts discussed at this conference on "Enhancing Teaching and Learning through Assessment".

8.1 Enhancing Learning

We believe that the type of learning that is of the greatest benefit to students is where they need to solve problems, acquire and retain new information and be able to apply

questions that were of genuine interest.

In this case, the professor wanted to learn as did the students.

The use of LearnLink enhanced many aspects of learning and made it easy for everyone to have an ongoing record of written communication. In addition, it made every administrative task simple and transparent to everyone. Every student had the same information; submissions were organized as to sender and group, and deadline critical submissions were time stamped.

8.2 Enhancing Teaching

We believe that the role of Faculty is to provide the richest learning environment.

Rather than continue in the same format that has been used for far too many years, we attempted to do something that incorporated that best of many styles of teaching based on assessment of previous courses.

Thus the information gathering skills learned in inquiry courses, the presentation skills learned in seminar courses, the professional skills learned in small groups were incorporated into time and space constraints.

We were also faced with constraints on human resources and to address these we looked at the behaviour of students around assessment.

In the case of presentations, we did not see the need for formal assessment. This was based on the observation that whenever students spoke in class, they were clear, informed and articulate or did not speak at all. Thus all we needed to do was to provide a forum to speak. We also believe that students require freedom to take risks in order to develop innovation skills. Students take the opportunity to try new forms of discussion, interaction and test hypotheses in the environment that is not evaluated. Based on the positive or negative reinforcement during these sessions, they proceed to use the new strategies in more formal situations. At that time, they have had the opportunity to refine their approach in a non-threatening environment.

We used assessment in two ways. In one case there was the opportunity to take risks, to try new approaches to problems and to explore the relevance of new knowledge to the problems at hand.

In the second case, we had a rigorous assessment with formal criticism of presentations in order to evaluate student performance. In situations where individual performance was measured, we considered the sources of information and the possibility of plagiarism. Since all of the presentations were written on-line and with editorial suggestions from other students, it was unlikely that plagiarism would occur. As an additional control, the presentations were in an electronic format and we had the opportunity to use a computer system designed to detect blocks of information that were identical, but from different sources (Turnitin.com).

For classroom presentations, we felt that students would do well without formal assessment. This would free time to clarify or further challenge presentations. Students could incorporate suggestions into their final presentation.

In the laboratory, we chose not to use assessment because it inhibited the teaching opportunity. Students would either just want to know the answer or not speak up in fear of being wrong.

In contrast, during the triple jumps, we did assess the information and problem-solving process that students learned in the laboratory.

Thus by moving the time and nature of assessment, we increased laboratory learning while still having an opinion concerning the student's progress.

The addition of an assessment technique was used to develop clinical reasoning skill. Conventionally, we would have such an examination and then, review what the faculty opinion of the answer should be and defend that position or based on a student's persuasion add marks to their score.

Since the mark was already determined, students had little interest in the faculty position. Furthermore, if a student did persuade us to change his score, this was done in isolation and only that one student benefited.

This seemed unfair to us.

Finally, we noticed in the corridor after almost any form of test students would gather and engage in heated discussions. This seemed like a very rich learning environment.

We incorporated these observations into the modifications we described for the clinical reasoning exercise. This has made this area much more efficient to teach.

We strongly encourage criticism and feedback and incorporate this into teaching. We have encouraged looking at the larger picture and again suggesting that no request is unreasonable. We have proven to students that they do have a voice in this process.

We have also noted that students value those aspects of the course that benefit students, while issues of staff development and administration problems are secondary.

8.3 Assessment of Accomplishments

There have been a number of areas of positive feedback for this approach including students, our own and other faculty. We believe that the basic concept is sound. We support the concept of multiple forms of assessment, at least in health sciences, where both quantitative knowledge and a more constructivist approach to problem-solving is necessary. This approach is reviewed extensively in an excellent review text (Denzin & Lincoln, 2000).

The concept of additional objective assessment in incorporated into the new COMPASS curriculum in the McMaster Medical Program (McMaster Undergraduate Calendar, 2005-2006). This is in addition to the traditional interpretivist assessment of individual performance in tutorial and later clinical settings. The latter evaluates a range of student skills in the context of a specific clinical problem.

However, what needs to be done is a more formal assessment of this and other teaching. This process generates further ideas and clarifies thinking.

All of the work that we have done is based upon opportunities to ask questions and we have on this with resources that were available at little or no cost.

Our belief is that funds should be more available for course evaluations and that development of better assessment tools should be encouraged.

We also learned about individual learning behaviour and in retrospect could identify students with learning problems. We plan to be more responsive to this in the future.

9. Conclusions

- By refining the use of assessment strategies, we have been able to retain the advantages of small group learning in large class.
- Medical practice is a combination of factual knowledge, and positivist assessment, and also a wide range of personal skills and interpretivist assessment. Both are evaluated to determine a final mark.
- Learning is greatest and more fun, when assessment strategies are aligned with each of the components of the course both in the classroom and in electronic format.
- The course should provide a mechanism for a written student dossier to be available not only for assessment but for assisting the student in their careers.
- Assessment can be removed in areas of the course where inclusion of assessment around a specific activity can limit discussion or where assessment can be replaced by motivation.
- Although assessment is removed from certain areas, it is possible to evaluate all of the skills and knowledge in other areas of the assessment package.
- The addition of assessment strategies in areas such as clinical reasoning can capture discussions by students that are otherwise lost and also make any adjustments to marks in the fairest way to all concerned.
- Assessment of courses should include a questionnaire

written by instructors and a summary of written comments written by one or two students to round out a statistical report generated by the administration.

- Assessment of courses should go beyond one year and incorporate changes in enrolment, the incorporation of concepts in other courses and universities.
- The course reflects the structure of three local problem-based medical schools allowing students to cite this as an example of problem-based learning and to explore their feelings about learning in this environment.

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Blending Process with Product: Using Assessment to Drive Learning Through the Creation of an Online Journal

Gillian Hallam
Clare Glanville

Faculty of Information Technology, School of Information Systems
Queensland University of Technology, Australia

This paper reviews and evaluates the introduction of an integrated approach to assessment as the key driver for learning in a postgraduate library and information studies program at Queensland University of Technology, Brisbane, Australia. In a unit dealing with issues associated with information resource provision, the students were required to develop an electronic journal which became the vehicle to combine the process of learning and the product of learning. As one author was a QUT Teaching Fellow in 2004 with the task of investigating the introduction of criterion referenced assessment in tertiary education, the unit was also used as a pilot project to explore the value of this assessment methodology. The unit was formally reviewed at the end of semester through the university's unit evaluation system and students also completed a questionnaire. The students believed the unit helped them develop an appreciation of the importance of professional communication in their discipline area, with half of them inspired to write for professional publication once established in their careers. It was found that, for this cohort of students, criterion referenced assessment played a significant role in offering transparency, accountability and fairness in assessment, as well as supporting novice academic staff in the assignment marking processes.

1. Introduction

In September 2003, Queensland University of Technology (QUT) endorsed a new assessment policy to introduce criterion referenced assessment (CRA) into undergraduate and postgraduate courses (Queensland University of Technology, 2003). 2004 was seen as a year of consciousness-raising, with CRA to be implemented in key strategic first year undergraduate units, while the goal for 2005 is to have CRA extended to all first year units. In the period 2005-2007, as other units fall due for review, they would be progressively modified to incorporate CRA. One of the strategies introduced by the university to foster understanding of and support for the policy was to introduce a special scheme within the QUT Teaching Fellowship program, with participants from different faculties working together to establish a community of practice as a forum for discussion and shared understanding of the concepts of criterion referenced assessment.

One of the authors, Gillian Hallam, from the Faculty of Information Technology, was appointed QUT Teaching Fellow with a specific project to consider the introduction of CRA as a whole-of-course approach to learning and teaching. As Faculty staff were involved in the design and development of the curriculum for a new Master of Information Management, the new course offered a fertile context for the CRA project. The development of the new study program required a complete review of all units in the existing library and information studies course, the Graduate Diploma in Library and Information Studies (GDLIS). As part of the consciousness-raising process and to facilitate staff and student understanding of CRA approaches, an existing unit, ITN338 Information Resource Provision, was considered to have value as a pilot project to run in semester 2, 2004 to test and evaluate CRA as a key part of the curriculum development process.

This paper presents a discussion on assessment designed as an integrated set of assignments for the unit ITN338, with all learning activities feeding into the development of an online journal. A brief overview of the overall learning context for the study program is provided, leading into a discussion on the development of criterion referenced assessment. Details are presented about the integration of assessment into the

approaches to teaching and learning in ITN338. The rationale for assessment is considered within the context of organisational assessment policy, principles of assessment and personal teaching and learning philosophies. The project itself presented an opportunity for staff and students to critically review the new assessment strategies within a framework of individual and collaborative learning activities. The integrated assessment tasks provided both the intellectual focus and the structure of the unit, effectively blending process with product.

2. The learning context

For many years, the Graduate Diploma in Library and Information Studies (GDLIS) was offered by the School of Information Systems in the Faculty of Information Technology at QUT as an entry-level course for library and information professionals. The academic staff are mindful of the enormous range of employment opportunities available to 'information professionals'. The landscape is extensive, from the broad levels of academic libraries, public libraries, state and national libraries, through to the narrower levels of special libraries and information centres, such as law libraries, health and medical centres, music libraries etc. Opportunities also exist beyond this more traditional library context, with career avenues available within knowledge management, records management, Internet and intranet development and so on. The world of libraries and information agencies in the 21st century is highly dynamic, with technology driving innovative developments in the management and use of information. These factors impact directly on the academic programs which provide the education and training for new graduates entering the library and information services (LIS) sector. While some traditional elements of librarianship remain important, the desired skill set for information professionals is rapidly expanding into new areas of knowledge. These factors have been drivers for the development of the new Master of Information Management (MIM) program.

The GDLIS course was offered as a two semester full-time study program (with part-time study options) in a face-to-face teaching and learning mode, with seven core units and one elective unit to be completed. The MIM has a total of 12 units, so is a three-semester full-time course. As the entry-level courses are recognised by the Australian Library and Information Association (ALIA), graduates are eligible for professional membership of ALIA upon graduation. On average, enrolments sit around 60 FTE, with a fairly even split between full-time and part-time students. The student cohort is an interesting one, with a wide diversity in academic background, employment history, personal interests and life experiences.

ITN338 Information Resource Provision was a core unit in the GDLIS, offered to students in their second semester of study. Information resource provision is regarded as an exciting and challenging area of library management: it involves an understanding of the issues that are central to the selection, acquisition and evaluation of information resources and the provision of access to them. To work effectively in this field, graduates need to have an understanding of the publication and distribution of information resources in different formats and media, together with an appreciation of the diverse information needs of clients in a range of different types of information agency. It is also important that they recognise the impact of legal and ethical issues on policy development in a rapidly changing information environment.

The unit ITN338 therefore aimed to develop the students' understanding of the key issues involved in developing and managing a library collection, to become familiar with the methods and tools used in the selection and acquisition of, and provision of access to information resources and to develop skills in evaluating a resource collection. While the principles of traditional collection management may continue to underpin the area, it is, at the same time, an area that is constantly changing. It is therefore that important that the curriculum is continually updated to reflect the evolving issues and challenges impacting on the field. The unit further sought to develop the students' generic capabilities of oral and written communication skills, critical thinking, teamwork skills and reflective practice.

3. Criterion referenced assessment

The unit ITN338 Information Resource Provision had evolved over a period of three years, not only to respond to the shifting dynamics in the management of and provision of access to information resources, but also to fit more closely with other units in the GDLIS. For a number of years, the principal pieces of assessment were an individual discussion paper, an oral presentation and a group project which required students to evaluate a real library collection. In 2004, the group learning activities moved to another unit in which there was strong focus on the development of teamwork skills. ITN338 was then seen as a unit which could provide students with the opportunity to focus more on their individual skills, yet with some collaborative activities.

Huba and Freed (2000) underscore the importance of clearly articulated learning outcomes as the initial step in the development of learner-centred assessment: "The first element of the assessment process is that, as faculty, we develop a set of intended learning outcomes, statements describing what students should know, understand, and be able to do with their knowledge..." (p.9-10). The learning outcomes for units at QUT are presented as objectives to cover Theory, Practice and Generic Capabilities. On completion of the unit, students should be able to understand and discuss:

- the value of information as a community resource
- the significance of diverse community information needs
- the issues associated with collection development and collection evaluation
- the issues associated with publishing, selection, purchasing and licensing of information resources
- the process of scholarly communication
- the changing environment of acquisitions work

At a practical level, students should be able to:

- research and discuss issues relevant to the unit
- prepare a written document for submission as a journal article
- undertake the process of peer review
- contribute to the collaborative development of an online journal
- deliver an oral presentation on a professional topic

The generic capabilities to be developed during the study program included skills in:

- information literacy
- critical, reflective and creative thinking and evaluation
- team work
- oral and written communication

The unit coordinator felt that an online journal would offer an innovative approach to structure the learning and assessment activities in the unit, with the goal of achieving the desired learning objectives. The university's online learning and teaching environment (OLT) provided the context where the journal could be created and published. Taking a holistic view of the learning activities, each assessment task was developed as an individual component in a cohesive model of teaching and learning.

The fact that new assessment tasks were to be designed meant that the relevant assessment criteria could be developed as part of the process. Griffin and Nix (1991) refer to criterion referenced assessment (CRA) as "a cohesive set of skills or standards" (p.4). It offers the opportunity for interpreting student performance in relation to given criteria with a set of standards, enabling performance to be described in terms of the tasks undertaken. Each criterion addresses a specific domain of content or behaviour and should be clearly expressed for all students prior to assessment. "The notions of proficiency, achievement and competence need to be clarified in terms of the tasks set, and the associated standards or criteria for mastery within each domain to be tested need to be defined" (p.77). Performance is viewed as a sliding scale between low levels and high levels of demonstrated ability, with mastery at the higher end of the continuum.

The development of the assessment criteria and associated standards of achievement were developed over a period of several months. Throughout Semester 1, 2004, as Teaching Fellow, the unit coordinator was able to develop and deepen her understanding of assessment in general, and CRA in particular, through independent academic study, discussion with colleagues at Teaching Fellowship workshops and participation in focus groups on the issues associated with CRA. The theoretical knowledge was therefore tested and applied

in the development of models of criteria and standards of assessment for the unit. The diverse assessment activities in ITN338 provided considerable variety in terms of the range of criteria to be developed, covering research skills, critical analysis and the structural elements of preparing a journal article, planning and delivering an oral presentation, critical reflection etc.

The unit was run in semester 2, 2004, with 36 students enrolled. As the Teaching Fellowship arrangements provided funding for a sessional staff member to be appointed to teach the unit and to mark the assessment, there was a further opportunity for testing the CRA process more objectively than if the unit coordinator was directly responsible for teaching and marking.

The CRA matrix encompassed the range of different criteria, with five different standards of achievement. QUT uses a seven-point scale of grading:

- 7: 85%-100%
- 6: 75%-84%
- 5: 65%-74%
- 4: 50%-64%

Grades 1-3 represent different levels of poor achievement. There was considerable discussion in the Teaching Fellow community about the challenges of developing more than five standards of achievement, particularly at the lower end of the scale. The motivation and engagement of learners is often found to be far higher amongst postgraduate, fee-paying coursework students than at the undergraduate level. There is anecdotal evidence to indicate that GDLIS students tend to drop out of the course rather than submit inferior work. Accordingly, the CRA matrix was developed with the 4 grades to reflect the marks of 50%-100%, and one grade of Refer/Fail to capture students who did not produce work of the required standard of < 50% in ITN338.

The assessment criteria themselves were developed to be closely aligned with the desired learning outcomes for the unit, with emphasis placed on the level of understanding of the topic and the information context, the quality of the research, analysis and critical reasoning. As each student could select their own specific discussion topic, the assessment criteria were

written at a high level to have general applicability across a variety of situations. The weighting of each criterion varied, to indicate to students the value of the different areas of the work they were asked to produce.

For the first piece of assessment, the journal article, criteria such as i) understanding of the topic; ii) understanding of the information context; iii) analysis and critical reasoning were each weighted with 20 marks, totaling 60% of the assignment. Use of the literature/evidence of reading was weighted at 15 marks, and then 5 marks were given to each of the criteria of the conclusions drawn, referencing, and written expression and presentation. The final 10 marks were awarded for a reflective discussion on the student's personal learning outcomes and the critical review of his/her own work.

It goes beyond the scope of this paper to discuss in detail the formulation of the text of each of the standards of achievement, but two examples are presented to highlight the concepts, with the standards for the grades 7, 6 and 5. Indeed only one student was awarded a 4 as the final grade for the unit.

The criterion 'understanding the topic' (Table 1) was broken down into two key attributes, the ability to:

- identify the audience
- identify and discuss the central issues of the topic.

7 85%-100%	6 75%-84%	5 65%-74%
Ideas are clearly presented and defined. Key issues are identified. Ideas are developed in clear, concise and ordered stages. Well-focused with the appropriate audience in mind.	Discussion focuses on the topic. Central ideas are apparent, but at times too general or too trivial. Generally acknowledges and meets the needs of the audience.	Discussion generally aimed at the topic. Central ideas are very generalise, without any clear focus. Acknowledges the audience, but only partially meets their needs.

Table 1. Assessment criterion 1: 'Understanding the topic'

The second criterion 'understanding the context' (Table 2) was expressed as the ability to relate theoretical aspects of the topic to practical application in specific contexts.

7 85%-100%	6 75%-84%	5 65%-74%
Clearly identifies relevant contexts. Effectively establishes a relationship between theory and practice, with highly relevant examples from industry or practice.	Takes into account potential contexts. Incorporates relevant examples from industry or practice.	Recognises the significance of relating theory to practice, but examples given lack direct relevance or are inappropriate.

Table 2. Assessment criterion 2: 'Understanding the context'

It should be noted that in class and in the study guide, students were given clear guidance about the need to write for a given professional audience and also to ensure that in developing their article, they should consider both the theoretical and practical aspects of the topic and should discuss case studies to highlight current practice in libraries and information centres today.

The oral presentation had a fairly even spread of weightings across the criteria of planning and preparation; understanding and analysis of the topic, quality of delivery and oral communication skills, visual aids and the reflective discussion.

In developing the assessment criteria for ITN338, semantics and vocabulary were central issues. The ability to use words and phrases that are specific and unilaterally understood in theory and in practice presents the greatest challenge. Sadler (1987) has argued that the lack of clarity or 'fuzziness' in the verbal descriptions of criteria inevitably results in differing interpretations on the part of students. O'Donovan, Price and Rust (2000) also indicate the confusion that can occur if the criteria are vague and/or non-explicit. Sadler (1998) and Ramsden (1992) underscore the

importance of ensuring strategies are in place to ensure a shared understanding of the criteria and standards by students and academic staff. Carlson et al. (2000) state that "Effective shared understanding needs to go beyond simple definitions of the terms used to encompass the practical application of the criteria and standards. For example, students may understand that they have to demonstrate critical thinking but may not be able to translate this theoretical understanding to the paper or assignment" (p.111). Sadler (1987) presents the view that shared understanding is like the two sides of a coin: the first side is 'disclosure' or the public articulation of the criteria against which performance will be judged, and the other side is 'visibility' or how the student interprets these criteria. Carlson et al. (2000) quote one academic staff member who indicates that it is only when students "actually internalise [the criteria] with their own work" (p.111) that any true sense is made of the criteria or expectations.

4. Methodology

In the first week of the semester, the students were advised of the new assessment policy, the requirement to implement CRA in new units and the role of the unit coordinator as Teaching Fellow as part of the university's community of practice. They were told that ITN338 was serving as a pilot unit to review and evaluate CRA in the context of a postgraduate course, to feed into the requirements for the new Masters course. The assessment tasks and the associated assessment criteria and standards were discussed with students in class. They were also invited to contribute to the evaluation of the pilot at the end of the semester, with the results of the evaluation to be presented at a Teaching Fellow Symposium at the end of the year. The sessional teacher was, of course, fully aware of the experimental nature of CRA in the unit and that she would also be asked to provide her own perspectives on the process.

The methods of evaluation were proposed:

- The standard Student Evaluation of the Unit (SEU)/

Student Evaluation of Teaching (SET) as a combined instrument

- A survey instrument seeking the students' response to the series of interlinked assessment items driving the learning activities 'to blend process with product' and the pilot project as part of CRA policy implementation
- A semi-structured interview with the sessional teacher

The evaluation activities were scheduled for the last two weeks of the semester. While it had initially been hoped to run a series of focus groups to capture more qualitative data from the students, logistically this did not prove feasible. The interview with the sessional teacher was conducted by a research assistant who had gained considerable experience in CRA issues through her work on a Faculty teaching and learning grant.

5. Assessment as the driver for learning in ITN338

In terms of content, the unit ITN338 was predominantly issues-focussed. There was a particular theme each week, with a guest speaker with in-depth knowledge of the theme to introduce students to the critical issues that impacted directly on their own work in the library and information sector. The idea of an online journal made it possible to develop the issues further: in writing their journal article, students would be given a chance to explore one specific issue of interest in depth, while the oral presentation offered an opportunity for students to share their learning about the broad range of issues they were addressing individually. The collaborative dimension could be achieved through editorial teams producing the weekly issues of the journal. There was also scope to introduce the peer review process to encourage students to focus on the quality of professional writing and the value of scholarly publishing. Accordingly, the process of learning and the product of learning were viewed cohesively.

At the beginning of the semester, the students spent time reviewing the Study Guide which provided

information on the individual assignment tasks and how they were integrated in the unit. There was a classroom discussion on criterion referenced assessment in general and within the unit in particular. Importantly, any assessable aspect of learning was incorporated into the classroom learning activities themselves. Early in the semester, the students participated in an interactive workshop designed to support them as they explored new territory. The workshop topics included:

- What was involved in creating an online journal
- How to be part of a productive self-managed editorial team
- The process of scholarly publishing and peer review activities

In the first part of the semester, students worked independently on their journal article and collaboratively with their editorial team to plan their issue of the online journal. They submitted a draft outline of the article they proposed to write and received formative feedback on this, which also gave the teaching staff an idea about the scope of each weekly issue of the online journal. Throughout the semester, each editorial group published their issue of the journal on the OLT site. In the second half of the semester, students were asked to give an oral presentation on their chosen topic, based on the article they had written for the online journal. All students were expected to read and consider the issues presented in the relevant articles each week so that they came to the seminars informed and prepared to contribute to the discussion. The different learning activities were reflected in the four pieces of assessment (Table 3):

Item	Task	Due	Weight
ITN338.1	Journal article	Weeks 5 -13	50%
ITN338.2	Oral presentation	Weeks 6 -13	25%
ITN338.3	Peer review of journal articles	Weeks 8 -13	15%
ITN338.4	Reflections on editorial role	Week 13	10%

Table 3. Schedule of assessment

The academic staff hoped that the assessment activities would not only drive student learning, but would also encourage students to take responsibility for managing

their own individual and collaborative learning activities to achieve the desired learning outcomes. The online journal was therefore central to learning and assessment in this unit, as illustrated in the diagram below:

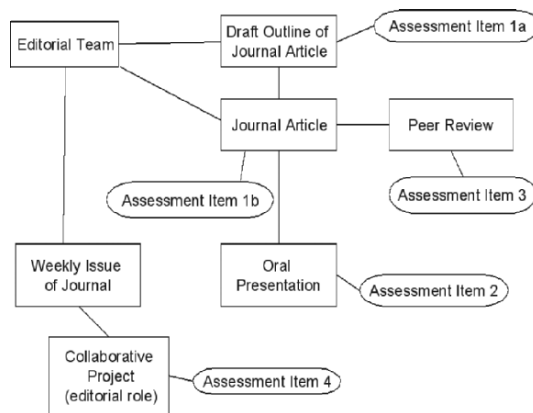


Figure 1. Diagram of assessment activities

The journal article itself (ITN338.1) was weighted at 50% of the total assessment, as it was regarded as the key independent learning activity with the emphasis placed on researching a topic of current interest. Some sample topics were provided, but students were encouraged to select an issue that they personally wished to examine. It should be noted that the actual research skills that underpin the development of the journal article represent a critical dimension of the successful library and information professional. As effective planning for the discrete issues of the online journal would contribute significantly to its success, the draft outline had a 5% weighting of its own, to ensure students do submit this promptly.

To help students engage with both the learning activities and the CRA assessment process, it was decided that the assessment criteria for one assignment, the peer review process, would be developed collaboratively by the students and academic staff as part of the workshop program. Claxton (1995) supports the idea of student involvement in negotiating or determining the criteria for an assessment task, as "here students are experiencing a greater degree of trust and responsibility, and can be helped to experience and to understand for

themselves what some of the difficulties are for designing forms of evaluation that are valid and fair" (p.342). Involvement in the development of assessment criteria enables students to learn about the assessment culture of higher education (Race, 2001), which in turn may be applied in the increasing role of library and information professionals in the delivery of formal and informal learning programs.

The personal philosophies of learning and teaching that underpin the approaches to assessment in ITN338 recognise that appropriate assessment design is crucial for effective learning. The goal to achieve an integrated set of assessment tasks finds resonance with Bowden and Marton (1998) who believe that "an integrative approach to assessment" (p.162) plays an important role in driving the teaching and learning process.

The creation of the right assessment culture is an important element in ITN338, reflecting the views of Zessoules and Gardner (1991) to strive to nurture complex understanding, to develop reflective habits of mind, to document students' evolving understandings and to make use of assessment as a moment of learning. Such an assessment culture "has the potential to accommodate fuller, more dynamic evaluations of student understanding, because it has the power to integrate assessment with learning and instruction" (p. 61). As postgraduate students, the GDLIS students generally establish their own clearly defined goals for learning and respect a number of core attributes in their assessment tasks:

- Unambiguous expectations
- Authentic tasks
- Choice and flexibility

The interest in 'negotiated assessment tasks' is viewed by Centre for the Study for Higher Education (CSHE, 2002) as "a natural extension of the trend towards offering students more flexible ways of studying and more choice in study options" (p.10). The assessment strategies in place in ITN338 certainly aim to support students to study more effectively by helping them arrange their timetables for submitting assessable work to suit their overall workload. This approach, plus the encouragement to engage with the curriculum itself, "should assist them to become more autonomous and

independent learners" (p.10).

With the strong emphasis placed on assessment activities which focus on student learning, it is important to acknowledge the students' own different motivations for learning and the individuality of desired learning outcomes. Sullivan and Hall (1997) highlight the student-orientation of a number of significant approaches to teaching and learning, such as experiential learning (Kolb, 1984), open learning (Rowntree, 1992), problem-based learning (Boud, 1985), action learning and action research (Zuber-Skerrit, 1990), and personal reflection (Schön, 1987). Sullivan and Hall (1997) stress that these approaches are valuable in motivating student learning, and self-reflection on learning, by providing the opportunity to stimulate interest, thinking and involvement. While the subject matter is not ignored, student learning needs become the principal focus so that students can apply their learning in different situations.

The QUT Assessment Policy (2003) highlights the value of self- and peer-assessment to support students in the process of making evaluative judgements about their own work and to encourage students to consider their own achievements in their academic work. Race (2001) notes that self-assessment can be especially valuable when reflective practice supports the personal understanding of learning goals and learning outcomes. It is argued that students spontaneously undertake self- and peer- assessment, so that academic input into the process supports a deeper learning experience, together with the development of skills which will be of ongoing value for performance appraisal in the workplace. A further dimension of self-assessment in ITN338 is encouragement of the graduate's engagement in lifelong learning activities. The ability to identify one's own need for continuing learning as part of career-long development will support personal and professional growth and, given the dynamic nature of library and information work, is especially important for information professionals in the 21st century.

6. Evaluation of the pilot project

As noted in Section 4 of the paper, the pilot project was evaluated from a number of angles: the student evaluations through SETs and SEUs, the survey to seek students' responses to the integrated assessment process and the interview with the sessional teacher.

SEUs and SETs are part of the quality assurance process at QUT, offering a common approach to evaluate of teaching and study programs across the university. The instrument used in ITN338 comprised twenty questions, with ten focusing on the curriculum, learning activities and learning materials, and ten focusing on the academic staff member's approaches to teaching and her support for learning. Students were asked to indicate the level of agreement with the given statements using a five-point Likert scale (strongly disagree/disagree/ neutral/ agree/strongly agree with an option for NA (does not apply).

Two questions sought student responses about the intellectual focus of the unit and the learning objectives:

- I understand from the unit materials (e.g. unit outline, study notes, OLT materials, handouts etc.) what learning and skills I am expected to learn by studying this unit.
- The topics and content of this unit are clearly related to what I am expected to learn.

Four questions dealt specifically with items of assessment:

- I understand the requirements of the overall assessment program (e.g. minimum unit requirements).
- The assessment tasks are clearly related to what I am expected to learn.
- I have been provided with guidelines or criteria which give me a clear explanation of how individual assessment tasks will be marked.
- The teacher gives me feedback that helps me improve my learning.

17 of the 36 students enrolled in the unit completed the SEU/SET, a response rate of 42.5%. The responses to the questions on assessment were consistent, with

the majority of students strongly agreeing or agreeing with the statements. While 94% of respondents agreed or strongly agreed that they understood the learning objectives, the lower figure of 76% felt that the topics and content had actually achieved these goals.

94% of students agreed (59%) or strongly agreed (35%) that they understood the requirements of the overall assessment program. Only one student (6%) disagreed and two students (12%) were neutral about the assessment tasks being clearly related to what they were expected to learn and that they had been provided with guidelines or criteria that clearly explained how individual assessment tasks would be marked. Responses to the questions about valuable support from the teacher through the feedback provided were also positive (88%), with 47% agreeing and 41% strongly agreeing. It is felt that a major shortcoming of the current SET/SEU practice at QUT is the condition of 'surveyitis' suffered by students, with the result that while they complete the quantitative measures on the survey instrument, there is little interest in providing qualitative feedback.

The separate survey instrument was therefore designed to capture more qualitative data about the students' experiences with the concept of integrated assessment tasks through the process of creating an online journal and the level of satisfaction with CRA in the pilot project. Basic demographic data was collected about the students' gender, age and enrolment status, which potentially allowed some correlation with data collected at other stages of the course. Again using a five-point Likert scale, students were asked to indicate the level of agreement with a number of statements. Each question also had space for students to provide comments about their response. The questions about the process of developing an online journal included:

- The process of creating an online journal was a valuable learning experience.
- The process of creating an online journal helped me develop an understanding of the discipline content of the unit.
- The OLT environment facilitated the development of the online journal.
- The process of learning to produce work in the genre of a journal article was a valuable experience.

- The process of peer review was a valuable learning experience.
- This unit has encouraged me to consider writing for professional publication in the future.

Responses to these questions are presented in Table 4. The following abbreviations are used:

SA	Strongly agree
A	Agree
N	Not sure
D	Disagree
SD	Strongly disagree

	SA	A	N	D	SD	% suppt
Process of creating online journal was valuable	7	14	0	1	0	95%
Process helped me understand discipline content	3	11	1	6	1	64%
OLT facilitated development of online journal	1	6	7	5	3	32%
Learning to write in genre of journal article was valuable	10	10	2	0	0	91%
Peer review process was valuable	9	9	3	1	0	82%
Encouraged to write for professional publication	4	7	9	2	0	50%

Table 4. Responses to questions about developing the online journal

The process of creating the online journal was seen by students as a positive approach to learning:

"The process was challenging, yes, but a very valuable experience"

Only one student did not find the process a valuable experience. One third of students stated that the process did not necessarily help them understand the discipline content of the unit. However, as the comments provided by several of these students indicated that the process of research and writing the article for the journal was indeed valuable as a way to learn about the discipline content of the unit, it was felt the wording of the question could have been improved to more clearly state what was meant by 'the process of creating the online

journal'. A couple of students who did not find it an effective learning process indicated that they did not like the content of the unit being developed by the students themselves, as they felt it lacked authority. Students had grave concerns about the value of the OLT system as the medium for publishing journal, with many of them expressing their dissatisfaction with the system. These concerns reflected the technical difficulties experienced at the beginning of the semester which presented the teaching staff with immense challenges to achieve the desired outcomes of publishing to the online system.

91% of the students appreciated the opportunity to write in the new genre of a journal article, resulting in 50% of the students agreeing that they would consider writing for professional publication in the future. Some students specifically appreciated the need to adapt the written article for an oral presentation:

"Having to prepare the material for different forms of communication made it a more valuable learning experience"

As a further 40% were unsure, the idea of writing for publication and for conference presentations could be taken up as career development activity to foster greater interest amongst library and information professionals.

The peer review process was also well-received, with 82% finding it a valuable process. Comments indicated, however, that the scheduling of the peer review activities needed to be improved, but the timeframe of the semester presented logistical problems. The academic staff would welcome a collaborative partnership with another institution teaching in the same field, to provide a more objective and anonymous approach to peer review. Nevertheless, overall it was felt that the process of learning through writing a journal article was successful, but that there was a definite need to improve the strategies for publishing the product itself.

The questions about the use of CRA in the unit were:

- Criterion referenced assessment helped me understand what I was required to do for the assignments.
- Criterion referenced assessment helped me

understand the strengths and weaknesses of my work.
 · I found the level descriptors for each criterion clear to understand so I could relate them to my own work.

Students were also asked if they had used CRA for assignments at other stages of their university studies, with the opportunity to comment on the perceived value of CRA as an assessment tool. Two additional questions asked about the overall level of satisfaction with CRA in the unit and whether CRA should be used in more units at QUT. Twenty-two students returned the questionnaire, representing a response rate of 61%. While 86% of the students agreed or strongly agreed that CRA had helped them understand what they were supposed to do for the assignments, some concerns were expressed about whether the process actually helped them understand the strengths and weaknesses of their work. The responses to the questions about CRA are presented in Table 5.

	SA	A	N	D	SD	% suppt
CRA helped understand requirements	6	13	2	1	0	86%
CRA helped understand own strengths & weaknesses	4	11	4	3	0	68%
Clear level descriptors	3	13	6	0	0	73%
Satisfaction with CRA in ITN338	3	13	4	1	1	73%
More units should have CRA	1	14	7	0	0	68%

Table 5. Responses to questions about CRA

14 students (64% of respondents) had been exposed to CRA in earlier studies. These students highlighted the value of CRA in articulating what was expected of them in the assessment tasks, and the grade they could anticipate achieving. A number of students felt that a rudimentary form of CRA had been used in other units of the course, to give students a good idea of what was being assessed in the assignments, and that they were used to this approach. This was the first time that the level descriptors had been presented as a complete CRA matrix. One student indicated that the relative clarity or fuzziness of the criteria remained an important issue for them, but felt the wording of the criteria in ITN338 was clear and logical. Students felt it helped them better understand the feedback provided by the teacher, as well as serving as a stimulus for their own self-

reflections on learning.

The comments provided by the students were valuable in developing a better understanding of their experiences with CRA. Positive comments about the value of CRA included:

"It gave me an indication of what is being assessed and how I should concentrate my efforts"

"Having designed/used CRA for many years, it was invaluable in helping me determine requirements"

"After you got received your grade back, the criteria were helpful in judging what the marker has assessed"

"The criteria served as a stimulus to the reflections on my learning"

Students who responded negatively to the CRA process expressed their concern about the "amount of assessment" rather than about the "process of assessment". One student apparently did not relate to the concept of CRA at all. In responding to the questions about CRA helping understand assignment requirements, the student commented:

"This alarms me as I have no idea to what this refers"

To the question about the clarity of the level descriptors, the student declared:

"Oh dear - what have I missed here?"

While this feedback was an isolated incident, given the amount of discussion in class about the pilot project itself as part of the Teaching Fellowship, and the description and rationale presented in the study guide, it is interesting to find the student had "missed" it all.

It was found that, overall, the students responded positively to the use of CRA in the unit. While there were a few concerns about some perceived discrepancies with the criteria, the feedback helps the academic staff scrutinise the wording of the criteria and to consider how to reduce the fuzziness and enhance the clarity of

the standards of achievement.

The interview with the sessional staff member offered the opportunity to consider the value of CRA from the perspective of the educator. Benefits were identified for the teacher in the classroom as well as in the marking of assignments. The criteria sheets themselves provided opportunities to focus on the work to be completed by the student in the individual assessment items and to stimulate classroom discussion on the assessment product within the context of the learning process. The range of criteria across the different assessment items encouraged discussion about desired learning outcomes across the spectrum of discipline knowledge and generic capabilities. The fact that students had considerable choice in selecting a topic for their journal article meant that the criteria in themselves offered common ground for exploring the expectations of students in their assignment work.

The semi-structured interview with the sessional teacher focused on four key questions to explore how it felt to have marking criteria to guide the marking process; what the actual marking process was; whether there was a need to deal with student queries as a result of the marking criteria; what changes should be made to the marking criteria. The sessional teacher found that the CRA process supported her own learning as a new lecturer, helping her to better understand the process of marking assignments and to develop her own confidence in assessing the work of others, particularly in terms of accountability, by being able to align her "gut instinct" with "professional judgement". The level descriptors made it easy to identify the relevant grade for individual pieces of work and to justify the marks or grades awarded, so that the marking criteria provided firm support for the "fairness" in the decisions she made. She felt it was very important to discuss the criteria with students early in the semester to ensure that the assessment process, the desired learning outcomes and the expectations for academic standards were clearly understood.

Generally speaking, academic staff have found that CRA reduces the number of challenges to assessment, i.e. students questioning the marks and grade awarded for a piece of assessment. In ITN338, there was only one incident of the marks being challenged, which was

resolved satisfactorily through a discussion of the stated criteria for examples of the practical application of the theories presented, which had not been addressed in the student's work. The sessional teacher concluded that she had found using CRA in the unit a very positive experience that had helped her own professional development.

7. Conclusions

In the pilot project of ITN338, assessment was used as the central learning activity in the unit, with CRA introduced as a part of the consciousness-raising activities in the implementation of the new assessment policy at QUT. Carlson et al. (2000) stress that development of assessment criteria and standards is an evolutionary process and subject to ongoing modification to improve wording or to increase the level of detail. The preliminary work undertaken in the pilot use of CRA in ITN338 is evidence of this iterative process. The diverse assessment criteria in the criteria sheets for the different pieces of assessment (written work, oral presentations, collaborative editorial work and self-reflection) are currently being reviewed. They have contributed to the development of further examples or models that illustrate the range of quality and acceptable performance across diverse learning activities in other units in the Master of Information Management. The goal in the current academic year is to develop a bank of criteria which can be applied in a range of different assessment situations. This will not only serve to strengthen the shared understanding of CRA amongst the academic staff, but also to strengthen the shared understanding of teaching and learning approaches across the course.

The pilot project has successfully shown that students respond well to the transparency, accountability and fairness in assessment processes that CRA can provide. Further research is required, however, to consider the extent to which CRA is able to improve student learning. As one student commented:

"I can generally assess my work according to the criteria, but specifically determining the strengths and weaknesses of my own work is difficult"

Race (2001) draws attention to the fact that the increased emphasis on quality assurance and academic review, through the Australian Universities Quality Agency (AUQA) or the Quality Assurance Agency (QAA) in the UK, expressly seeks to define the linkages between assessment activities and learning outcomes, so that the student can clearly understand the relationship between the curriculum itself and their new understandings. It is important for academic staff to work with students to consider evaluation strategies which will help explore the validity of CRA in practice, for example to develop a better understanding of student learning outcomes through assessment; to determine the extent to which CRA specifically can produce 'better' learning outcomes; and to consider the potential relationship between CRA and the motivation to learn.

Student-centred assessment, criterion referenced assessment, authentic assessment and self assessment are critical issues in the current debate on assessment in higher education. The approaches to assessment in the unit ITN338 reflect the overarching guidance provided by the Centre for Study in Higher Education (CSHE) (2003), aiming to set clear expectations for students, with a reasonable and focused workload, and allowing students to monitor their performance and receive feedback. Most importantly, the assessment activities themselves are authentic in so far as they focus on the complexities of performance in the real world, not on the reproduction of standardised learned facts. The assessment process for ITN338 Information Resource Provision aims to be comprehensive, valid and fair. By making assessment central to, and driving, the learning activities through the creation of an online journal, it was hoped that the students would be able to blend process with product, so that their studies offered an interesting and engaging journey towards the development of skills and knowledge that will be of ongoing value to them in their dynamic and diverse careers in the library and information profession.

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Challenges in Assessments in a Case-Based Science Course

Carmel McNaught

Paul Lam

Centre for Learning Enhancement And Research

Daniel Ong

Leo Lau

Department of Physics

The Chinese University of Hong Kong, Hong Kong SAR, China

Our experience in a case-based science project at a university in Hong Kong highlights the need to go beyond the design and implementation of case-based teaching to have a strong focus on assessment. Traditional assessment is not compatible with the constructivist nature of this new (to Hong Kong) approach to teaching and learning. This paper reports the process of changing the assessment strategies in a Year 1 Surface Science course held in the second term of the 2003 — 2004 academic year at The Chinese University of Hong Kong. The case-based course and the assessment strategies were evaluated using a range of data from the students and the teachers — surveys, focus groups, the Study Process Questionnaire, performance measures and teacher reflections. While the course and strategies were successful in many aspects, the student and teacher workload was high. Modifications are suggested for future work with case-based learning and assessment.

1. Background

A case is a story, often told as a sequence of events in a particular place. Often, there are human actors woven into the case story (Shulman, 1996). A case-based approach emphasizes the active construction of knowledge gained from simulated experience. Cases should provide clear contexts in which learners can construct meanings and concepts; Morrison (2001) calls this 'actionable learning'. The context of a case is intended to enable students to put themselves in the role of being an actor in the situation; in this way they are more likely to be engaged in the learning and try to relate what they are learning to previous experiences. Cases may also help learners to develop problem-solving skills and collaborative skills that are recognized as key outcome skills that students will need in their future professional lives (Morrison, 2001).

Shulman (1996) provided a long list of potential benefits for case-based teaching and learning. For example, cases may: aid in teaching principles or concepts of a theoretical nature by showing the occasions when the theories are applicable; illustrate the precedents for practice, in abstract and context-dependent issues such as morals or ethics; train students in analytic strategies and skills; and increase students' motivation for learning. In addition, Harrington et al. (1996) remarked that teachers would also benefit from taking a case-based approach to their teaching as they have a chance to reflect upon the learning process when they write and introduce the cases in their classes.

Much attention has been paid to the pedagogy, while comparatively less interest has been shown in the assessment of case-based courses. This is problematic as assessment is often the key to the overall success of any teaching innovation, as assessment has a marked effect on how teachers teach and students learn. This is often termed 'the backwash effect', e.g. Elton (2002). For example, a poorly designed or implemented assessment has the danger of wrongly focusing students' attention onto surface learning skills such as rote memorization, and so diluting or even ruining the whole purpose of the case-based approach.

Traditional forms of assessment are not compatible with the overall constructivist nature of the case-based

approach of learning and teaching. As Figure 1 summarizes, the case-based approach has characteristics that include: students taking a more prominent role in the classroom, teachers emphasizing both the learning process and the product, and teachers paying attention to both students' individual and in-group performances. However, traditional assessment has teachers playing the key role, with the predominant mode being the grading of students' products in testing situations where students usually work alone. Thus, the learning process is not included in the assessment scheme and this de-emphasizes the process elements of such attributes as problem-solving, team work and communicative competence.

Employing traditional assessment in classes where the case-based approach is adopted is counter-productive. Some students who sense this limitation of traditional assessment will be de-motivated to contribute to group activities.

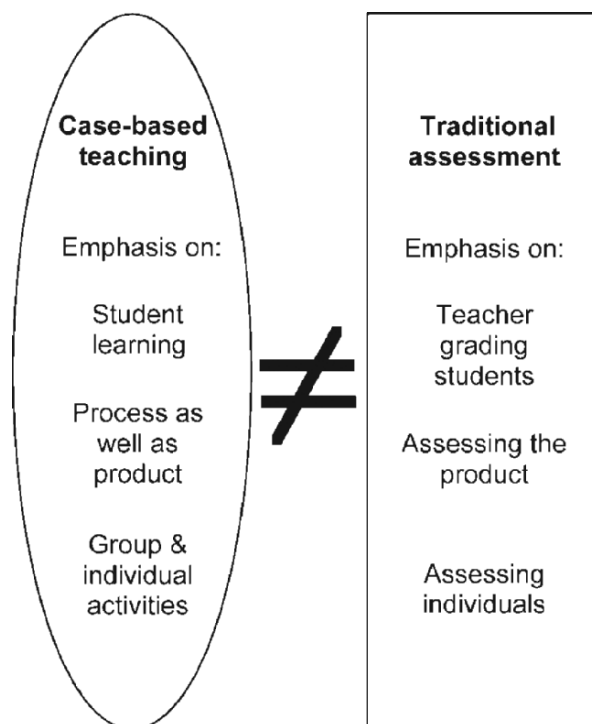


Figure 1. Mismatches between traditional assessment and the case-based approach

An ideal assessment design for case-based courses should match the constructivist nature of the case-based approach. As illustrated in Figure 2, the assessment process should allow students to play a more prominent role in the design of assessments and encompass a wider range of student performances. With case-based assessment, emphasis is also put on monitoring students' process in completing the case-based activities, rather than on the products alone. The 'new' assessment requires students to demonstrate competence across a range of learning processes and learning skills, such as information searching, working in groups, and making presentations, which are often not required in a traditional course.

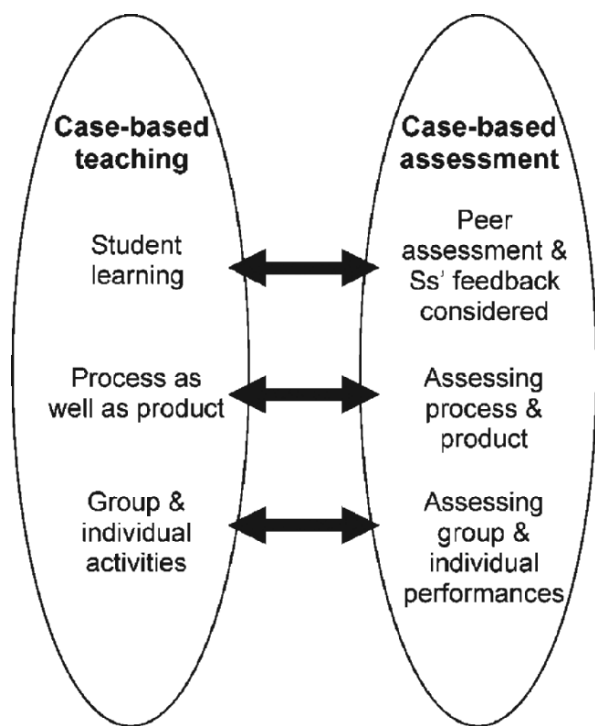


Figure 2. Making assessment and teaching match in the case-based approach

The present paper describes an endeavour to implement these changes in a case-based course, included in a project designed to introduce the case-based approach to the teaching of university science. The focus of the paper is on the design of this case-based assessment, rather than on the design of the cases used in the course. The case-based course and the assessment strategies were evaluated with data from both the students and the teacher.

2. The course and the assessment strategies

This study is part of a three-year project that began in the year 2002 aimed at implementing a case-based approach to teaching and learning in a selected set of science courses in Hong Kong universities. As using cases to teach science subjects is a relatively new idea in Hong Kong, the project began by writing cases suitable for the context using industrial research data gathered in the Advanced Surface and Materials Analysis Centre in the Department of Physics at The Chinese University of Hong Kong (CUHK). Then, a number of trial runs were carried out on various undergraduate and postgraduate courses in the Material Science stream of the Department (six case-based courses have been completed thus far). Earlier work on the project is reported in McNaught et al. (2005).

As the project progressed, it became apparent that we needed to focus as much attention on the design of assessment as we were on the writing of cases. This paper reports one of the project's attempts at designing and implementing case-based assessment in a case-based Year 1 Surface Science course held in the second term of the 2003-2004 academic year at CUHK. There were 22 students on the course which was separated into two main phases. The first phase used a group-based peer teaching strategy in which the students were required to take part in some cooperative learning activities, centred around four important topics of the subject. The students self-studied material, discussed the concepts in their own small group and then taught their classmates. They were provided with readings and a detailed study guide in order to scaffold (e.g. Jonassen, 1999) their learning. This first phase was seen as formative, and the presentations were set as important 'practice'.

The second phase of the course involved the introduction of a Materials Science case. Students discussed in groups, searched for information, made decisions concerning the problems posted in the case, and lastly presented their ideas to the whole class. There were thus two rounds of class presentations. However, the assessment for the course was focused on the second phase where the case was analysed and presented.

Care was taken to implement the assessments for this Year 1 course in ways that matched the overall case-based approach such that the assessments: shifted from being solely teacher-centred to actively involving students' contributions; had a mechanism to distinguish not only group but also individual performances; and were able to monitor students' capabilities in a range of learning processes and skills.

In order to achieve these aims, the following strategies were implemented. To encourage student contribution to the assessment, all assessment criteria were laid down at the beginning of the course and a briefing session was held to introduce and clearly explain the format of the course and the relatively complicated assessment model. Students were asked to comment on the assessments. Their feedback led to refinement of the format and timetabling of the assessments. All cases were coupled with very clear statements of requirements followed by a detailed marking scheme as a result of the students' opinions. Students' contribution was also seen in the peer-assessment activities introduced to the course: group members graded each other, based on their participation and contribution within the group.

To enact a mechanism which distinguished not only group but also individual performances, the teacher of the course introduced consultation sessions in which he monitored individual performances. There was a course-end examination testing knowledge that the individual students learnt both from doing their own projects and from their peers through their presentations. There was also peer feedback of contributions from individual members in a group. The group performance was monitored by group presentations and reports.

To monitor students' capabilities in a range of learning processes and skills, the grades were not only allocated to the products, but were also allocated to the intervening processes. The teacher monitored the abilities of the students in understanding the issues in the case, generating a hypothesis on their own, and searching for information in the early consultation sessions in which he met each of the groups in turn. He then monitored the groups' group-working skills, problem-solving abilities and the knowledge they learnt in the classroom activities when he gave time to the

students to have group discussions in class. Lastly, analytic skills and presentation skills were demonstrated on the occasion when the students presented their solutions to the cases at the end of the course.

There was a careful record kept of each interaction between the teacher and students, and detailed mark sheets were maintained.

The course-end examination was also changed to cope with the case-based nature of the course. The teacher had deliberately included more demanding questions that called for understanding of a situation, application of theories and concepts, and solving problems.

	Beginning	Middle	End
<i>Typical processes/skills</i>	Understanding of the issue. Generating hypothesis. Information seeking	Group-working. Problem-solving. Knowledge acquired	Presentation. Clarity of thoughts. Practicality of solutions
<i>Group performance (Teacher assessor)</i>	Early consultation sessions*	Classroom observations* (*total 10%)	Presentation marks (30%)
<i>(Peer-assessor)</i>	–	–	–
<i>Individual performance (Teacher-assessor)</i>	Q&A in consultation*	–	Exam marks (50%)
<i>(Peer-assessor)</i>	–	Comments on others' contribution (5%)	–

Table 1. Assessments designed for the case-based course

The assessment mechanism is captured in Table 1, which shows the various assessment methods (teacher-grading or peer-grading) employed in the course to monitor both the group and the individual performances.

Multiple sources of data were used to evaluate the course, as illustrated in Figure 3 (after the model of Lam

& McNaught, 2004). The data covers feedback of both the teacher and students, as well as the performance of the students.

The teacher data included collection of the teacher's reflection and discussions with other research members during observations of the class in action. The student data were rich. The revised two-factor Study Process Questionnaire (SPQ) was used (Biggs et al., 2001); in this version, the achieving scale of the first version (Biggs 1987) is incorporated into the deep scale. The SPQ is a 20-item questionnaire which provides a measure of students' approaches to learning on two scales (surface and deep). The SPQ was administered twice: once at the beginning of the course and again at the end, to monitor changes in learning motivation and strategies. Written surveys were also administered once in mid-term (response rate 85%) and once at the end of the course (response rate 95%) to collect students' opinions on the teaching and assessment approach. The mid-term survey had 15 Likert-scale items and three open-ended questions and was administered at the end-of March, 2004, in class. The main focus of this survey was the first phase of the course about self-studying and peer-teaching. The course-end survey consisted of nine Likert-scale items and four open-ended questions. It was administered at the end of April, 2004, and focused on both the case-handling experience of the second phase and students' overall comments on the whole approach used in the course. A one-hour focus-group meeting was held with 13 randomly-selected students from the course to discuss their feelings towards it. Lastly students' performance data were also collected. Marks were obtained for: students' presentations, case reports and final examination results.

The evaluation looked at the appropriateness of the new assessment strategies, as well as the performance of the case-based approach in supporting students to attain the desired learning outcomes.

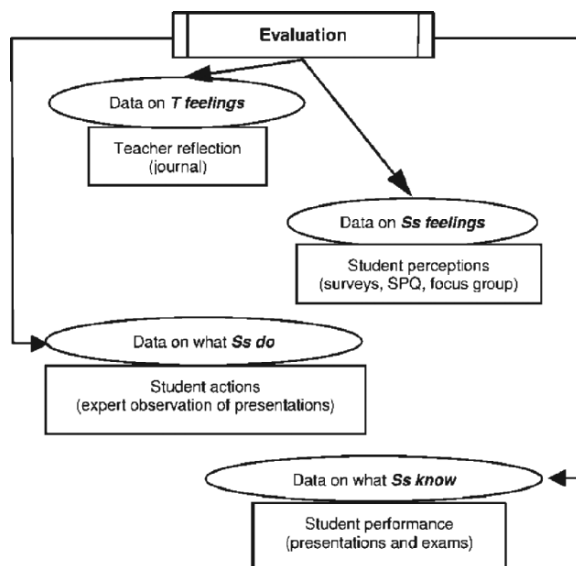


Figure 3. Evaluation data types

3. Findings and discussion

3.1 On the design of the assessment

Overall, the design of the assessments seemed to have strengthened the students' motivation to learn beyond the basics of the subject area. The teacher reflected that he noticed great enthusiasm on the students' part when they did self-study and also when they prepared for the case; this was considered to be the result of the fact that the course emphasized the monitoring of the different stages of the students' learning process.

The shortcomings recorded, however, included that the teacher had a much heavier workload, and that the students were unsure about the limits of their knowledge exploration before they could claim that they had fulfilled the course's expectation.

Comments on the individual assessment strategies collected from the surveys and the focus-group interview were: concerning the *early consultation sessions*, the teacher thought that he was successful in recognizing

the self-study, group-working and problem-solving difficulties of the students before it was too late but the practice "doubled or even tripled the workload". The students felt that they actually progressed a great deal in both knowledge and learning skills through the consultation sessions and they felt "a learning curve is drawn".

Concerning the *classroom observations* which were designed to rate students' abilities to participate in group discussion and give effective presentations, the strategy was considered to be of high value. The physics teachers and the educational observers could easily identify evidence of good group-working and presentation skills, and they also found they gave quite high ratings to these skills.

The *presentation and reporting assessments* were considered fair by the students but they were less certain about how much they actually learnt from the presentations of other groups. Students thought it fair that there were strategies to track individual performances rather than assigning the same marks to all members in the same group. Individual performances were distinguished by the teacher's paying attention to individual performances in consultation sessions and in presentations, and students giving peer comments at the end of the course to rate group members' contributions. One student remarked "I can learn from others through peer-commenting". The teacher, however, remarked that the students were still not very comfortable in criticizing each other and they "gave each other very similar marks". However, when considering how much students felt they learnt from the presentation sessions, there was only some agreement with the statement in the mid-term survey that "listening to the other groups' presentations is an effective way of learning" (students: mean score = 2.84) (5 = strongly agree, 1 = strongly disagree) on all questionnaire items).

Lastly, concerning the *course-end examination*, the teacher was pleased that he had put effort into diversifying the nature of the questions in the paper so that many of the questions reflected the thinking skills the students had been trained in through the case-based activities in the course. As a result, questions not only required students to simply remember or understand concepts, but also to apply them, use them to analyse

new situations and data, synthesize a number of ideas in order to solve problems, and evaluate strategies (Bloom's taxonomy: Bloom, 1956; revised Bloom's taxonomy: Krathwohl, 2002). Examples of the examination questions are in Table 2. Students were told that the case-based learning activities and the examination would be closely related and, naturally, this contributed to an increase in students' motivation in going through the various non-traditional case-based activities in the course.

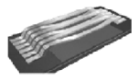

Level	Example questions
Application/ analysis	<p>Describe the procedures of making the following 3-D structure:</p>  <p style="text-align: center;">Example Poly-Si beam process sequence</p>  <p> <input type="checkbox"/> Si <input checked="" type="checkbox"/> Phosphorous glass <input type="checkbox"/> Polysilicon </p> <p style="text-align: right;">PSG= Phosphorous Silicate Glass (a CVD oxide)</p>
Synthesis/ evaluation	<p>A solder interface is being examined by Auger electron spectroscopy (AES) and X-ray dispersive spectroscopy (EDX). Which technique can provide information whether there is an intermetallic formed? Why?</p>

Table 2. Sample higher level examination questions

3.2 On the overall case-based approach

The data collected showed somewhat encouraging results concerning the overall case-based approach. It was found that many students (but no means all of them) were satisfied with the skills acquired from the activities. For example, 37% and 53% of the course-end survey respondents agreed that the activities had improved their "problem-solving skills" (mean score = 3.21) and "presentation skills" (mean score = 3.53), respectively. Also, it was stated in the focus-group meeting that this course related more to real-life situations and this was good for students. Furthermore, during the presentation sessions, several observers joined the class and found that most of the students were able to work well in groups (indicative of enhanced team-working skills) and they were able to speak in public (presentation skills).

Concerning the potential for learning brought by the new method, students were guardedly positive. Students

generally agreed to the statements in the course-end survey "I learned a lot more about the theories and concepts of materials science by going through the cases" (mean score = 3.62) and "I learned much about how to apply materials science theories and concepts to solve real problems by going through the cases (mean score = 3.43). Also, more than 80% of the survey respondents claimed that they needed to have significant periods of self-studying in order to work effectively on the cases (mean = 4.00). This indicates that students were motivated enough to be willing to spend time to learn. Furthermore, more than 60% of the respondents agreed that "I learned more by going through the cases than I could have learned if the course had been conducted in a traditional format" (mean score = 3.57).

In the focus-group meeting, most of the students expressed the belief that they got a deeper understanding of their presented topic because of the required peer teaching; they needed to know more in order to present their points and teach their peers. Note that this is in contrast to their limited enthusiasm for learning from other groups. Overall, students felt they learnt from self-study, group discussion and actual presentation about their given topic or case but were less sure that they learnt from others. This does support our belief that learning requires active student engagement and 'second-hand' learning is not as effective.

At the end of the focus-group meeting, students were given three options on improving the course and they were asked to vote. They were asked to vote concerning the types of course design they would like to see if they were to take this course again. The three options the students considered were: 1) keep the course similar, but increase the credit of the course; 2) keep the self-study and case-related parts, but include some lectures at the beginning of the course to talk about basics, and also increase course credit; and 3) revert to lecture-based and traditional design. Most students voted for the core elements of the case-based teaching to retain. Details of the vote are in Table 3:

<i>Model</i>	<i>Number of Students</i>
1. Similar design + increased credit	2
2. Lecturing for basics + self-study + case + increased credit	9
3. Traditional	2

Table 3. Results of the votes to continue the case-based approach in the future

A positive effect on learning outcome was also evidenced by an analysis of students' learning outcomes on the final examination. The analysis was conducted based on Bloom's Taxonomy: the questions in the final examination were grouped into three different categories, according to their levels of cognitive reasoning required. The three categories are: 1) knowing/ comprehending, 2) applying/ analysing, and 3) synthesizing/ evaluating. The classification of the questions was checked by fellow physicists and a science educator.

As shown in Figure 4, students performed quite well in the first and second category, with an average percentage score of 79.7 and 81.0 respectively (where 100 represents full marks for that category of question). They even achieved higher scores in the second category than in the first category questions. This fact surprised the authors and the teacher as first-year students were previously recognized as not particularly strong in tackling problems that require application of theories and analysis of situations and data. The data seems to suggest that the cases might have some positive influence on the students' ability to tackle more difficult questions. The fact that students achieved 67.5 percent of the possible marks on the very complex questions in the section is also pleasing.

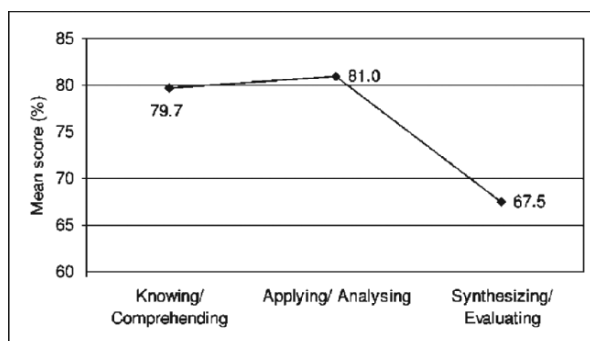


Figure 4. Students' performance in examination questions that require different levels of understanding

Despite the promising results portrayed above, evaluation also showed areas of concerns and possibilities for improvement. On the whole, students found the workload too harsh for this one-credit course. [Students in the first year typically take around 15 credit points each semester.] Students were required to work on the task without much prior knowledge on the topic. From the mid-term evaluation survey data, more than 60% of the respondents disagreed that "the workload of the Cooperative Learning Activities is manageable" (mean score = 2.21). In the course-end survey, more than 30% of the respondents "strongly disagreed" with the statement "I found completing the cases enjoyable" (mean score = 3.29).

The SPQ data indicate the pressure students were under as well. The results are in Table 4. The students' deep approach scores increased, though not significantly. Their surface approach scores, however, increased more and this increase was statistically significant. Given the other data, we have about student's engagement in the course, our interpretation is that the workload pressure caused the students to feel they were attempting to 'cut corners' in the work they did.

Approach to learning		N	Mean	Std. Deviation	t-test result*
DA	pre	22	29.77	4.72	N.S.
	post	21	30.67	4.90	
SA	pre	22	26.50	4.90	S.
	post	21	30.95	5.64	

Table 4. SPQ data

* It is best to use paired-t tests in this situation. However, we did not have paired data and the less powerful individual t-test was used. N.S. - not significant. S. - significant difference

4. Conclusions

Taking the whole course into account, although the data do indicate a number of challenges, we still have a picture that shows the potential of case-based learning and we certainly had some significant achievements.

In particular, the attempt to match the assessment strategies with the constructivist characteristics of the case-based approach seemed to be a success: 1) students were able to contribute to the assessment (giving comments on assessment strategies and commenting on their peers' performance); 2) the assessment that considered both students' learning process and products ran smoothly and seemed to have promoted students' interest and motivation in the activities; and 3) the attention paid to distinguish individual performances from the group performances was also worthwhile and well-appreciated by the students and teacher.

There was more learning within groups than between groups in both phases of the course. While this does not surprise us, it does create challenges for designing learning tasks so that students not only learn some material in depth but also gain an adequate coverage of course topics. The balance between a totally case-based course and one which is a hybrid of self-learning, case-based tasks and conventional lectures seems to be an appropriate design model, and one we will adopt for our future courses.

The major problem, though, in this course was the workload on both the students' part in completing the many demanding activities, and on the teacher's part in paying attention to the numerous aspects concerning the learning process and products in the various stages of the course. It is clear that case-based courses take time and this factor needs to be reflected in the credit allowance for students and the teaching load allocation for teachers.

In summary, the study has collected ideas for future adjustments in design. It is clear that a hybrid lecture-with-case-based model seems to be more suitable to the Hong Kong context. It also seems that even more guidance should be given to students to help them understand the expected learning outcomes of all the individual activities of the course, so as to help them self-monitor their progress.

Building a culture of active, student-centred science classes in Hong Kong universities will take time. Case-based assessment strategies will be integral to that endeavour.

Acknowledgement

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The Impact of Innovative Assessment Practices on Students' Learning

Rosario Hernández
Hispanic and Lusophone Studies
School of Languages, Literatures and Film
University College Dublin, Ireland

The aim of this paper is to present an evaluative study of the impact of innovative assessment practices on students' learning. The substantiating evidence has been drawn from the author's academic practice of teaching Spanish as a foreign language to university students. This study shows that innovative assessment practices allow learners to demonstrate a wide range of knowledge and skills while more traditional methods may prove more restricted. However, the success of innovative assessment methods towards the enhancement of students' learning is not always guaranteed. As this study shows, good channels of communication between teacher and learners, and the building of trust between those involved are some of the pedagogical implications that arise when adopting innovative assessment.

1. Introduction

Innovative assessment can be understood in two ways, namely, a) if it is considered new in the context where it is adopted, and/or b) if it tries to do something different (McDowell, 2001). From the first perspective, new forms of assessment can be regarded as innovative when they are an alternative to assessment methods used before. On the other hand, traditional methods can be innovative if there is a shift in their purpose. Other terms used to refer to innovative assessment are 'alternative' or 'authentic' assessment. Dissatisfaction with traditional assessment methods has prompted academics in higher education to consider alternative methods that would be appropriate to assess a wide range of learners' knowledge and skills (McDowell & Sambell, 1999; Race, 1999). The diversity of assessment methods adopted in higher education is an indication that changes are taking place in assessment practices (Alverno College, 1994; Hounsell et al., 1996; Nightingale et al., 1996; Struyven et al., 2003; McDowell et al., 2004; Juwah et al., 2004). However, there is also evidence that the traditional written essay remains the predominant method of assessing students' learning in the arts and the social sciences in many British universities (Brown et al., 1997; Maclellan, 2001). Similar findings were reported in a university-wide study conducted in my own institution, University College Dublin (O'Neill, 2002). Despite some initiatives by individuals and Schools in introducing alternative assessment practices, my own College of Arts and Celtic Studies could still be regarded as one where traditional assessment practices are generally used across disciplines. It is in this context that I introduced assessment practices that I considered to be more appropriate for facilitating students' learning. Therefore, the research question that I proposed to investigate was whether the innovative assessment practices introduced in a level 3 undergraduate module¹ actually enhanced students' learning. This paper draws on data from students' reflections about the course from the moment it was introduced to them, until its completion.

2. Background to the study

"Assessment is at the heart of the student experience" (Brown & Knight, 1994, p.12). Thus, it should be regarded as an integral part of the teaching and learning process (Brown, et al., 1997; Heywood, 2000). However, assessment is too often disconnected from the learning process (Shepard, 2000), and it is considered as an addition to teaching (Ramsden, 2003). In trying to integrate assessment into the learning process, Biggs (2003) argues for an alignment between teaching, learning and assessment. This means that the teaching methods and assessment practices become aligned to the learning activities stated in the objectives. It is argued that a formative assessment approach is needed to facilitate that alignment.

Constructivist theories of learning emphasise that learners are actively involved in making sense of the experiences around them (Williams & Burden, 1997). Consequently, it can be inferred that learners should play an active role in the process of learning and assessment. Birenbaum (1996) makes more explicit the role of learners in the assessment process when she describes the new assessment culture that is conducive to a constructivist conception of teaching. She attributes the following characteristics to such culture:

- It emphasises the integration of assessment and teaching;
 - The student is an active participant in the process of assessment;
 - The assessment takes many forms;
 - The assessment tasks are meaningful and authentic;
 - Students participate in the development of assessment criteria;
 - Students document their learning through reflections.
- (Birenbaum, 1996, p.7)

The theoretical underpinnings for this study were two-fold. First, it was informed by a constructivist perspective of learning, together with the attributes of that as-

¹ University College Dublin is in the process of moving to modular programmes of study. 'Course' is the traditional term that is being replaced by 'module'. Throughout this paper both terms are used interchangeably.

assessment culture as described by Birenbaum (1996). Second, it was influenced by a review of research on formative assessment conducted by Black and William (1998), which ascertained that formative assessment can enhance learning when students are provided with quality feedback and guidance on what they can do to improve their learning.

The university course that became the object of this research is a final-year level 3 undergraduate module, taken as an option by students of Hispanic Studies at University College Dublin. Spanish is the prescribed language of instruction and assessment in this module, and the target language is used by the learners and by the teacher at all times. A proposed translation into English of the title of the course might be 'Becoming a Writer in a Foreign Language'.

3. Module description: proposed methods of assessing learning

'Becoming a Writer in a Foreign Language' is a twelve-week module, that is, one semester long in the university structures, with a total of twenty-four teaching hours. The number of places allocated to this module is normally twenty, although twenty-two students participated in this course in 2003-04, when the study was conducted. At the beginning, a session is devoted to a briefing on the course. Learners are presented with the learning outcomes, the proposed teaching methodology and assessment procedures. They are also invited to negotiate all those aspects of the course, as well as setting their own learning outcomes.

The aim of this module is to develop the learners' communicative competence in writing Spanish.

Four specific learning tasks are adopted as means to attain this aim, namely written activities, a learning journal, a writing portfolio and a written examination.

The intended learning outcomes are listed below. At the end of this module, the participants will be able to:

1. Demonstrate their familiarity with and application of the writing process, in terms of planning, elaboration and revision;
2. Produce a variety of texts written in Spanish;
3. Use appropriately and correctly a writing style that incorporates a range of vocabulary and complex linguistic structures;
4. Engage in self- and peer-assessment of writing activities;
5. Reflect on their learning process;
6. Have greater confidence in their ability to write in Spanish.

The four assessment methods adopted in this module are aligned to the learning tasks:

1. Writing activities in class and outside the classroom. The tasks involve individual writing as well as pair and group writing and assessment. The first draft is assessed formatively by the teacher or by the students, and the feedback provided allows the learners to re-write their assignment or to improve certain areas. No mark is allocated for these learning activities.
2. Learning Journal. Its aim is to facilitate learners' reflection about their own learning and a way to document the process of learning.
3. A writing portfolio. This instrument is formative as learners compile it during the course. However, it also has a summative function in that it incorporates all the learning activities undertaken during the course and the improved versions, as well as the reflection that is part of the journal.
4. A written examination at the end of the course. That is a compulsory requirement, at present, according to the university's regulations.

These assessment methods are considered innovative according to the two criteria that were mentioned above: as introducing something new or as using known practices in new ways. The writing activities method was an assessment that students were familiar with; however, it is considered innovative because it is given a strong formative element, with the emphasis on the provision of feedback, and the revision of drafts to facilitate the integration of assessment with teaching and learning. Thus, the writing activities method of assessment tries to achieve something new. Similarly,

the written examination is a method that students are familiar with. However, students approach the examination as another element of the assessment process rather than as the main factor in deciding their final grade. The use of the learning journal and the writing portfolio as methods of assessment are innovative because students have not used them before.

The purpose of the assessment practices introduced is two-fold. Firstly, they aim at being formative by helping the learners to learn how to improve their writing skills. Emphasis is given to assessing the process of writing as well as the product. Secondly, this module is an attempt to involve learners in the assessment of their own learning, and in that of their peers by introducing self- and peer-assessment practices. Both purposes of assessment allow the integration of teaching, learning and assessment because assessment becomes part of teaching. Furthermore, these methods of assessment are considered appropriate because they allow assessment of the process as well as the product, which is considered essential in a module that entails the development of writing skills.

It has been argued that part of the success of introducing innovative assessment methods is to present them in a transparent way to the learners (McDowell & Sambell, 1999), with the appropriate criteria adopted to assess the students' learning. Providing learners with the criteria that were adopted to assess their learning was one of the main aims undertaken at the beginning of the course. The assessment criteria applied to the assessment of the portfolio focuses on four elements, namely the quantity, quality, variety and improvement of the written texts produced by learners. Descriptors for each of the four headings are provided to students. The learning journal is assessed on the basis of evidence on reflection about the learning process, and on how learners have developed self-regulation². Making sure that the criteria are applied to students' work allows them to internalise and understand such criteria. During

² It has been decided not to include a copy of the assessment guidelines because such guidelines are written in Spanish. As criteria are generally context specific, it is suggested that criteria need to be developed in the context where the module is being taught in order to address the specific learning outcomes. Criteria could also be adapted from available literature.

the course learners are also involved in devising criteria to assess their peer's written activities, as well as their own (Hernández, 2004).

The remainder of this paper focuses on the impact that these innovative assessment practices, introduced in this module for the first time, had on the students' learning.

4. Research methodology

A case-study approach was adopted to research the impact that the new assessment practices introduced in this module had on students' learning. The study involved collecting data from the students at three different stages of the course, and analysing the emerging themes. The researcher was also the teacher of the course. This methodology was chosen because it provided an opportunity for an in-depth analysis of innovative assessment practices over a period of time, in the relevant context where those practices were introduced. Undoubtedly, the limitations of this approach are the subjectivity of the data and its interpretation, given that the teacher of the course was the person conducting the study. However, a case study has the advantage of being a bottom-up approach to gather evidence on which to bring about change, based on reflective practice (McDowell et al., 2004).

The initial data collection is based on a focus group session where the students were provided with information about the module. Their perceptions of the module were particularly relevant as it was a major departure from the type of teaching and assessment they had experienced when taking other university courses. Evidence of any development in the students' perceptions and the impact of such perceptions on students' learning, was sought halfway through the course. For this purpose, learners completed a self-assessment questionnaire, and a follow-up semi-structured interview between the researcher and each student was also conducted. The final means of data collection was a reflective incident produced by the learners at the end of the course. Its purpose was to

ascertain the impact of the course on students' learning, particularly the innovative assessment practices that had been introduced in this module. As the study focused on the innovations that were beyond assessment, learners were not consciously aware that the impact of assessment was an object of research. This, it is believed, provided a more natural environment in which to collect authentic data.

5. Students' initial perceptions of innovative assessment practices

The main themes emerging from the focus group's discussion that took place at the beginning of the course were not specifically related to the new assessment practices. Innovative assessment practices did not appear as a main concern to students when the module was introduced to them. Students highlighted other issues, although some opinions about assessment practices were also stated. The most significant themes that emerged at this early stage of the course were as follows:

5.1 An alternative to traditional modules

Students highlighted the fact that 'Becoming a Writer in a Foreign Language' provided an alternative subject of study to other modules that were offered, especially literature ones. Some students expressed views that some literature modules were boring and that there was too much reading involved. Often, they referred to lectures as boring, thus indicating that they were looking for a different mode of course delivery that would engage them in learning. The traditional lecture is generally regarded as a rigid teacher-centred approach to teaching where students have little opportunity to participate in active learning (Cowman & Grace, 1999). Students seemed to indicate that they were in favour of an active learning approach, as it is reflected in the next theme.

5.2 Active participation

The fact that this module involved the active participation of the learners was stressed by the whole group, who considered it as a very positive feature of this module. Learners valued the opportunity given to them to take an active role, to work with others, and to learn from each other. Building trust between the students, and between the students and the teacher, was essential for the success of learners' active participation (Fallows & Chandramohan, 2001).

5.3 Use of the target language

The other emerging theme, at this early stage of the course, was the fact that many students have opted for this module because it provided them with the opportunity to use the Spanish language. They believed that because most of the other modules were taught in English, this module would allow them to improve their competence in written and oral Spanish language. Research shows that learners, contrary to lecturers' perceptions, are often in favour of being more exposed to the target language when pursuing language and literature degrees (McBride, 2001).

5.4 Student involvement in negotiating significant aspects of the module

Good teaching is understood as being able to provide good learning experiences and a supportive learning environment (Biggs, 2003). An attempt to build a powerful learning environment for this module was based on communication with the students (Orsini-Jones & Cousin, 2001). Students commented on how much they appreciated receiving information about different aspects of the course, including learning outcomes, teaching methodology, assessment practices and criteria to assess their learning. Including them in negotiating those aspects was perceived as a display of confidence in their ability to self-direct their learning.

5.5 Integration of teaching and assessment

As most of the students were not familiar with the innovative assessment methods introduced to assess their learning in this module, it is understandable that not many concerns were raised at this early stage of the

course. They relied on the traditional assessment methods familiar to them, mainly on the written essay, to establish comparisons between traditional and innovative assessment practices. Because assessment was integrated with teaching, they saw that the alternative assessment methods would provide them with continuous and constructive feedback to improve their learning. This was a novel feature because for them the essay had mainly a summative function and they remarked that, once it was handed in, its most important value was the mark they received. Special emphasis was given by them to the opportunity to reflect about their own learning by using a journal. Building up the portfolio was a challenge that they undertook as a way to document their own learning. The most positive aspect of the innovative assessment practices at this early stage was that clear criteria were provided to assess the different components of the module.

"The best way to assess this module"

"I value that this course is assessed using four different methods, it provides an opportunity to learn from the beginning to the end knowing that assessment is integrated with teaching throughout the course"

"The procedures are very fair because assessment is incorporated into teaching and learning and it is a continuous activity"

"I like the continuous assessment in this course; there is less pressure when the final assessment comes. You are given an opportunity to revise and improve your writing throughout the course"

"The learner plays an active role in the assessment process"

"These assessment practices make you work constantly"

"It requires a lot of work on the part of the student"

Many more examples indicate that these innovative assessment practices are significant in contributing to an increase in the learners' intrinsic motivation to learn. Those comments reinforced some of the issues that had emerged earlier in the focus-group discussion, namely the integration between teaching, learning and assessment, and the active role of learners in the learning process. An emerging theme is the importance of using a variety of methods, especially those that align the teaching methodology and assessment to the learning outcomes (Biggs, 2003).

6. Students' concerns about innovative assessment

Six weeks into the course, new data was generated from a self-assessment questionnaire completed by each student and a follow-up interview between each student and the teacher. The main issues that emerged at this stage were classified under three headings, namely general views about the assessment practices, issues regarding the assessment of the writing tasks and a third category related to the journal and the portfolio. A content analysis was carried out and the findings are summarised below.

6.1 General views about the use of alternative assessment in this module

The following excerpts from the students' journals (translated into English by the researcher) illustrate the value of the assessment practices adopted to assess the learning of students who opted for this module:

"It is a very original and interesting way to assess this module"

6.2 Assessment of the writing activities: formative function

The formative function given to the assessment of writing activities proved to be a more controversial method of assessment. The researcher knew that this could prove difficult for many students as they were used to receiving marks for their work. On the other hand, this module would provide them with feedback about their work and constructive comments about how to improve their written tasks. Conflicting views were reported, and there were cases when the same student indicated positive and negative experiences. The pedagogical underpinnings of this practice are based on creating the conditions under which assessment supports learning (Gibbs & Simpson, 2004). These conditions include not only the quantity and timing of

feedback but, more importantly, its quality and how students respond to it.

The positive reactions from students about not receiving marks for their written activities are summarised as follows:

"It provides me with an opportunity to re-write and/or improve my work"

"You can learn from your mistakes"

"It is very fair; it gives you an opportunity to learn more"

Other comments that are highlighted as a characteristic of this type of formative assessment include:

"It allows me to take more risks regarding vocabulary and grammar structures, knowing that I will get feedback that will allow me to improve my Spanish"

"It values the process of learning as well as the final product"

"There is no pressure to compete with your classmates, you learn according to your level of competency in Spanish"

"It is less stressful"

These comments from students highlight important principles of formative assessment such as risk taking. It appears that learning is more effective when students do not try to conceal their mistakes (Knight, 2001). With appropriate feedback and the possibility for students to work on aspects that need some improvement, assessment is perceived as being less stressful for the learners. Such an approach facilitates the integration of teaching, learning and assessment.

The negative comments outlined by the learners about not receiving marks for their work were associated with students' previous experiences of assessment:

"We are used to getting marks and it is hard to get used to this method"

"The comments and remarks are good but I would prefer to receive marks"

"I would prefer to receive marks because I believe that learning happens when you write first and not in the later versions"

The last comment was made by a very good student who had a near native competence in Spanish. This raises issues regarding students' different needs. Not receiving marks may be appropriate for the majority of learners but it may not be a successful method for students who fall at either extremes of the scale in terms of linguistic competence. Very good students may not perceive the need to improve much, and they would value getting a mark as they see their work as the definitive version. The effort they are prepared to put into their learning does not go beyond getting a mark for their work. If no mark is provided, they are expected to reflect about their learning, and they may not be prepared to put the effort into it. At the other end of the spectrum, students whose linguistic ability is low may lack the confidence to be able to regulate and take charge of their own learning. Thus, their motivation may also be affected. It may be necessary to work on building their confidence before such feedback practices are introduced. It is conceivable that getting a mark may provide the initial reassurance that they need to take that step. The question remains when to withdraw from giving them a mark so that the formative aspect of the task can be addressed fully.

Smith and Gorard (2005) have also reported negative comments by students when receiving feedback comments only. However, in that particular study students felt that the comments did not provide them with sufficient information so that they would know how to improve.

6.3 Students' views about the learning journal and the portfolio

The students valued these methods as appropriate instruments to assess their learning because they allowed them to reflect on their learning. These are some of the comments made:

"They are good instruments to assess this course"

"The journal gives you an opportunity to reflect about your own learning"

"The portfolio allows you to organise your learning activities and to reflect about what you have learnt; it makes you realise how much work you have done"

Students expressed in the questionnaire some initial

concerns about how to write the journal. They brought a copy to the interview with the teacher and, if they still had some questions, they were able to address them. Even when the students did not have difficulties with this instrument, the teacher took the opportunity to give valuable feedback and reassurance about the work being done by the students. It may be the case that if students were given the opportunity to submit their journals in the first few weeks of the course, their uncertainties about how to write their journal would disappear sooner. Based on previous experiences with other groups, early submission of journals was not considered necessary by the teacher.

A review of the literature on students' journals shows that this instrument encourages reflection among learners (Langer, 2002). However, learning journals often show different levels of reflection (Hernández, 2000). Different levels of student engagement in critical reflection were also found in the present study. That may be linked to students' perceptions about the value of the instrument and, in the case of writing in a foreign language, to their linguistic competence. The initial concerns expressed by some learners regarding how to write their journal may have had an impact on their level of critical reflection. Guidance from the teacher during the early stages of the course may facilitate more reflection by the learners.

The question of whether journals can be used to assess students' learning has been much debated (Moon, 2002). Some argue that the process of reflection is better left un-assessed (Steward & Richardson, 2000). Certainly, critical reflection and affective learning are difficult to quantify in terms of marks, which are the common ways to report students' learning in educational institutions. However, assessing journals can be justified when clear criteria are provided (Moon, 2002) and learners are well aware of what aspect or aspects of the journal are being assessed, i.e. the process, the product, students' learning, critical reflection, etc.

The portfolio is an instrument widely used by artists to present their work. Portfolios are often considered as powerful collections of students' work (Seidel & Walters, 1998). They are very popular instruments in the United States in educational courses that have a written component (Cassany, 1999). The portfolio as an

instrument to assess students' learning presents difficulties and, as a result, many advocate their formative function (Cassany, 1999). It is argued that a summative function can be given to students' portfolios when the criteria to assess such instruments are clearly stated. Learners may also take an active part in assessing their own portfolios and those of their peers.

7. How innovative assessment practices influenced students' learning

The reflective-writing assignment submitted by the learners at the end of the course provided the researcher with valuable data to address the research question that was formulated at the beginning of this paper, namely if the innovative assessment practices introduced in this module enhanced students' learning. The answer to the research question came from two fronts, namely from evidence of learning that came about as a result of introducing those particular assessment methods, and from the factors that contributed to the enhancement of students' learning.

7.1 Evidence of students' learning

The innovative assessment practices introduced in this module indicate that they have contributed to the enhancement of students' learning in the following areas:

7.1.1 Students' self-regulation

It is not an easy task to encourage learners' autonomy and responsibility for their own learning (Davies & Jones, 2001). However, the innovative assessment practices adopted in this module have achieved that goal as some of the learners have noted.

"The journal helps you to be responsible for your own learning. It helps you to think about how you learn"

"The journal has helped me to reflect about my own learning and about the learning activities done during the course"

"Now I think before I start writing; I imagine that I am the reader and I try to see how I would react"

"I have learnt a lot. It has allowed me to reflect about aspects of learning that I had not thought about before"

"The portfolio becomes a textbook that contains all you need to revise the course"

It would be presumptuous to conclude that the introduction of innovative assessment practices has been the only factor contributing to the development of students' self-regulation. Arguably, self-regulation is the result of a series of features that have been an integral part of this particular module. It is our belief that the attributes of the assessment culture stated by Birenbaum (1996) have contributed significantly to the development of students' self-regulation. Student reflection makes sense in the context of meaningful assessment tasks where learners feel that they play an active role both in the development of criteria and in the assessment process. One can also speculate that it is more difficult to develop learners' self-regulation in courses where assessment practices are more traditional. This may be particularly so if assessment focuses only on the results or product of learning, and when learners are not involved in peer- and/or self-assessment. The role of the teacher as a facilitator of learning cannot be ignored. His/her enthusiasm and belief in encouraging learners to direct their own learning undoubtedly serves as a motivator for students.

7.1.2 Life-long learning skills

Recent trends in higher education indicate a move towards including key, generic or life-long skills into academic programmes (Murphy, 2001). Life-long learning skills may include teamwork, negotiation skills, and presentation strategies. Many traditional teaching practices are not conducive to incorporating those skills, never mind assessing them. However, innovative assessment can succeed in that regard, as the learners themselves have expressed.

"What I have learnt in this course is relevant to life beyond the university"

"I can transfer what I have learnt in this course to other courses and to other situations outside the university"

7.1.3 Affective abilities

This study shows that the integration of innovative assessment practices into the teaching and learning process has contributed to the enhancement of learners' affective abilities, particularly the development of their confidence and self-esteem, as the following statements from the learners confirm.

"The course has allowed me to develop my confidence and my self-esteem"

"At the beginning of the course, I could not see myself as a writer. Now I have confidence in myself and in the way I can express myself in Spanish"

7.1.4 Competency in written and oral Spanish

A considerable improvement in students' linguistic ability was reported by the learners. More importantly, evidence of such improvement was documented by the researcher through the analysis of students' written tasks. The quality of students' work at the beginning of the course was significantly lower than what they were able to produce at the end of the course. Such improvement may have occurred if more traditional assessment practices had been used. However, the teaching methodology and the innovative assessment practices adopted can be regarded as significant factors contributing to students' enhancement of learning. Aspects of writing such as planning or thinking about the readers of their texts were reported by the students as contributing to the quality of their texts. That process indicates a move from surface to deeper features of written texts.

7.2 Factors contributing to the enhancement of students' learning

The enhancement of students' learning appears to have been aided by the constructive feedback given by collaborative learning, and by a relaxed atmosphere. These factors have been highlighted by the learners.

7.2.1 Constructive feedback

"The feedback I received during the course has changed the way I think about writing. Now I am conscious about what I write, about why I write it and about the audience or the readers of what I write"

"I like the type of assessment that this course implied. It was spread throughout the course and the feedback received allowed you to improve your writing"

"What I liked most about the course was that you were given an opportunity to take the feedback on board and learn how to improve your work"

7.2.2 Collaborative learning

"This module has provided me with the opportunity to work with others (pair and group work), and to learn from others as well as from the teacher"

"You learn a lot from others"

"You learn a lot about self- and peer-assessment"

"It is good to receive feedback from others. You learn a lot from reading and assessing somebody else's work"

7.2.3 A relaxed atmosphere

"I have learnt a lot and I have enjoyed it"

"Learning and assessment have taken place in a very relaxed atmosphere"

"When we looked back at the amount of learning activities that we have completed during the course I was amazed. I did not think we had done so many. It was fun and now it does not seem like hard work"

"The activities were very interesting and I have learnt a lot"

ment methods contribute to the enhancement of students' learning. The evidence shows that the innovative assessment practices adopted in this particular module have facilitated students' learning in a way that complements or offers an alternative to the more traditional assessment methods. An analysis of students' views has provided significant data to conclude that innovative assessment practices contribute to the enhancement of students' learning in ways that traditional assessment may not. Brown (1999) states that students are often presented with a "very restricted diet of assessment methods" (Brown, 1999, p.9). Consequently those methods do not allow them to demonstrate a wide range of knowledge and skills. By adopting four different methods to assess students' learning, it is our belief that they offer learners the possibility to display their knowledge in a variety of ways.

Hence, one of the features of innovative assessment methods has been their high relevance in the context where they are implemented. In the eyes of those that argue for reliability or consistency in marking, this type of assessment is considered very subjective. However, if assessment criteria are clearly stated, alternative assessment can be as reliable as any other type of assessment. The advantage of using innovative assessment methods is that, usually, there is a variety of methods that would provide evidence of students' having gained knowledge from different sources.

Let us not forget that innovative assessment can take place using traditional methods if they are used in such a way that their purpose is to achieve something different. There is agreement among researchers and practitioners that the most effective assessment of student learning is the one where multiple assessment methods are adopted.

The success of innovative assessment practices in promoting students' learning is not always guaranteed (McDowell & Sambell, 1999). Great care needs to be given to the introduction of such innovative practices. It is important to help students understand assessment criteria and to involve them in the developing of such criteria too. It is also essential to provide them with constructive feedback that motivates them to improve their learning. Furthermore, it is necessary to build trust among students and between the teacher and the

8. Conclusions

This paper has tried to ascertain if innovative assess-

learners so as to create a relaxed atmosphere where collaborative learning can take place. When teachers share with students the process of assessment, assessment becomes something not 'done to' learners but 'done with' learners (Harris & Bell, 1994). This, in turn, could contribute to an increase in learners' intrinsic motivation so that they adopt a deep approach to learning.

Although teachers and some students may be in favour of innovative assessment, there may be some reluctance on the part of learners to accept new assessment methods (McDowell & Sambell, 1999). This has pedagogical implications and it brings us to consider some of the issues outlined in the previous paragraph. More than with traditional assessment methods, the early intervention of the teacher is crucial when alternative assessment methods have been adopted. As the process of learning is assessed by these methods, it may be the case that learners have nothing to show as evidence of their learning by the end of the course. There is no possibility of cramming at the end of the course because the process and the product of learning are assessed.

Although it may not be possible for the results of this small study to be generalised to other learning contexts, it is my belief that they are significant enough to claim that innovative assessment enhances students' learning in areas where other assessment methods are inadequate or missing.

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I would like to thank the students who took this module in the academic year 2003-04. They provided me with invaluable data that I have taken on board in order to improve my own teaching and assessment practices. I thank them for their honesty in revealing themselves throughout the course, for their trust in me and in each other, and for their eagerness to learn. I hope that whatever they learnt during that semester is still part of their life-long learning wherever they are now. I can

certainly say that, for me, being the facilitator for that module was a learning experience, assessed by my own students, which I treasure.

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Reviewing Outcome-based Assessment and Implementation issues

Learning Outcomes and their Assessment: Putting Open University Pedagogical Practices under the Microscope

Chris Dillon
Catherine Reuben
Maggie Coats
Linda Hodgkinson
Centre for Outcomes-Based Education
The Open University, United Kingdom

The Open University (OU) is the United Kingdom's only university devoted to distance learning. It is also the UK's largest university with over 200,000 students overall. Around 150,000 students are studying undergraduate level courses. Over the last decade, major policy changes have impacted on UK higher education. Following the recommendations of the National Committee of Inquiry into Higher Education (Dearing Report, 1997) and the establishment of the Quality Assurance Agency, all UK universities have been required to define learning outcomes for their programmes and link learning outcomes to teaching and assessment. This major pedagogic shift led the OU to establish the Learning Outcomes and their Assessment (LOTA) project to re-examine the ways its courses are planned, designed, delivered and assessed, and to initiate necessary institution-wide changes. Explicitly linking outcomes, assessment and teaching, actively using assessment for learning, and supporting academic staff development are key elements in enhancing student learning.

1. Introduction

Over the last decade, major policy changes have impacted on UK higher education. Following the recommendations in 1997 of the National Committee of Inquiry into Higher Education (the 'Dearing Report') (National Committee of Inquiry into Higher Education, 1997) and the establishment of the Quality Assurance Agency (QAA) (The Quality Assurance Agency for Higher Education), all UK universities have been required to define learning outcomes for their programmes and to link learning outcomes to teaching and assessment. For a broader discussion of the implications of an outcomes-based approach in UK higher education since the Dearing Report, see Coats (Coats, 2000). This major pedagogic shift has led the Open University to re-examine the ways its courses are planned, designed, delivered and assessed, and to establish a university-wide initiative - the Learning Outcomes and their Assessment (LOTA) project - to guide institutional change.

This paper will report on the methodology of the LOTA project, some findings of our work on outcomes-based assessment, and the main learning points that have emerged. The paper will also identify some of the issues in the implementation of outcomes-based learning, teaching and assessment in a wide-area supported open learning environment.

1.1 The UK Open University

The undergraduate students of the UK's Open University are nearly all studying part-time at home through distance learning, with about 70 per cent in employment. For most courses, no previous qualifications are required and there is no upper age limit to study. Students are adults who study for personal as well as career-related reasons, and most combine their studies with work, family and other commitments.

OU courses (self-contained modules) are planned and produced by teams of academics, educational media designers and editors working at the OU headquarters in Milton Keynes. Courses use a range of media from print to web-based e-learning and are designed to function both as standalone entities and as components of programmes leading to awards. Undergraduate

courses are offered at levels 1, 2 and 3, corresponding approximately to first, second and third year study at a conventional UK university. Students choose their own pathways through the available courses to accumulate credit towards OU awards (certificates, diplomas and degrees) to suit their needs. The structure is fundamentally open and flexible; students need no formal qualifications to register for a course and have considerable autonomy over what is studied and when it is studied. This openness is a central feature of the OU's educational philosophy.

To support its students the OU has thirteen Regional Centres throughout the UK and a network of coordinators in many countries in the European Union. Regional Centres organize tutorial and other support for students in their geographical area. Staff tutors (full-time regional academic staff) appoint part-time tutors, called associate lecturers (ALs), in their regions to support the OU's teaching. There are now over 7000 ALs tutoring over 600 courses produced by the University's faculties of Arts, Social Science, Education and Language Studies, Health and Social Care, Science, Mathematics and Computing, Technology, and the OU Business School.

Students taking a course are assigned to an associate lecturer who will have a group of up to 20 students. Depending on the course and the geographical distribution of the students, ALs provide face-to-face tutorials and day schools, telephone tuition, and on-line support via email or conferencing. The AL will also mark the assignments (known as tutor-marked assignments, or TMAs) of the students in their group and give feedback on performance. In some courses, students also complete computer-marked assignments (multiple-choice questions known as CMAs).

TMAs and CMAs are continuous assessment components of a course, and provide opportunities for both formative feedback and summative grading. To gain credit for their course students also complete an 'examinable component' which may be a conventional examination¹ or, increasingly, a portfolio, report or extended essay. This may be marked by the student's tutor but it will also be marked independently, usually by another tutor randomly selected from the tutors on that course.

The assessment strategy, the continuous assessment tasks (TMAs and CMAs) and the examinable components associated with a course are designed and written (and renewed each time the course is presented - which may be once, twice or several times a year) by the central course team. The course team also provides advice and guidance to help students prepare for and tackle the assessment, as well as providing marking guidance to support the ALs in grading and giving feedback on their students' work.

2. The LOTA project

The Learning Outcomes and their Assessment (LOTA) project was set up in 1999 to raise awareness about learning outcomes across the Open University, and to shift thinking toward an outcomes-based approach. This was institutional change on a scale not seen since the OU was established in the late 1960s. The main challenges facing the project in the initial stages were:

- Introducing new documentation for quality assurance (QA) purposes to demonstrate that all courses and awards had agreed sets of outcomes.
- Introducing a new language of learning outcomes - previously OU courses had been associated with learning objectives but these had not usually been linked closely with assessment.
- Initiating a culture change - for both academic and administrative staff this meant new ways of talking and thinking about the curriculum and the enhancement of learning.

The focus of LOTA was initially on quality assurance to meet the requirements of the QAA. All UK universities are audited by the QAA to check that the institution has adequate processes and procedures in place to assure the quality of its teaching provision.

The link between teaching and assessment and the need to align them in a way 'that will engage students in the activities most likely to lead to quality learning' (Biggs, 1999) has been well-established. But a first step was to

try to clarify what that link meant in practice in the context of OU teaching. Informed by QAA guidelines course teams were asked to define the learning outcomes of their courses under four main headings:

- Knowledge and understanding - relating to subject content.
- Cognitive skills - such as analysis, synthesis and critical reasoning.
- Key skills - such as communication, information literacy, and learning how to learn.
- Practical and professional skills - as required by professional or regulatory bodies.

Identifying and grouping the main learning outcomes for courses already in existence had several advantages:

- Courses are designed and written by subject specialists and can be highly content driven. Cognitive and key skills development in particular may be embedded in a course, but may not be made explicit to students. Students, therefore, may identify subject content as their only learning and may not recognise, or be able to articulate, their other skills and abilities. Clear cognitive and key skill learning outcomes provide students with a 'language' with which to describe and articulate these skills to peers and employers.
- Assessment had not traditionally been designed to support an outcomes-approach. Identifying and grouping outcomes meant that a clearer relationship could be established between outcomes and the forms of assessment that would best support them. Clear learning outcomes also help to drive good formative assessment practice, giving opportunities to provide feedback to students against the outcomes to offer guidance about how to improve performance.
- OU courses must support the learning outcomes of awards. A curriculum map documents the relationship between courses and higher-level award outcomes. Identifying and grouping course outcomes creates clearer distinctions and relationships between courses and hence clearer progression pathways for students,

¹ Held at local centres to minimize travelling distances for students - but which may be specially arranged to take place anywhere under appropriate invigilated conditions if, for example, the student is disabled, posted away from the UK as a member of the armed forces or, as in a few cases, in prison.

within and across faculties, towards an award.

A similar identification process was carried out at award level to produce specifications for diplomas and degrees. A key factor here is that the OU is a highly modular course-based environment. Students register for individual courses not for programmes of study. Although most awards contain some compulsory courses, the pathways taken by individual students can differ both in the courses they choose to take and the order in which they take them. From an award perspective the overall intended learning outcomes must be linked back, through the curriculum map, to the compulsory and core optional courses that the student must study. The assessment associated with the outcomes of individual courses can then be demonstrated as contributing to the assessment of the outcomes of the overall award. From a QA point of view, therefore, an award-level learning outcome can thus be audit trailed back to the course or courses where it has been developed and assessed.

2.1 From quality assurance to quality enhancement

As Coats (2003) points out, the LOTA project evolved rapidly from quality assurance to quality enhancement: "What is the difference? Quality assurance (QA) is about checking the standard of what is done; identifying 'good practice'; awarding classifications or scores. Quality enhancement (QE) is about improving and developing; not just doing things well but doing things better."

For LOTA quality enhancement means looking closely not only at the documentation and institutional processes but also at the way learning outcomes are actually being used. Just as importantly it also raises questions about how outcomes are being understood, not just by the academics in the faculties and course teams, but by the ALs who are in the 'front line' of distance teaching, and by the students themselves.

It quickly became apparent that the shift to an outcomes-based approach involved not only identifying learning outcomes and making sure that the assessment supported them, but also in involving staff in exploring how this process could be made meaningful to students such that it added value to their learning experience. The triad in Figure 1 emphasises that outcomes,

assessment, and teaching and learning are mutually connected, and should be seen as complementary aspects of quality enhancement. Underlying this triad are three main principles: transparency, transformation and transferability.

- Clearly identifying outcomes leads to *transparency*: teaching and assessment intentions are made explicit, and both tutors and students work with the same set of criteria to assess progress and to focus on ways to improve.
- Integrating formative and self-assessment, as well as summative assessment, into the learning process is *transformative*: students are encouraged to become actively involved in understanding how they are learning and how they can adapt their learning to new situations.
- Learning in a formal HE environment is about developing as an independent learner who can *transfer* the ability to learn effectively from HE into other, more educationally informal, environments such as the workplace.

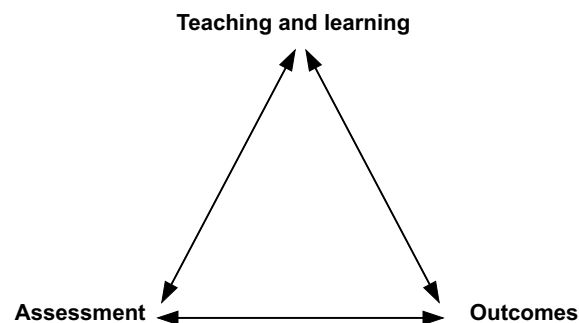


Figure 1. Quality enhancement: the learning and teaching triad

Enhancing the quality of teaching so that it leads to transparent, transformative and transferable quality learning is the key role of academic staff development. Good staff development needs to prompt new thinking about the curriculum, and how students engage with it. Academics need to start from an outcomes perspective not only by asking the question 'what do we want students to get out of this course or programme - and how can the assessment help them achieve and demonstrate it?', but also by exploring how students can answer for themselves the question 'what am I getting out of my studies - and how can I explain and

demonstrate what that is to others'.

The heart of the LOTA approach is about making things explicit so that there is a framework and a language for asking - and answering - these questions. Enhancing learning, therefore, is not just about improving assessment practices but about understanding how the outcomes - teaching-assessment triad underpins curriculum and staff development.

3. The LOTA approach

A major challenge was in introducing LOTA ideas to the academic community. Timescales for change in the OU are long. Faculty course teams work largely independently during the 2-3 year production period of a course and it can be difficult to inject new ideas into the course development process. With long production and presentation cycles (OU courses are typically designed to be presented for 6 years, with an interim review, before they are withdrawn, re-written or replaced), new ideas can take a long time to work their way into the system.

Another factor was that academic change in the OU is largely a bottom-up process. The OU has a strong tradition of academic autonomy in terms of designing and producing innovative distance teaching materials. The approach adopted was to focus on changing 'hearts and minds' rather than attempting to force change through. Three main components of the LOTA approach were:

- Establishing a team drawn from across the University comprising staff (including senior academics) from all the faculties and schools to act as 'champions' of the ideas with their academic colleagues.
- Involving the 'champions' in setting up links within their faculties and working with course teams (often ones with which they were already academically involved) to explain and embed LOTA ideas.
- Carrying out, with the support of the champions and course teams, audits to identify the main learning

outcomes in courses², and to explore how the assessment supported the stated outcomes.

There were several significant advantages to this approach:

- The team met monthly over a period of three years and provided a rare opportunity for colleagues from different academic disciplines to come together to talk about learning and teaching at an institutional rather than a faculty or departmental level.
- It made a 'safe' space in which talk to colleagues about learning and teaching, particularly the pros and cons of current approaches, was legitimated. The meetings came to be seen by the team as a uniquely valuable experience³.
- Open and supportive discussions with colleagues from other academic areas provided opportunities to share ideas and information widely, and to learn about where synergies existed across the University that might otherwise not have been evident.
- Workshops, pilot projects and other academic resources supporting LOTA were planned within the group, and then taken forward in ways appropriate to the different academic areas. Academic staff development was, therefore, initiated and mediated by known and trusted individuals within each faculty, not by outsiders.

3.1 Course audits

Audit is a way of checking the match between course learning outcomes and assessment. The LOTA approach put an emphasis on transparency; the work showed that auditing assessment and teaching material against the intended learning outcomes identifies gaps between:

- the intended learning outcomes and the assessment of those outcomes;
- what is assessed and what is taught; what is actually

²OU courses have a six-year life so most courses had not been designed with learning outcomes and their assessment in mind. All new courses now have stated outcomes and associated assessment strategy.

³In other research (Dillon et al., 2005) we have found similar 'safe environments' to work well for students in encouraging them to raise awareness of and recognise their own learning and skills.

assessed and what is assumed to be assessed;

- the information and guidance given to students and that given to tutors.

Auditing was carried out by experienced ALs working as consultants to course teams. This brought a degree of independence to the process and highlighted gaps between the assumptions of the course designers and the actualities of course delivery. Addressing those gaps suggested ways the assessment and feedback process might be improved and used to enhance learning:

- Assessment tasks should be linked explicitly to relevant learning outcomes. That is, assessment needs to be specifically devised to match the relevant outcomes. Assessment should provide opportunities for important outcomes to be revisited several times during a course, and feedback to students should make reference to this.
- Recognise the developmental aspect of assessment by explaining to students the assessment strategy of a course and how they can use it to support their own learning. Opportunities for self-assessment against the learning outcomes are as important as summatively assessed tasks, and help support the development of the student as an independent learner.
- Use outcomes as criteria to prompt feedback and 'feedforward' comments from tutors. Feedback addresses existing students' performance while feedforward offers guidance to improve performance.
- Use the language of outcomes in student guidance (including course, programme and qualification descriptors), notes for tutors and staff development activities as a way of talking about expectations, development and achievement.
- Support students in using outcomes in self-assessment and personal development planning (PDP) activities and encourage them to see outcomes as a way of describing their achievements to others, such as employers.

Figure 2 summarises the audit process and links audit to curriculum alignment. In the highly modular course environment of the Open University explicitly linking outcomes, assessment, courses and awards is important. As adults already in employment many OU students will expect to use their studies and qualifications to improve

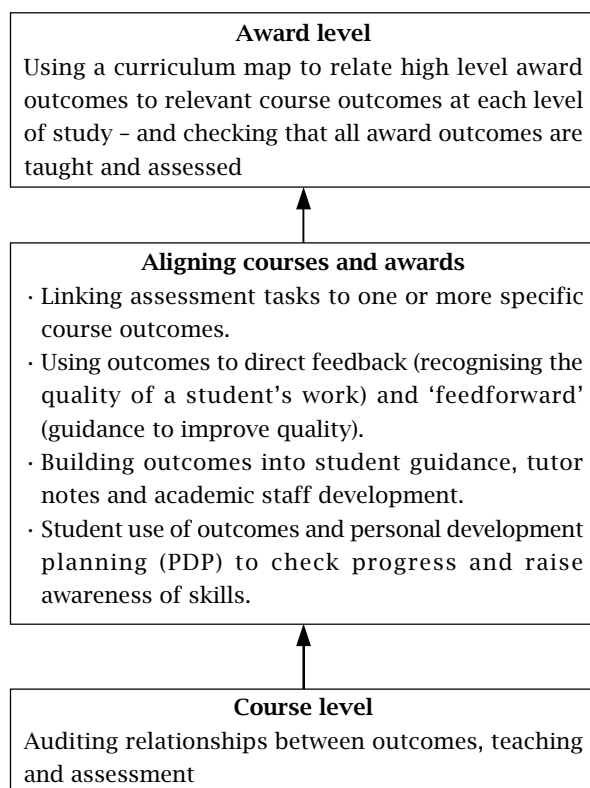


Figure 2. Auditing to align the curriculum

their careers. Typically a student may spend about six years studying part-time with the OU.

Within that time personal goals, prospects and job opportunities may change. Waiting until the end of their degree before changing or developing their career may not be a realistic option. To take advantage of new career opportunities as and when they arise, therefore, students need to be able to talk about, and give examples of, the skills and knowledge they are gaining during their studies. In a competitive job market students may be disadvantaged if they are not able to be clear to others about their wider skills as well as their detailed subject knowledge. Learning outcomes offer concise statements to help students describe their learning.

Assessment provides milestones and checkpoints for the student to monitor and evaluate their progress against the learning outcomes. It also provides examples of applications of skills and attributes - for example: planning; time management; finding, selecting, organising and using information; effective communication;

and independent learning - that the student can draw on to provide evidence of their achievements.

4. LOTA case studies

Audits and assessment pilot projects were set up in different faculties. As a result, nine case studies are available (Centre for Outcomes-Based Education, 2005) covering the following topics:

1. ***Improving reliability of assessment using grade descriptors - the case for staff development.***

How the use of grade descriptors improved the reliability of assessment and impacted on staff development. (Faculty of Education and Language Studies)

2. ***Developing and assessing key skills - the case for course audit.***

Identifying where and how skills of communication, group working, information literacy, and laboratory skills were developed and assessed. (Faculty of Science)

3. ***Teaching and assessing skills outcomes on a project course - the case for explicit alignment.***

Making clear the link between learning outcomes, assessment tasks and feedback. (Faculty of Technology)

4. ***Associate lecturers as course team members - the case for working in partnership.***

Using AL expertise in reviewing, planning and writing a course. (Faculty of Technology)

5. ***Linking assessment to award outcomes - the case for course audit.***

Checking that award level outcomes are addressed by the component courses. (Faculty of Mathematics and Computing)

6. ***Using feedback to enhance learning - the case for feedback on learning outcomes.***

Directing teaching to the achievement of outcomes. (Faculty of Arts)

7. ***History programme guides - the case for programme documentation.***

Providing students with a clear guide to the rationale,

outcomes, assessment and language associated with an award. (Department of History)

8. ***Assessing communication skills and cognitive learning outcomes - the case for course audit.***

Improving the fit between learning outcomes and assessment. (Faculty of Arts)

9. ***Science MSc projects - the case for criterion-based assessment.***

Developing an assessment strategy with a criterion-based marking scheme. (Faculty of Science)

Although too long to include here, each case study contains the main learning points for the faculty in which they were based. All the case studies are available on the website of the OU's Centre for Outcomes-Based Education (www.open.ac.uk/cobe).

5. Levels and progression

Alongside the case studies and audits, there were also questions about how the outcomes supported the level of study and students' progression through levels and courses. Although progression routes towards an award are not imposed by the University, the three undergraduate levels are broadly characterised by the supported development of knowledge, understanding and skills at level 1, guided application and critical understanding of knowledge at level 2, and an independent approach to study at level 3.

To help course teams design courses that contribute to a particular level of study, particularly in the development of cognitive and key skills, a set of levels indicators (Centre for Outcomes-Based Education, 2005) was developed to provide descriptions of the generic learning aims and outcomes. The indicators are intended to:

- Provide a common framework and language to describe the performance and achievements expected from students studying at undergraduate levels 1, 2 and 3.
- Offer a language to help students identify their skills

and achievements and describe them to others.

- Identify a set of graduate aims and abilities (or attributes) to support personal and career development.

This framework is intended to help course designers ensure that the learning outcomes of different courses are consistent within a level, and that there is progression between levels in cognitive and key skill development as well as in subject knowledge. The OU undergraduate levels framework is available at www.open.ac.uk/cobe.

6. Findings and discussion

The course audits and the case studies provide information about how outcomes, teaching and assessment can be aligned. Some of these are detailed and specific to individual courses. However, more general learning points and recommendations also emerged which may have resonances within the wider HE community:

- *The assessment tasks, the guidance given to students and tutors, and the feedback provided by the tutors were not always well-aligned with the intended learning outcomes of a course.*

Recommendation: Assessment activities should be devised with the course learning outcomes in mind, and should identify clearly which outcomes are being addressed. (Indeed, course design should start from the intended outcomes and assessment, not from detailed subject content.) Tutors should bring relevant learning outcomes to the students' attention and refer to them explicitly when providing feedback to students. Where several assessments contribute to an overall course grade, the learning outcomes should be seen as developmental and revisited several times.

Guidance notes for students and marking schemes for tutors should give, as far as possible, the same information so that there is transparency about what is

expected, and a shared understanding about the assessment criteria. There should be no hidden agenda in teaching. For students to be effective learners they, as well as tutors, need good explanations about what learning outcomes are for and how they can be used to enhance learning.

- *It was not always clear whether assessment was 'for' learning or 'of' learning or both.*

Recommendation: Effective developmental assessment should offer opportunities for both summative and formative feedback. Tutor feedback should be aligned with the outcomes and provide not only marks and comments on the quality of the work, but also 'feedforward' to help students move on and further improve their performance.

Learning outcomes can act both as 'hooks' for feedback and feedforward from the tutor, and as criteria which the student can use to assess and improve their own performance. A parallel project *FAST - Formative Assessment in Science Teaching* is looking in more detail at what feedback is provided by tutors and how it is used by the students.

Assessment can often be seen as something that is not an integrated part of the process of learning but a different type of activity more concerned with measuring what has been learnt. The aim of LOTA is to engage staff to think consciously about what a piece of assessment is for, and be explicit about how it supports learning.

- *Different academic areas will see things in different ways.*

Recommendation: Academic areas should take ownership of outcomes and assessment and explore what the approach means for them if the pedagogic shift to outcomes is to have a lasting effect.

Approaches to assessment developed in one discipline area may not necessarily work in another. The case studies confirmed that the styles, traditions and expectations of student learning differed across the faculties. For many colleagues, explicitly linking outcomes to assessment and feedback is not a familiar

or comfortable way of devising assessment or commenting on students' work. This was evident, for example, when it came to auditing the assessment of cognitive and key skills in subjects such as mathematics compared with, for example, arts and humanities.

The LOTA project recognised from the outset that there would be no one single approach to outcomes-based learning and teaching that would suit all academic areas. More work is needed at the OU in different academic areas to explore how these changes impact on practice and professional development.

7. Conclusions

For the Open University - with over 200,000 students, around 10,000 full-time and part-time academic staff, and with embedded central and regional pedagogical practices focused on distance education and supported open learning - the move to an outcomes-based approach continues to be a major challenge. However, in placing the OU's pedagogical strategy under close scrutiny, first to address the requirements of the QAA and then to look closely at the ongoing enhancement of teaching and learning, the LOTA project has been highly influential in motivating and supporting large-scale institutional change.

Perhaps not unexpectedly change at this scale takes time. There is no quick fix. Academic staff no less than students need time to assimilate new ideas, take ownership of them, adapt them so that they become meaningful in new contexts, and try them out to see what works and what doesn't. As the case studies indicate, the shift to an outcomes-based approach implies more than simply identifying learning outcomes and devising new assessment.

The LOTA project work has emphasised the need not just for alignment between learning, teaching and assessment within the curriculum but fundamentally in connecting those changes to staff development. In practice this means that all academic staff need to build

and share a common understanding of how learning outcomes and assessment practices are used to enhance student learning.

The outcomes - assessment - teaching triad in Figure 1 emphasises that assessment is not a separate activity but is intimately connected with the learning process. The principles of transparency, transformation and transferability underlie the triad. Building clear links between teaching, assessment and learning outcomes is key to student development. Feeding forward on assessment activities, by using the outcomes as hooks for guidance on how to improve performance, supports student progression through courses and levels. For the student, understanding how outcomes, assessment, feedback and learning are intimately linked together is part of becoming an independent learner. Explicit outcomes inform self-assessment and support personal development planning. Being able to use an outcomes language to recognise and articulate skills and knowledge, and being able to draw on a portfolio of completed assessment tasks (for example, reports, critiques, designs) as supporting evidence, is an increasingly important aspect of employability.

The LOTA approach has enabled staff to explore the implications of outcomes-based assessment, to discuss, consult and recommend procedures and systems, and to manage the issues involved in the design of assessment strategies in ways that enhance student learning. The results of the project work are now being embedded into practice and disseminated widely across the Open University.

Acknowledgement

The scope of the LOTA project has meant that a large number of central, regional and part-time colleagues at the Open University have been involved at various stages of the work. The authors would like to thank these colleagues for their commitment in working towards embedding the principles of outcomes-based education into OU learning and teaching, and in making large-scale

institutional change possible.

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Institutionalizing a General Education Program Review Process: Outcomes Assessment

Sue A. Fellwock-Schaar
College of Education

Pamela C. Krochalk
College of Health and Human Services

Mary J. Cruise
Center for Teaching and Learning
California State University, Dominguez Hills, United States

The General Education (GE) Program at California State University, Dominguez Hills, is designed to provide undergraduate students with the foundational skills and knowledge required of a well-educated person. Currently the GE Committee has completed a review of the first two years of a systematic, five-year program review process to ascertain whether or not (1) course objectives/outcomes are student centred, measurable and/or observable, and appropriately reflect University GE objectives; and (2) students are mastering the stated University GE Area objectives. Multiple sources of evidence are examined by reviewers including course syllabi, student work samples, and student examinations. Assessment rubrics are used to promote assessment consistency among reviewers. This paper will focus on the assessment review process, assessment techniques, and outcomes related to the GE Program Review Process. Also included is a discussion of the issues raised and changes made to improve all aspects of the GE program review process.

1. Introduction

Established in 1965 and located in the greater Los Angeles area, California State University, Dominguez Hills (CSUDH) is one of 23 California State University campuses; enrolment is approximately 13,000 students. About 90% of incoming freshmen need remediation in mathematics, English, or both before they can begin undergraduate classes. There is a high degree of ethnic/racial diversity: approximately one-third of the students are African American, one-third Latino, and one-sixth each Asian and Caucasian. CSUDH's accreditation body, the Western Association of Schools and Colleges, requires a commitment to creating and sustaining campuses as learning communities. The University's response is reflected in its mission statement, "The University is a multi-cultural, multi-ethnic teaching and learning community dedicated to ...educating a student population of unprecedented diversity ..." (CSUDH Catalog, 2005-2007, p. 12). The concept of learning community entails a paradigm shift for faculty and students to move from teacher-centred learning to student-centred learning (Barr & Tagg, 1995). One interpretation of this movement is that the teacher is responsible for creating an environment conducive to learning and the student is responsible for learning. One method for promoting this shift is to establish a student learning outcomes assessment process whereby program-level and course-level outcomes are identified in student-centred, measurable and/or observable terms, followed by assessment to judge whether learning has occurred as stated in the outcomes.

Since 2001, CSUDH has been engaged in showing evidence of student learning outcomes achievement to our accreditation agencies and stakeholders, including funding sources. The building of this body of evidence is in response to the national challenge in the United States for higher education to demonstrate measurable learning outcomes (Allen, 2004). This paper describes one initiative which includes a comprehensive review process of the General Education (GE) Program, and an evaluation of the effectiveness of the GE Program.

2. Background

The Strategic Plan of CSUDH for 2003-2008 includes student learning and achievement as a priority. A primary goal regarding student outcomes and assessment is to "Strengthen and assess student learning for academic excellence and social responsibility" (CSUDH Strategic Planning Taskforce, 2003, p.24). The means by which this goal is to be accomplished include "strengthen[ing] the process of learning assessment for continuous program and instructional improvement by fully integrating assessment into all university processes... [and] provid[ing] remedial instruction that improves persistence to graduation and establishes measurable outcomes" (CSUDH Strategic Planning Taskforce, 2003, p.24). As the Strategic Plan evolved, new University academic policies began to focus on assessing courses and programs to ascertain that instruction is student-centred and has measurable and/or observable student outcomes as suggested by current thinking in the scholarship of teaching and learning (Allen, 2004). While it must meet the requirements of the State of California Education Code, the GE Review process is independent from state review, yet compatible and consistent with the review process for all CSUDH academic programs.

The GE Program is designed to provide undergraduate students with the foundational skills and knowledge required of a well-educated person. The framework for General Education at Dominguez Hills consists of program-level goals, Area-level objectives and/or outcomes, and course-level objectives and/or outcomes. The program-level goals articulate (1) competencies and skills essential to further study, (2) knowledge of physical and human environments and the legacies of predecessors in civilization, and (3) principles, methodologies, value systems, and thought processes employed in human inquiry (CSUDH Catalog, 2005-2007, p.91). These goals provide direction for the University GE objectives in seven Areas. The seven University GE Areas are: Area A-Basic Skills (composition, quantitative reasoning, logic and critical reasoning, and oral communication); Area B-Natural Sciences; Area C-The Humanities; Area D-Social Sciences; Area E-The Whole Person; Area F-Upper Division Integrated Studies; and Area G-Cultural Pluralism. Each Area has specific university level objectives outlining what students

are able to do after completing selected courses from the designated Areas. These Area objectives, in turn, provide direction for GE designated course-level objectives.

The GE Committee, comprised of undergraduate and graduate faculty from across the University, is charged with oversight of the GE Program including its review process. A five-year review cycle has been determined so that one or two of the seven Areas are reviewed in each of Years 1 through 4 with a total program review in Year 5. A Review Team for each Area is established and is chaired by a GE Committee faculty member. Three additional faculty members, one each selected by the GE Committee, the Dean of the College of Liberal Arts, and the Provost constitute the team. Additionally, the University Student Learning Outcomes Assessment Committee chair or faculty designee participates upon request.

Although the CSUDH GE Program has been in existence for more than 25 years, the first program review was instituted in the 2003-04 academic year. The review process was designed to accomplish the following purposes:

1. Help the GE Program faculty perform a self-analysis concerning the courses they are teaching for GE;
2. Perform a systematic review to provide evidence to accrediting agencies about student learning outcomes and achievement;
3. Ascertain whether or not GE course objectives/outcomes are student-centred, measurable and/or observable and appropriately reflect the University GE Area objectives;
4. Ascertain whether or not there is evidence that students are mastering the stated University GE Area objectives and course objectives/outcomes in each Area;
5. Provide opportunity for GE program faculty to give feedback to the GE Committee regarding the Area mission and objectives, with recommendations for modifications as appropriate; and
6. Determine whether or not a course meets the standards for continuation in the GE Program.

Early in the Fall semester, faculty teaching GE courses in the Area under review are reminded that they need

to collect student materials during the semester and to give them to the Course Coordinator, who is appointed to collect and assemble materials to be submitted to the GE Committee for review in the Spring semester. Faculty are asked to submit course syllabi, graded student work, and sample exams with a range of grades. The Course Coordinator then organizes faculty discussions to analyze those materials for evidence of alignment with University GE objectives; student-centred, measurable objectives/outcomes; adequate assessment methods; appropriate and current course content and resource materials; academic rigor; and commensurability across sections when large enrolment necessitates multiple classes of the same course.

The Course Coordinator is responsible for summarizing the results of the discussion, including any faculty recommendations to strengthen the University GE Area objectives, and forwarding a portfolio including the faculty-collected materials, the Standard Course Syllabus created for the University Curriculum Committee, and the analysis to the Area Review Team for examination in the Spring semester. The Area Review Team members independently examine each course portfolio received using an agreed upon rubric (see Tables 1 and 2); Review Team members then meet to reach consensus regarding recommendations about each course which are then forwarded to the GE Committee. Based on the results of the assessment, the GE Committee determines action to be taken for individual courses and sends written results of the course review including feedback and suggestions, to the course faculty and coordinator.

3. Rubric design and implementation of the review process

It is important to note that the GE Program Review is faculty driven and, as such, is a process in which faculty review faculty. Thus, it must be collegial in nature, sensitive, and unbiased while keeping student learning outcomes as the focus. As the process developed, it became clear that the demands of the review needed to be balanced with faculty workload that for many years

had not included the collection of student and faculty data. In light of these issues, and prior to any data collection, GE Committee members developed guidelines and materials designed to capture the information needed in a sensitive and timely manner. These materials were first distributed to Area A Course Coordinators in Fall 2003-04. When the Area A Review Team began to read the course materials in the Spring, it became evident that an assessment rubric was needed. A rubric was then developed based on the guidelines and materials that had been distributed to the Course Coordinators in the Fall.

A question arose as to which kind of assessment rubric would be more beneficial to the review process—one with holistic ratings for each of the review sections, one with numerical ratings assigned for each component of each section, or a narrative worksheet with comments on each component? Two versions of the rubric were presented to the Review Team, one of which was holistic and the other that combined rating and narrative formats. Upon deliberation, use, and consensus, a model emerged which combines specific and holistic ratings with narrative (see Tables 1 and 2). Based on an agreed upon 80% as the lower limit for acceptability of each item on the rubric, the descriptors in the holistic format vary in quality and quantity for each component across the ratings (see Table 1). In Table 2, the Lickert rating scale gives Review Team members the chance to rate each component of each section, and the narrative portion enables reviewers to elucidate specific concerns or highlight ways in which the teaching faculty are particularly responsive to course-level student learning objectives/outcomes and/or mastery of the University GE objectives.

Although not perfect, reviewers have generally agreed that the combination of formats provides a "reasonable guide" for the review process. While the rubrics are subject to modification by each review team, they have been used as is for Areas A, B, and C, and it is expected that modifications for future areas will be minor. The development of the rubric was critical in the process of conducting the Area reviews and it has encouraged both faculty and the reviewers to consistently focus on the essential components of the GE Program.

4. Discussion

4.1 Review process

In Year 1 (2003-2004), 100% of the course materials were submitted in a portfolio format as requested (10/10 for Area A). (See Table 3) One of these 10 portfolios was judged to be exemplary and faculty from the other nine courses were asked to resubmit their portfolios one year later with revisions. Of these nine, three moved from "needs significant improvement" to "exemplary" at the resubmission. The remaining six were expected to be submitted in February, 2005. Improvement was generally related to the inclusion of a broader sample of materials, deeper analysis of issues by Area A faculty, and initiation of procedures that produced the intended results in a reasonably short amount of time, e.g. meeting with all course faculty, including part-time instructors, regarding the importance of the student-centred, measurable and/or observable objectives / outcomes. One course, however, was completely redesigned by faculty to align with the stated University GE Area A objectives.

In Year 2 (2004-2005), 75% of the course portfolios from Areas B and C were submitted as requested (27/36). (See Table 3.) Fifteen percent of the first-time submissions were exemplary (4/27). Of the 27 portfolios that were submitted, 18 of them were returned for revision and resubmission, due in February of 2006; one course was voluntarily withdrawn from the GE Program because course faculty decided that it was not a good fit with the University GE Areas B and C objectives. Portfolios for nine courses were not submitted; faculty for these courses were strongly encouraged to submit their portfolios in February 2006; in so doing, they will remain in their original cycle and be reviewed in another four years. If faculty choose not to submit course portfolios by February 2006, the respective courses will be withdrawn from the GE program.

Overall, resubmissions were requested for two main reasons: (1) faculty failed to state and/or align course objectives/outcomes with the University GE objectives as stated on the standard syllabus, and (2) analysis by course faculty lacked sufficient depth and reflection concerning necessary improvement. Additionally, final grades, disaggregated by section for each course, were

	4—Exemplary	3--Satisfactory	2--Needs Improvement	1--Needs Significant Improvement
Area A Objectives	Standard Syllabus satisfactorily addresses all objectives in GE target area; all objectives in GE target area are addressed by all instructor syllabi; on all instructor syllabi course materials are current & strongly aligned with Area objectives; criteria for evaluation of student work/assignments are listed & highly correlate to Area objectives	Standard Syllabus satisfactorily addresses objectives in GE target area; all objectives in GE target area are addressed by at least 80% of instructor syllabi; on at least 80% of instructor syllabi course materials are current & align with Area objectives; criteria for evaluation of student work /assignments are listed & correspond to Area objectives	Standard Syllabus poorly addresses objectives in GE target area; all objectives in GE target area are addressed by 50-79% of instructor syllabi; on 50-79% of instructor syllabi course materials are current & align with Area objectives; criteria for evaluation of student work /assignments are listed but poorly correspond to Area objectives	Standard Syllabus does not addresses objectives in GE target area; all objectives in GE target area are addressed by < 50% of instructor syllabi; on < 50% of instructor syllabi course materials are current and/or align with Area objective; criteria for evaluation of student work /assignments are not listed
Course Objectives	Standard syllabus objectives/outcomes are student-centred & measurable; all instructor syllabi course objectives/outcomes are student-centred & measurable	Standard syllabus objectives/outcomes are student-centred & measurable; 80+% of instructor syllabi course objectives/outcomes are student-centred & measurable	Standard syllabus objectives/outcomes are student-centred & measurable; 50-79% of instructor syllabi course objectives/outcomes are student-centred & measurable	Standard syllabus objectives/outcomes are not student-centred & measurable; objectives/outcomes from <50% of instructor syllabi are student-centred & measurable
Materials	Standard Syllabus with course objectives/outcomes is included; course syllabi from all instructors are comprehensive & helpful to students; student exams from all instructors reflect a range of grades; multiple exams are included from all instructors; student work samples reflecting range of grades are included for all instructors; materials are included from all course sections & instructors	Standard Syllabus with course objectives/outcomes is included; course syllabi from at least 80% of instructors are comprehensive & helpful to students; student exams from at least 80% of instructors reflect a range of grades; multiple exams are included for at least 80% of instructors; student work samples reflecting range of grades are included for at least 80% of instructors; materials reflect an appropriately representative sample from course sections & instructors	Standard Syllabus with course objectives/outcomes is included; course syllabi from 50-79% of instructors are comprehensive & helpful to students; student exams from 50-79% of instructors reflect a range of grades; multiple exams are included for 50-79% of instructors; student work samples reflecting range of grades are included for 50-79% of instructors; materials reflect an appropriately representative sample from course sections & instructors	Standard Syllabus with course objectives/outcomes is not included; course syllabi from <50% of instructors are comprehensive & helpful to students; student exams from <50% of instructors reflect a range of grades; multiple exams are included for <50% of instructors; student work samples reflecting range of grades are included for <50% of instructors; materials are not a representative sample from course sections & instructors

Table 1. Holistic GE Program Review Assessment Rubric

Evidence	<p>For all course sections all of the following are true: Means of instructor assessment is appropriate to measure mastery of GE objectives; criteria for success of student mastery of GE objectives aligns with GE principles; examination of syllabi indicates teaching methods are appropriate for mastery of GE objectives; student work samples & exams demonstrate student mastery of target GE objectives; evaluation of student work samples & exams demonstrates academic rigor consistent with GE principles as noted by grades assigned; the range of course grades is consistent with levels of demonstrated mastery</p>	<p>For at least 80 % of course sections all of the following are true: Means of instructor assessment is appropriate to measure mastery of GE objectives; criteria for success of student mastery of GE objectives aligns with GE principles; examination of syllabi indicates teaching methods are appropriate for mastery of GE objectives; student work samples & exams demonstrate student mastery of target GE objectives; evaluation of student work samples & exams demonstrates academic rigor consistent with GE principles as noted by grades assigned; the range of course grades is consistent with levels of demonstrated mastery</p>	<p>For at least 50-79% of course sections a minimum of 5 of the following are true: Means of instructor assessment is appropriate to measure mastery of GE objectives; criteria for success of student mastery of GE objectives aligns with GE principles; examination of syllabi indicates teaching methods are appropriate for mastery of GE objectives; student work samples & exams demonstrate student mastery of target GE objectives; evaluation of student work samples & exams demonstrates academic rigor consistent with GE principles as noted by grades assigned; the range of course grades is consistent with levels of demonstrated mastery</p>	<p>For <50% of course sections less than 5 of the following are true: Means of instructor assessment is appropriate to measure mastery of GE objectives; criteria for success of student mastery of GE objectives aligns with GE principles; examination of syllabi indicates teaching methods are appropriate for mastery of GE objectives; student work samples & exams demonstrate student mastery of target GE objectives; evaluation of student work samples & exams demonstrates academic rigor consistent with GE principles as noted by grades assigned; the range of course grades is consistent with levels of demonstrated mastery</p>
Commensurability	<p>Examination of syllabi, student work samples, exams & final grades demonstrates course alignment of with GE principles & objectives all course sections; grading patterns are highly correlated across sections; a systematic & effective mechanism is in place to ensure comparability for courses taught by existing, new, & adjunct faculty; student evaluation is included in the comparability mechanism</p>	<p>Examination of syllabi, student work samples, exams & final grades demonstrates course alignment of with GE principles & objectives across at least 80% of course sections; grading patterns are similar across sections; a mechanism is in place to ensure comparability for courses taught by existing, new, & adjunct faculty</p>	<p>Examination of syllabi, student work samples, exams & final grades demonstrates course alignment of with GE principles & objectives across 50-79% of course sections; grading patterns are dissimilar across sections; the mechanism to ensure comparability for courses taught by existing, new, & adjunct faculty is in place but is ineffective</p>	<p>Examination of syllabi, student work samples, exams & final grades demonstrates course alignment of with GE principles & objectives in <50% of course sections; grading patterns are highly dissimilar across sections; there is no mechanism to ensure comparability for courses taught by existing, new, & adjunct faculty</p>
Program Analysis	<p>Department analysis overall is deep & comprehensive; department identified major strengths & weaknesses of course as they relate to GE principles & objectives; rates of student success & mastery of GE objectives are analyzed & possible solutions for improvement are generated; thorough description of how results will be used to improve the instructional program is included; plans for improvement are logical, pedagogically sound, & concrete plans are in place; recommendations/plans highly correspond with GE principles & objectives</p>	<p>Department identified major strengths or weaknesses of course as they relate to GE principles & objectives; rates of student success & mastery of GE objectives are analyzed; thorough description of how results will be used to improve the instructional program is included; plans for improvement are logical & pedagogically sound; recommendations/plans are aligned with GE principles & objectives</p>	<p>Overall analysis of the course as it relates to GE principles & objectives is cursory; rates of student success & mastery of GE objectives are analyzed minimally; brief description of how results will be used to improve the instructional program is included; a plan for improvement is briefly mentioned but not detailed; recommendations/plans mentioned indicate minimal alignment with GE principles & objectives</p>	<p>Overall analysis of the course as it relates to GE principles & objectives is minimal or missing; rates of student success & mastery of GE objectives are not analyzed; description of how results will be used to improve the instructional program is not included</p>

* "Mastery" requires 80% accuracy

	Targets	4	3	2	1	Comments
Area Objectives	Standard Syllabus addresses objectives in GE target area					
	Instructor syllabi address objectives in GE target area					
	Course materials are current					
	Course materials are aligned with Area objectives					
	Criteria for evaluation of student work/assignments are listed & correspond to Area objectives					
Course Objectives	Standard Syllabus course objectives/outcomes are student-centred & measurable					
	Instructor syllabi course objectives/outcomes are student-centred & measurable					
Materials	Standard syllabus with course objectives/outcomes is included					
	Syllabi from instructors with course objectives/ outcomes are comprehensive & helpful to students					
	Student exams reflecting a range of grades; multiple exams are included for each instructor					<input type="checkbox"/> NA—exams are not given in course
	Student work samples reflecting a range of grades are included					
	Materials reflect an appropriately representative sample from course sections & instructors					
Evidence—Meeting GE Objectives	Means of assessment is appropriate to measure mastery of GE objectives					
	Criteria for success of student mastery of GE objectives aligns with GE principles					
	Examination of syllabi indicates teaching methods are appropriate for mastery of GE objectives					
	Student work samples & exams demonstrate student mastery of GE target objectives					
	Evaluation of student work samples & exams demonstrates academic rigor consistent with GE principles as noted by grades assigned					
	The range of course grades is consistent with levels of demonstrated mastery					
Commensurability	Examination of syllabi, student work samples, exams & final grades demonstrates alignment of content & assignments with GE principles & objectives across sections					
	Grading patterns are similar across sections					
	A mechanism is in place to ensure comparability for courses taught by existing, new, & adjunct faculty					
Departmental Analysis	Department identified major strengths & weaknesses of course related to GE principles & objectives					
	Rate of student success & mastery of GE objectives are analyzed					
	Description of how results will be used to improve the instructional program is included					
	Plans for improvement are logical & pedagogically sound					
	Recommendations/plans are aligned with GE principles & objectives					

4 = Exemplary
3 = Satisfactory

2 = Needs Improvement
1 = Needs Significant Improvement

Table 2. Rating/Narrative GE Program Review Assessment Rubric

	Year 1		Year 2	
	Frequency	Percent	Frequency	Percent
Portfolios submitted	10	100	27	75
Portfolios not submitted	0	0	9	25
First-time submissions rated "exemplary"	1	10	4	15
Portfolios needing resubmission	9	90	18	67
Resubmissions moving from "needs significant improvement" to "exemplary"	3	33	*	*
Courses withdrawn from GE Program by department	0	0	1	0

*Resubmissions for Year 2 are due February 1, 2006

Table 3. Results of GE Program Reviews to date

added to the course portfolio to provide more information for the analysis of commensurability across sections. Examination of these grades by section was informative and, in some cases, revealed extreme disparity in grading practices among faculty teaching sections of the same course. For courses in which resubmissions improved to "exemplary" status, Course Coordinators took steps to gather faculty for discussion and followed through with systematic efforts to ascertain that all faculty teaching the course understood the GE Program requirements and provided instruction that focused on student learning, via student-centred, measurable and/or observable objectives/outcomes.

Based on faculty discussion, it was decided by the Review Team that student learning was the most critical factor in the review. In implementing this decision, the Review Team members tried to put themselves into the place of faculty receiving the review results with each type of rubric format: holistic scores, individual scores for each component, or narrative reports. There was concern about how faculty would perceive numerical ratings on reports generated by their colleagues and how their perceptions would affect their response to improve the process which was aimed at student learning. Therefore, a decision was made to omit reporting the rubric scores altogether and focus on a narrative report to the course faculty. The team wanted the reports to be supportive, but firm, about their concerns and decided that a narrative report would be the better way to accomplish this.

Reviewers submitted their analyses to one member of the team for synthesis in written narrative reports,

paying special attention to areas of concern. The narrative reports were reviewed by Review Team members prior to submission to the GE Committee. Use of the rubric has provided the common ground by which the Review Team could make recommendations to the GE Committee and guide the discussion of recommendations by the GE Committee to course faculty. The assessment rubric is now included in the packet of materials that is distributed to each faculty member whose course is under review. GE Program faculty, the Area Review Teams, and the GE Committee all find the assessment rubric to be a useful goal-directing document and an important guide for rich discussion, analysis, and decision-making.

A feedback loop is embedded in the Review process: the Review Team makes recommendations to the GE Committee, the Committee discusses recommendations and decides upon action, letters are sent to the Course Coordinator and appropriate faculty, and faculty make recommendations to the GE Committee regarding proposed changes in the University GE objectives. In both years of the review, there was consensus that five years is too long to wait for revisions of some courses in which there was limited evidence of a match between University GE objectives and student achievement. In such cases, resubmissions were requested for one year after the original submission. This allows course faculty time to review the recommendations, make changes to support mastery of the University GE objectives, and collect additional student materials that demonstrate achievement of student-centred, measurable objectives/outcomes. In cases of resubmission, the course stays in the original cycle and is reviewed again five years from

its original submission of materials.

A number of insights gleaned from this undertaking provided direction for improvement and institutionalization of the GE Review Process: (1) Rubrics are important both as an evaluation guide and as a standard by which course faculty can set their goals; providing the rubric to faculty before the process begins is important. (2) Considering the "match" between the type of rubric and the possible perception of faculty about the review process aided in acceptance of the review by course faculty. It was helpful to consider in advance what course faculty would better receive from their colleagues - a holistic score, a rating on various components, or a narrative describing what is working well and what needs to be improved. (3) Verifying agreement among the Review Team members early in the review process is essential. (4) A five-year cycle is too long to wait for recommended changes; a flexible alternative such as the possibility for course revision and portfolio resubmission in one year facilitates change in a timely manner for the benefit of students. (5) Course Coordinators who were not department chairs generally submitted stronger portfolios. (6) Faculty review and analysis prior to portfolio submission is a critical part of the process and needs more emphasis. (7) Inclusion of direct contact with students or information from them should be considered in future reviews. (8) An examination of grades assigned in all sections of courses under review is informative, particularly as it pertains to section commensurability. (9) With some modification, the model for the rubric can be used to review courses applying for approval as a course in the GE Program.

4.2 GE Program evaluation

Evaluation focuses on the effectiveness of the GE program. Effectiveness is defined in terms of the following research questions:

1. To what extent are designated GE course objectives/outcomes student-centred, measurable and/or observable, and appropriately reflect stated University GE Area objectives?
2. Is there evidence to support the claim that students are mastering the stated University GE Area objectives (80% indicates mastery)?
3. What feedback from faculty suggests that revision of

University GE Area objectives is required to meet the goals of the GE Program?

Four items from the rubrics used for the five-year review process are used to provide data to answer these questions. They are:

1. GE course objectives/outcomes are student-centred, measurable and/or observable.
2. Assessment method(s) at the course level is appropriate to "measure" mastery of University GE Areas' objectives.
3. Criteria for success of mastery of University GE Areas' objectives align with GE goals.
4. Faculty recommendations for change are congruent with GE goals and/or University GE Areas' objectives.

Some preliminary findings only can be reported due to limited data to date in the five-year review and evaluation process. There is evidence thus far that more GE course objectives/outcomes are student-centred, measurable and/or observable than not by a 2:1 ratio. If this trend continues, Dominguez Hills may be able to show that a paradigm shift is occurring as described by Barr and Tagg (1995) and that learning is occurring as stated in the outcomes. The limited evidence to date appears less promising in support of items 2 through 4 (above). However, it is anticipated that whatever the final results are, they will help to point the GE Committee in a direction designed to improve the GE program in terms of learning and achievement of learning based on assessment of learning outcomes which connote effectiveness at Dominguez Hills.

5. Next steps

The effort by CSUDH faculty to institutionalize a systematic review of GE courses has begun and the first two years of a five-year review cycle have been completed. Departments and faculty under review have embraced the process with varying degrees of time and effort and the results have been mixed, but the process has been viewed positively by both faculty leadership

and the administration, and it is expected that it will be well-received by the next University accreditation team. The review process appears to be critical in helping faculty examine the alignment between their own courses and the University GE objectives with the aim of providing the foundational skills and knowledge required of a well-educated person.

Regarding GE program evaluation, data collection on the effectiveness of the GE program as defined by the research questions identified earlier in this paper will be ongoing and cumulative for another three years and beyond as program evaluation is a continuous activity. The value of providing evidence of program effectiveness cannot be underestimated as demands by stakeholders increase and funding sources for state-supported institutions diminish.

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An Assistant Dean, Learning and Teaching's Role in Quality Assuring Assessment

Sally Kift
Faculty of Law
Queensland University of Technology, Australia

All institutions now have an array of top level policies devoted to assuring learning and teaching quality and student learning outcomes for any number of purposes, including the necessity to embed graduate attributes and skills' acquisition. What is less certain is that a corresponding amount of effort has gone into assuring the design of valid and reliable assessment and feedback practices for transfer to the imperatives of assessing these new agenda learning outcomes. In most institutions, this aspect of curriculum leadership and Quality Assurance (QA) falls to Assistant or Associate Deans (Learning & Teaching) to progress; usually middle management positions, occupied by discipline academics embedded in Faculty structures. This paper will examine the context and characteristics of these roles briefly and present a simple conceptual framework for them. It will draw on examples from various policies and initiatives enacted in the author's Faculty, particularly in the area of valid assessment of graduate attributes, to illustrate the principle of quality assured assessment progressed under the auspices of this role.

1. Introduction

In Australia, with the advent of the Australian Universities Quality Agency (AUQA) and 2005 Nelson reforms, the urgency that drives pedagogical policy development includes the obvious imperatives to satisfy quality audits, to manage accountability and risk, and to promote consistency and educational improvement.

However, in many time- and resource-poor faculties, the responsibility for operationalising institutional learning, teaching and assessment agendas usually falls on a small number of committed individuals interposed between top-level university management structures on the one hand and, on the other, the often-crowded classroom and overburdened teacher. Depending on variables such as faculty culture, resourcing and faculty perception of priorities, this pivotal group may include officers such as Heads of School, Program Coordinators and Year/Major Coordinators, but will always include the variously titled Deans or Associate/Assistant Deans (Learning & Teaching or Academic). The context and characteristics of these positions have received little analysis (cf. Lines, 2004), but what is clear is that it is these curriculum leaders who "act as the conduit, both ways, between the staff and the corporate plan" (Lines, 2004, p.44) and who therefore shoulder much of the responsibility for assuring quality assessment practices and their shackled stable-mate, the learning and teaching design, of which they are integrally a part.

In progressing and assuring the efficacy of desirable, authentic assessment, especially in the area of graduate attribute development and acquisition, the role of the Assistant Dean is to create the appropriate environment (strategic, policy-embedded and cultural) to assure that the nexus between institutional strategy and classroom implementation is facilitated. Implicit in this is the necessity both to ensure constructive alignment (Biggs, 2003) and program coherence as between program and individual subject objectives at the macro level *and*, in the subjects themselves, alignment as between subject objectives, learning and teaching approaches and the assessment tasks prescribed.

In this paper the challenges and possibilities of the Assistant Dean role will be discussed, particularly in

terms of the necessity for this role to lead and manage change as a "complex learning and unlearning process for all concerned" (Scott, 2004). A simple conceptual framework for the role will be presented, illustrated with examples from my Faculty's policies and initiatives. The final part of the paper presents a Faculty case study on assessing graduate attributes in particularly problematic aspects, as an exemplar to illustrate the principle of quality assured assessment practices, facilitated under the auspices of this role.

2. The role of the Assistant Dean, learning & teaching

The variously titled Deans or Associate/Assistant Deans (L&T/Academic) (here "A/Dean, L&T") are often an interesting but unspecified mix of visionary, strategist, mentor and micro-manager, who may or may not (and most often not) have line management and/or budgetary responsibility to develop and implement the strategies, policies and quality assurance adherence with which they are charged (Scott, 2004). Lines (2000), in the context of an Australian Technology Network (ATN) study to identify support mechanisms for implementing pedagogical change and improvement, reported that these "new academic positions have evolved over a number of years driven by the recognition of the importance of teaching and learning to the overall business of the university" (Lines, 2000, p.44).

While most Heads of School and various Program, Year and/or Major Coordinators struggle just to ensure (cf. assure) the delivery of their resource-intensive, online and on- and off-campus programs in an inferior funding environment, it is the A/Dean, L&T who undertakes the relatively thankless pivotal role in their Faculty of curriculum leadership and pedagogical transformation; indeed "anything to do with the teaching and learning environments that nobody knows what to do with" (Lines, 2000, p.44). These discipline-based academics shoulder the dichotomous responsibilities of supporting and promoting the top-level quality agenda in the Faculty (for example, by championing ongoing learning and

teaching innovation, improvement and evaluation, relevantly here regarding the implementation of assessment policy imperatives), while simultaneously endeavouring to enable and support a growing minority of enthusiastic innovators, attempting to persuade the cynical spectators and seeking to neutralise the spoilers/obstructionists; all focussed around what is doable in pedagogical terms and making explicit the validity and value of engaging with this work.

It follows that the role entails the indispensable dynamic of managing downwards, upwards and sideways: of persuading teachers that implementing the institutional agenda will be both valued and of enduring value; of persuading institutional management that their expectations of teachers should be realistic and appropriately resourced; and of persuading Faculty/School leadership that the agenda is on a par with institutional exhortations to pursue, what is perceived to be, more-valued research and commercialisation opportunities.

Particularly unenviably, the role's essence is the challenging and shifting negotiation role of moderator or "honest-broker" who must mediate the indelicate balance between institutional good-policy-making and Faculty implementation-void-filling; between Faculty good-policy-making and School operational pragmatism and scepticism; and between the institutional rhetoric of valuing L&T and the valued teacher's perception of promotion-reality being still firmly skewed in favour of the more objectively quantifiable research head and commercialisation quantum.

The breadth of the role, and many of both its challenges and opportunities, reside in -

- *the functions undertaken*: for example, drafting reports, plans, faculty responses; service on multiple Committees, sub-committees, working parties, etc. many of which the A/Dean, L&T chairs at Faculty level; responsibility for faculty online and flexible delivery; responsibility for quality assurance (QA), evaluation strategies and supportive policy development and implementation; whole of course dealings with students; liaison with the role's equivalents in other faculties and, more recently, in other universities; facilitating both Faculty, institutional and external

learning and teaching grant applications;

- *the stakeholders to whom the position is answerable, or at least "call-on-able-by"*: for example, Dean(s); Heads of School (own and Faculty others); QA officers for courses/programs; relevant DVC or PVC; students; institutional learning and teaching support services and IT services; teaching colleagues in own and other Faculties; teaching colleagues from other universities, both discipline and otherwise; sessional teaching staff, etc; and
- *the role's QA aspect*, particularly quality assurance compliance oversight for core program documentation, chief amongst which is the individual unit/subject/course outline document that forms the critical contract with the student semester by semester and is the foundational document for constructive alignment in the curriculum (and which, is might also be noted, is a frequent flashpoint between the operational and the pedagogical).

Let it be otherwise overlooked, the work of an A/Dean, L&T also has a strong student aspect, which in some instances is a cause for further managing and persuasion of colleagues. Often it falls to the A/Dean, L&T to serve as the Faculty's "curriculum conscience"; to remind institutional actors that, while engaged in the busy work around the not-insignificant responsibilities of program delivery, accountability, reporting and marketing, the humble individual student, the focus of much of the busy work, should not be forgotten.

In the specific context of this paper, and more generally having regard to the indivisibility of learning and teaching design on the one hand from valid assessment practices on the other, in each of the above aspects the A/Dean, L&T has the potential to influence and lead desirable curriculum renewal and reform by enhancing learning and teaching through assessment. A simple conceptual framework for how this might be done in the role is now presented which examples the framework's enactment in the author's Faculty. The final part of the paper considers a case study in the author's Faculty which has sought to progress the valid assessment of graduate attributes in the most problematic areas of their learning design, most of which work has been progressed under the sponsorship of the A/Dean, L&T's curriculum leadership role.

3. A conceptual framework for the A/Dean's learning and teaching role

The context-embedded nature of this role lies at the heart of its potential to be a positive mechanism for facilitating the development and delivery of quality assured assessment policies, processes, structures and procedures in support of enhanced student learning outcomes. Under the auspices of the A/Dean's L&T role, it is organisationally possible to conceptualise how change, as the "complex learning and unlearning process for all concerned" (Scott, 2004) referred to above, might be managed and progressed by curriculum leadership at a variety of levels of engagement and influence. An attempt has been made to represent this conceptually and diagrammatically in Figure 1. In this conceptualisation, the role is construed as a relational or holistic one, where the series of separate elements (Faculty, School, University and sectoral) are integrated into the sum of their parts. The concept envisages a structure that *supports* students and teachers *through* practice and scholarship.

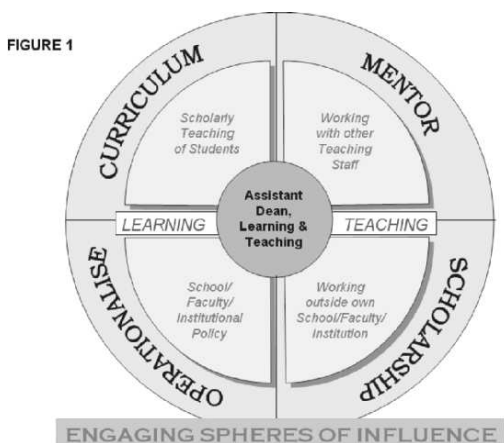


Figure 1. A/Dean L&T's potential spheres of influence in curriculum leadership.

In Figure 1, an *individual* staff member's levels of influence as a teacher in the Faculty learning and teaching environment, engaging in scholarly teaching and the scholarship of teaching, are represented by the lighter, internal, quarter-segments of -

- scholarly teaching of students;

- working with other teaching staff (e.g. in teaching teams, on learning and teaching grants, etc);
- operating within the bounds of learning and teaching policy and perhaps with some potential for effecting change at that level;
- working outside the School /Faculty /Institution on some occasions with other teachers (e.g. on learning and teaching projects, through teaching scholarship publications, through involvement in discipline curriculum renewal, etc.).

For an A/Dean, L&T, with a mainstream placement that is central to both the Faculty and the institutional learning and teaching environment, the possibilities for exercising much greater influence for the "pedagogical good" of enhancing student learning outcomes are represented in Figure 1 by the expanded darker, encompassing quadrants of curriculum, mentor, operationalise and scholarship. Each of these will now be discussed briefly, illustrated by practice, policy and initiative exemplars from the author's Faculty. Following this, the final part of the paper will present a tangible demonstration of the QA possibilities for enhancing assessment under the sponsorship of the A/Dean by way of a Faculty case study on assessing graduate attributes.

3.1 Curriculum influence

Rather than influencing "only" the specifically allocated students in designated subject areas of individual teacher responsibility, the A/Dean, L&T role enables direct *curriculum* involvement for the benefit of all Faculty students and their learning engagement: for example, through curriculum reform and enhanced course documentation (specifically refer the latter as regards embedding constructive alignment and desirable formative feedback opportunities in aid of assessment as learning); and through informal curriculum engagement (e.g. orientation activities, emails to first year cohorts, organisation of peer mentoring programs, etc.).

3.2 Influence as mentor

While individual teachers have every prospect of being influential as regards colleagues' teaching professionalism, the A/Dean, L&T role is structurally replete with oppor-

tunities to support, develop and *mentor* greater numbers of Faculty teachers (including sessional academics who now discharge no end of assessment duties in our increasingly casualised sector (Kift, 2003)).

In this dimension, it is possible to influence others' scholarly learning, teaching and assessment practice and to encourage teachers to make that practice public through the publication of teaching scholarship. This is especially so if structures are provided through targeted staff development initiatives and through the provision of the opportunity, as Scott (2004) suggests, to be reflective about the unlearning and new learning change process. By way of specific example, my Faculty (Law) has now been involved in three major learning and teaching development projects financed by large grants, under A/Dean L&T leadership (respectively, on embedding graduate attributes, on assessing graduate attributes and (currently) on enhancing student transition). The consequence of this involvement has been steady, externally validated, evidence of cultural change and desirable curriculum renewal, framed around graduate attribute development embedded in the discipline context (McKenzie et al., 2005, pp.11-12, 60-66). The specific assessment practice gains in this latter regard will be discussed in the case study below.

3.3 Influence by operationalisation

Through policy development, implementation and agitation, the A/Dean, L&T has potential to influence assessment-as-learning practice through *operationalising* learning, teaching and assessment philosophy at both the faculty and institutional levels. Specific and relevant examples here include -

- overseeing Faculty course design through chairing Faculty committees and working parties to ensure due regard is given to assessment imperatives; particularly as regards -
 - moving beyond limited traditional assessment practices, which in Law have been typified by single, end of "teaching", unseen written examination;
 - appropriate and transparent links to tasks that are valid for the much broader range of learning outcomes now sought to be addressed;
 - ensuring tasks are "authentic" in the sense of being replicative to the greatest extent possible of work

the student is likely to encounter in the professional workplace *and* that the link to the authentic world of work is made transparent;

- tasks being explicated by explicit publication of appropriate criteria and standards; and
- ensuring that opportunities for formative feedback are constructively incorporated into course documentation.
- monitoring policy implementation and QA compliance (especially regarding the unit/subject/course outline to ensure constructive alignment and program coherence);
- through initiating policy development for a supportive critical curriculum environment (for example, on closing the loop on student feedback for QA purposes (Kift & Nulty, 2002); on faculty teaching awards and grants directed to strategic purposes);
- developing funding opportunities for staff to attend Learning and Teaching conference/events for scholarship publication;
- developing (e.g.) Online Learning and Teaching Policy or subject coordinators guidelines that embed good practice aspects (such as provision of timely formative feedback online).

3.4 Influence by scholarship

Influence at the wider intra- and inter-institutional level may be exercised for student learning enhancement through *scholarship* of teaching publications and invited speaking engagements both at other Universities and by being "institutionally visible" in this context (for example, through mentoring, especially at staff development opportunities, and regular presentations at conferences, forums, panels and other scholarly activities, both discipline specific and general; through invited keynotes and other invited workshop facilitations). In this way, it is possible to exercise greater influence at an entirely different level of engagement by modelling and disseminating learning, teaching and assessment approaches through such scholarship and visibility, and nationally and internationally, through scholarship citation.

4. Assessing problematic graduate attributes: a case study

As has been the case in many institutional contexts, the "skills agenda (has offered) a fruitful point of engagement" (Boud & Falchikov, 2005, p.38) in my discipline - legal education. However, this does not occur serendipitously and/or without the intervention of a change agent.

With some prompting, in the late 1990s, the Faculty of Law at the Queensland University of Technology, Australia (QUT) committed itself to providing a package of learning, teaching and assessment opportunities that combined substantive content, theoretical and practical knowledge with the development of certain generic (and other discipline specific) skills; all of this in a legal context to a basic level of competency for all students, regardless of the diversity of their prior background and experience (Christensen & Kift, 2000). Just as the placement and assessment of substantive content is carefully considered in line with subject, year and program objectives, so also it was thought necessary to be deliberately thoughtful about the placement and assessment of generic (and discipline specific) skills as a "whole of course" exercise (Kift, 2002).

However, the renewal of the undergraduate (law) curriculum to address student learning outcomes framed in terms of mastery of both content knowledge and skilled behaviour obviously required a fundamental re-evaluation of the validity and reliability of traditional assessment methods and examination of the latter's transferability to the new imperatives of assessing authentic skills learning.

It is in this context that this case study reports upon an institutional Learning and Teaching Development Large Grant, secured by the author's Faculty under the project leadership of the A/Dean, L&T, to address the assessment imperatives of an explicitly skills-focused agenda. At the abstract level, it serves amply to illustrate the possibilities of the curriculum leadership role of an A/Dean, L&T in the way conceptualised in Figure 1. In the specific assessment-as-learning context, the case study examines the Faculty's progress towards the development of an "assessment framework"; designed

to be a practical tool available to all teaching staff (including sessional teachers) that was sufficiently rigorous to assure the quality of our newly developed skills' assessment tasks.

4.1 Why an assessment framework?

"If you want to change student learning then change the methods of assessment"
(Brown et al., 1997, p.9)

It has become clear that, to motivate today's time-poor students to embrace any new learning, particularly learning that extends beyond strict content objectives and seeks also to inculcate skills and values, the importance of that new learning must be reflected in the assessment regime. This is simply another way of saying that assessment tasks must be aligned with the articulated learning outcomes and that getting the assessment "right" is crucial to the efficacy of curriculum renewal and students' learning engagement (Elton & Johnston, 2002). It falls to the A/Dean, learning and teaching's to marshal such arguments, which are not necessarily readily nor well understood in the specific discipline context, to ensure these issues become a major area of Faculty concern. It was through exactly this process that my Faculty's attention was focussed on the quality assurance of assessment practices through curriculum alignment that embraced learning outcomes around skilled behaviour.

Under the A/Dean's L&T's curriculum management aspect, the development of an assessment framework to inform the Faculty's quality assurance of the learning, teaching and assessment of generic and discipline specific skills was the subject of a successful grant application for funding from the University in 2002. For the purposes of trialling and evaluating the framework, the Faculty identified four areas of generic skills development (project areas) that had proved extremely challenging in terms of developing valid and reliable assessment practices, specifically:

1. the embedding of indigenous content and perspectives;
2. the development of oral communication (with particular emphasis on negotiation, advocacy, tutorial participation, and client interviewing for internal and

- external students);
3. the infusion of ethical values and knowledge;
 4. teamwork in large and small classes in which both internal and external students are enrolled.

These project areas were chosen because they were representative of social, relational and cultural skills that had been identified as either problematic in their own right (because assessment has been hampered by perceptions of subjectivity or cultural bias) or problematic because of difficulties experienced in formulating valid and reliable assessment tasks (particularly in large group teaching and in flexible delivery modes). As these difficulties are not discipline-specific, the project's outcomes were hoped to be transferable to other contexts and all project team members were encouraged to (and did) publish their scholarship in teaching and learning research and development in this regard.

Over 20 faculty teachers were engaged in the project and more than thirty-five teaching scholarship publications were disseminated by members of the project team over the course of the project and since its completion. The assessment framework developed was a shared achievement and has informed many of the assessment practices now embedded in core Faculty units.

While some of this work may well have occurred in an ad-hoc way over time, the central position of this paper is that such wholesale and principled curriculum renewal (as set out in more detail below in its assessment aspect) is only possible when driven by a curriculum management role such as that of an A/Dean, in which resides both the administrative power and responsibility to assure that desirable change is embedded in course documentation *and* the discipline credibility to mentor the entire process. Crucially also, the A/Dean has a central role to play in the deployment of a communication strategy to sell the (inevitable) requirement for curriculum QA in the Faculty and discipline context. It should not be assumed that discipline experts enmeshed in current practice necessarily accept the validity or value of this work. Therefore, the strategies and arguments deployed to enable the adoption of an assessment framework in the author's Faculty context will now be briefly addressed, before turning to the detail of the

QA framework itself.

4.2 An assessment framework: some background and a sales spiel

As the concept of curriculum alignment was not necessarily on the radar of discipline colleagues, as with most new learning, it was therefore considered desirable to contextualise the issue to the Faculty learning environments and to provide adaptable schema to support teachers in the deployment of new curriculum approaches. Of course, as has been acknowledged above, the role of any assessment will depend on the learning outcomes identified and pursued for a given course of study. With some guidance, colleagues were soon able to identify that, at a fundamental level of subject design, the type of information that might facilitate the efficacy of assessment tasks, and which should be communicated to students, could be suggested by the following headings, all of which are directed at the necessity to be explicit about the skills outcomes to be attained in course documentation (Kift, 2002):

- State the skill(s) to be explicitly and implicitly developed in the subject;
- Why these skill(s) have been chosen for this subject;
- What is the learning outcome in relation to the particular skill(s)?;
- How will each of the skill(s) be developed in the subject?; and
- How does this subject's skill(s)' development relate to the year's curriculum as a whole and then to the program of study as a whole?

Equally as important as painting the big picture for students was determined to be the issue of explaining to learners each *item* of assessment in terms of, for example, what the skills outcomes for the particular assessment task were expected to be, and how such outcomes linked with those of the particular subject of study and with other subjects being studied by the student, so that students were presented with "a theoretically grounded and integrated approach to assessment" (Johnstone & Vignaendra, 2003, pp.383-388).

Crucial to garnering support for the validity of this curriculum renewal *in the discipline context*, the recent

Australian Universities Teaching Committee's (AUTC) "stocktake" of legal education, *Learning Outcomes and Curriculum Development in Law* (Johnstone & Vignaendra, 2003), which examined the impact of a variety of teaching methods offered within the discipline of law in Australian universities and sought to identify good practice in teaching and learning (Johnstone & Vignaendra, 2003, p.363), helpfully drew attention to the fact that:

It is now well accepted that assessment is one of the most important elements of subject design (Johnstone, Patterson and Rubenstein, 1998; Hinett and Bone, 2002). Assessment has changed in law schools, partly driven by university requirements, and partly by greater understanding of how good assessment strategies can influence student learning....The view of assessment in the traditional model of law teaching - a single end of year written examination after "teaching" was completed - no longer dominates law schools as much as it did in the past. This, in part, is due to a more thoughtful approach of some law teaching academics, and in part to the "top down" influence of university teaching and learning policies.

Also mentioned in the AUTC 2003 Report (Johnstone & Vignaendra, 2003, pp.390-391) is that this more sophisticated approach to assessment has produced other "notable improvement(s) to law school assessment regimes" including:

- the diversification of assessment methods;
- dissemination of information to students about assessment criteria; and
- greater attention to providing feedback to students on their performance against those criteria.

With the Faculty's agreement then, the project team considered that all of these matters should be reflected in any assessment framework designed for quality assurance purposes. The shared discussion and new learnings around the development of the framework are another significant outcome of the project.

The balance of this paper will now consider the detail of the assessment framework as ultimately refined and utilised, which readers might find of value as a tool to

aid in progressing the assessment-as-learning agenda.

4.3 An assessment framework

"It is generally recognised that good assessment is assessment that is valid, reliable and fit for its purpose" and should also "enable certification or classification of students' achievements and to promote and enhance students' learning" (AUTC Project, p.6). A further, often forgotten purpose of assessment, is to provide feedback, not only to the students (as implicit in the foregoing), but also to teaching staff.

At a most fundamental level, the complex graduate attribute agenda that we have embraced prompts the query: How can we assure the quality of our assessment of students' skills development? The answer to which my Faculty arrived is that we should be able to assure the quality of that assessment if it satisfies certain criteria (that we have distilled from the educational literature).

Ultimately, we sought to reduce those criteria to a checklist form that staff may now access via the Faculty website (with some explanation of what we understand by each item available as an embedded explanatory link). Using the checklist, the hypothesis is that the details of each assessment method we have (or locate) can be evaluated against the criteria to check for quality. This should give us some informed-by-principle idea of a "quality-rating" or "score" for each assessment item. At the very least, it will certainly highlight strengths and/or weaknesses both at the micro task level and at the macro whole-of-course level, the latter across the incremental development of a given skill.

For example: one of the skills which contributes to the graduate capability of "Communication" is "oral presentation". This is a skill that has been mapped onto at least nine subjects in the undergraduate curriculum through three levels of skills progressions (notionally years 1, 2 and 3 of the degree) (Kift, 2002). Various assessment tasks have been designed to assess this skill in the different subjects. When the body of these tasks is gauged as against the assessment framework we have developed, we should be able to demonstrate whether those assessment tasks "work" and, if they work, why they work (on the basis that they meet the criteria that

have been established). If some aspect of the development of the skill is lacking across the course then that too can be addressed to ensure that the skill has been assessed comprehensively.

Over the course of the project, we have in fact filtered a range of assessment methods through the checklist/framework and, by that process, have sought to elucidate the process for preferred skills assessment in a given area of skilled behaviour by reference to best (or at least good) practice assessment methods (which may have been constructed by amalgamating the best features of several assessment tasks). These good practice tasks have then been trialled and evaluated. The framework criteria were then modified as appropriate on the basis of the evaluation and feedback from those trials.

Importantly for the Faculty, the final checklist needed to be a practical tool that all Faculty staff (including sessionals, none of whom necessarily have any background in educational theory) will feel comfortable in using and referring to: it had to be accessible in terms of its functionality and its language. To have academic credibility, it also needed to be sufficiently rigorous to achieve its stated aim of assuring the quality of assessment tasks. Desirably, it should further promote good practice by acting as a prompt for reflection by staff on their daily teaching, learning and assessment work. Acknowledging how resource intensive skills development is, and the consequent impact that it has had on academic workloads (particularly, in terms of the level of feedback required to support student learning), another very important consideration for us was that any assessment and feedback model adopted must be "manageable", in the simple sense that we can deliver on it given current staffing and resourcing constraints.

In the terms referred to earlier in this paper, it is in this latter way that a realistic mediation of the overarching institutional agenda with the capacity for coalface enactment is effected. A further allowance in this regard is the pragmatic acknowledgment that there must be room for rational compromise between desirable assessment of skilled behaviour and the concept of "across whole-of-course assessment". By way of specific example (Knight, 2001), in assessing the skill of oral communication in its oral presentation aspect, once we

have agreed on criteria that encapsulate what a good performance of that task might look like (which the team managing that project area did), the desirable approach would be to judge that performance multiple times by a number of different trained assessors to view a reasonably representative sample of the range of possible student performances. Within current resourcing limitations, certainly with the large cohort of students in my Faculty, this is simply not possible. However, as Knight observes,

"(T)his does not force us into the preposterous position of suggesting that higher education can only produce tolerably reliable judgements of low-level, achievements such as information recall. The answer to this and many other assessment problems is a programme-level answer, dependent on leadership and systemic thinking. It may be impossible to get reliable judgements of skill at oral presentation out of one module but it is not hard to see how they could be had from a programme-wide approach to assessment...What the individual teacher cannot afford, let alone manage, programmes can."

(Knight, 2001, p.15)

In this way, when the skill has been mapped onto nine subjects in the undergraduate curriculum through three levels of skills progressions (Kift, 2002), the assessment becomes a "programme-wide assessment plan, so that by the time students came to graduate there would be many measures of performance by different observers all using the language of a common observation schedule or set of assessment criteria". (Knight, 2001, p.22)

The checklist that has been formulated is explicated further below. The checklist was refined once the initial assessment tasks (in the project areas) were trialled and evaluated. On the finalised Grant website, each item on the checklist is accompanied by a short explanation (embedded on the site). The language used in the final version strives to be staff-centred to aid accessibility.

4.4 The assessment framework deconstructed

The assessment framework has been reduced to a checklist constituted by a series of prompts in the form

of checkboxes. The quality of an assessment task is measured against these criteria; a judgement which is undertaken (whenever possible) in conjunction with an analysis of student feedback elicited as to their perception of the efficacy of the particular item of assessment. Examples of this process are available on the Faculty website (2000-2001). Those checkboxes, together with some minimal explanation (Nulty & Kift, 2003), are as follows -

- *Is the assessment method valid?* Does it actually assess what it purports to assess? Can it be used to discover whether students have achieved the learning outcomes identified for the subject studied and does it allow students to demonstrate those achievements?
- *Is the assessment method reliable?* Would the marking of the task give the same result no matter who did it? Would it give the same mark if the marking was repeated at a later date? Could a third party make some external verification of the mark awarded?
- Particularly, this relates to transparency in assessment practice and fairness (referred to above and also discussed further below). Students need to be able to determine for themselves what characterises high quality work - if they can't do this for themselves how will they work as autonomous professionals once they graduate? (Boud & Falchikov, 2005) Therefore, the encouragement to staff here is to be open about the assessment criteria used and the performance standards relevant to each criterion. This helps learners to learn for themselves - not only now but into their future. It also helps teachers in their learning design because they can be clearer about what they are trying to achieve. Issues here include -
 - Are there clear and appropriate marking criteria which will be consistently applied? (Bone, 1999).
 - Is there consistency of criteria in the assessment of this skill across units?
 - Do the performance standards under the criteria provide an adequate basis for discriminating between different categories of attainment? (Price & Rust, 2004)
- *Is the assessment fair?* (Related to reliability and transparency in assessment practice). Students are very quick to judge fairness or otherwise as a sort of intuitive Gestalt. Teachers should be particularly careful about the use of a grading curve which can be

seen to be unfair if it allows people to get high grades for relatively poor work, or low grades for good work (cf true criterion referenced assessment) (James, 2002).

- *Is the assessment unambiguous in its intention?* The relationship between the assessment and the desired learning outcome should be obvious to the students: that is, learners should be able to *see* the *relevance* and *purpose* of each assessment activity. If this is the case, then students should be able to engage with the activity in a self-directed and purposeful manner *and* will find it easier to be motivated about the task. Good performers should have the opportunity to be (and be rewarded for being) creative in their thinking and drawing in associations from other areas of their knowledge and skill because they can actively hypothesise about inter-relationships.
- *Is the assessment authentic?* As closely as possible, assessment tasks should resemble tasks that students would encounter in a genuine work or life setting (rather than an artificial academic one). Such authentic assessments are usually more inherently interesting, engaging and motivational by virtue of their connection to the students' graduate workplace (the relevance of which should be made transparent).
- A sub-dimension here is to give some consideration to differences in cultural and social backgrounds and to personal and professional aspirations: what is relevant, interesting and engaging to one learner is not necessarily so to another.
- *Does the assessment method help students to develop in the area being assessed?* Active assessment processes should aspire to the notion assessment-as-learning, or for "educational improvement" (AAHE Assessment Forum): the assessment should promote student learning by being explicitly linked to the learning objectives of the subject (constructive alignment (Biggs, 2003) and the "how" of this should be made clear to students).
- Specifically, staff might like to ask themselves does the assessment task help students to learn (Issacs, 2001) -
 - By being **constructive** in the sense that assessment tasks build on what has been assessed before and build from the simpler to the more complex?

Re this latter, does the assessment relate to *different stages of learning*? A simple way of stating this might

be to say that higher-level abilities should be demonstrated by final year students. But it is also important to consider the incorporation of higher level thinking into assessment tasks:

"There is an argument that all too often in ...higher education we assess the things which are easy to assess, which tend to be basic factual knowledge and comprehension rather than the higher order objectives of analysis, synthesis and evaluation."
(Centre for Staff and Learning Development)

For example therefore: staff might ask themselves which level of the Bloom or Solo cognitive hierarchy (in terms of learning outcomes as described by different verbs) does the assessment task address? Alternatively, if the assessment task assesses the affective, rather than the cognitive, domain then a different taxonomy should be employed. Teachers might also care to consider whether the totality of the assessment regime relates well to different learning styles (e.g. aural, visual or kinaesthetic), to different cognitive styles (e.g. divergers, convergers, assimilators, explorers). Also under this head, the issue of the assessment re-iteratively providing timely, constructive information to students about their learning that is both formative and summative should be considered.

- *Does the assessment strategy* help the teacher to teach by providing timely information about the *students'* learning: this also should be both formative and summative.
- Is the assessment method manageable, in the sense that it is efficient and effective for both students and academics? (Bone, 1999, p.34; AUTC Project, 2001). Issues here include that -
 - the work-load associated with marking student work is within the capacity (in terms of skill and time) of the teaching staff available; and
 - the work-load associated with completing the work to be assessed is within the capacity (in terms of skill and time) of the students.

Gibbs, in particular, suggests a range of strategies for making assessment more manageable in large classes without unduly affecting learning, including "front-ending" to "minimise problems that may occur later" by putting more time into preparing the assessment task

and briefing students; engaging them in practice assessments (such as peer- or self-assessed tasks) so that they can understand the criteria in use (Gibbs, 1992).

- *Does the assessment provide equal opportunity?* Assessment should provide equal opportunity to all students in a group. This means that the *only* factor limiting a particular student's performance should be their ability - not any variation in the opportunity for support provided to one student relative to another. Note that this means that we can (and do) provide some students with more support than others, but generally, should *offer* the same level of support to all of them.
- *Is the assessment ethical?* (Nulty et al., 2003) There are several ways in which assessment could be unethical. What follows is a non-exhaustive list. Clearly teachers should not ask students to complete tasks which are against their religious beliefs, or which would involve any criminal activity, or carry any health risk or which would oblige them to risk others. Similarly, students should be given a reasonable opportunity to freely choose to participate in the assessment (in the sense that there should not be any element of coercion involved, other than that the completion of assessment tasks is a subject requirement - yet, they still retain the right not to participate at any point and therefore receive no marks for that assessment.) Other aspects of ethical assessment are touched upon elsewhere in this checklist. For example; equity of opportunity should be evident for all items of assessment; adequate time should be available to all students to complete the task; the same resources should be available, marking criteria and standards should be clearly articulated etc.

While the preceding checklist items are generally to be taken into account for each specific assessment task, there are some points of enquiry worth asking of *the whole assessment strategy* for the subject of study and, further, for the entire program. Briefly, they may be stated as follows:

Does the whole assessment strategy:

- allow students to demonstrate their learning in

different ways

- encourage students to learn in different ways
- cohere together to make a systematic and complete assessment.

Is the whole assessment strategy up and down-scalable (in terms of size of student cohort)?

4.5 The assessment framework - a basis for improvement.

The assessment framework discussed above academic staff to evaluate the quality of their assessment practices and thereby seek to improve the quality of those practices. For my Faculty, this is a considerable enhancement to practice. This part has briefly detailed the main elements of the framework and has sought to elucidate how it might be applied in practice. It is hoped that the general approach illustrated can be applied to the evaluation of any assessment method and might therefore represent a useful quality assurance tool regardless of discipline or institution. At the very least, an explicit conceptualisation of what might constitute a quality assessment strategy should be the "firmer (base) for improving our students' education experience" (AAHE Assessment Forum).

commitment demanded of the role (Kift, 2004) - but that these dynamics can be harnessed to the greater pedagogical good. The broad conceptualisation of the role presented allows that significant influence at several levels of engagement with both students and staff is possible and that considerable progress in culture, policies, processes, structure and procedures in support of good pedagogical practice can be effected. Specifically, the assessment framework case study provides one example of a faculty-wide endeavour to address agreed assessment issues arising out of the graduate attributes agenda, pursued under the auspices of the A/Dean, L&T role. It is not to overly aggrandise the role to suggest that the efficacy and sustainability of the change effected in the assessment context would not have been delivered without the centrepiece of the A/Dean mix of visionary, strategist, mentor and micro-manger.

It is hoped that others in this and similar roles (program coordinators, for example, are obviously similar), together with institutional managers might find something of value in this conceptualisation of the possibilities inherent in these middle-management-educational-leader positions and commit to achieving means by which this cohort might be better cultivated and their needs supported, to ensure the assurance and enhancement of learning, teaching and assessment quality for our students.

5. Conclusions

This paper has sort to demonstrate that the role of a curriculum leader, such as A/Deans, L&T, enmeshed in the discipline context of a Faculty, is vital to assuring enhanced learning, teaching and assessment practice. In the current resource-poor environment, good pedagogical coal-face change consequent on good pedagogical institutional policy will not just happen without the intervention and leadership of a management-charged change agent.

It has been argued that the role of the A/Dean, L&T, while now reasonably mainstream, remains riddled with inevitable tensions and challenges - an unsurprising organisational fact given the dualities of the

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Creating a Teaching and Learning Culture to Embed Graduate Attributes into Assessment Practices

Sundrakanthi Singh
Teaching and Learning Office
Faculty of Computing, Health and Science
Edith Cowan University, Australia

Barry Gibson
School of Exercise, Biomedical and Sports Science
Edith Cowan University, Australia

This paper presents the initial phase in the process of transforming the teaching and learning culture to effect change in the assessment practices within a particular context. It outlines the imperatives for generic skills development and describes the implementation of a graduate attributes framework in a particular university context with specific reference to assessment practices. A set of guiding principles to adopt when embedding graduate attributes into assessment is proposed together with a grid that identifies multiple methods of assessment that may be used within a process/skills oriented curriculum.

1. Introduction

The issue of assessment techniques and policies within the university is an increasing problem that is closely associated with staff workloads and student/staff ratios in the classroom. This paper looks at the situation as it has evolved at Edith Cowan University (ECU) and investigates attempts that are being made to resolve some of the difficulties that have arisen during the process of including graduate attributes into the assessment structure of units within degree programs.

At the university the academic program is coordinated at the School level by a Faculty Courses Committee which is responsible for quality control of all units and courses that are to be taught within each Faculty. The overarching body responsible for quality control is the University Teaching and Learning Committee which assesses all new initiatives and passes them onto Academic Board for final approval. The assessment policy at the university has recently been revised and now requires that there must be at least three points of assessment and different methods of assessment must be used in at least two of the three assessment points. While the revised policy has caused little concern, the workload now involved in the assessment of work has become an area for concern. The issue for staff is that today classes are much larger, with class sizes being in the vicinity of 200-300 students, which makes the marking load significantly higher for staff. Added to this is the fact that little credit is given for marking in terms of workloads, with the emphasis being placed on the teaching of units and research output. With staff promotion being heavily dependent on research and teaching performance and the university's national ranking being heavily weighted towards research output it is understandable that large assessment load is a significant concern.

The outcome of this is that time spent on assessment becomes a trade off and lecturers are forced to adopt the "least time-consuming" approach and put most effort into the area of teaching and research. This often results in the use of multiple choice and short-answer questions which take less time to mark. Examinations that involve essay type answers therefore tend to be used by those lecturers who are involved in smaller classes. Another factor that influences the assessment methods used

relates to the demands placed on the students. Today a significant number of the students face the pressures of balancing university load with their workload outside the university as many are forced to work to support themselves and their families during their university studies. Heavy assessment demands place more pressure on the students and negate the possibility of taking on additional part time work. The preference for shorter assessment is also reflected in the unit and teaching evaluations where students are often very critical of units when lecturers include a heavy assessment program. This in turn can lead lecturers to steer away from situations which will result in unfavorable unit and teaching evaluations. The various constraints and demands that are now being placed on both staff and students have resulted in the use of assessment methods that are less time-consuming for both staff and students.

It is strongly believed that this situation can be addressed and a solution found through the establishment of a framework that maps graduate attributes with particular methods of assessment and takes into account the workload for both staff and students. The initiative described in this paper attempts to address this situation from a learning development focus. The overarching goal is to embed generic skills at the level of the curriculum and to use assessments as a lever to enhance the development and application of generic skills within subject specific professional settings.

2. Assessment practices within a graduate attributes framework

2.1 The need for the development of generic skills

The Australian Technology Network's Teaching and Learning Committee defines graduate attributes or generic skills as "the qualities, skills and understandings a university community agrees its students would desirably develop during their time at the institution and, consequently, shape the contribution they are able

to make to their profession and as a citizen" (Australian Technology Network, 2000). These generic skills include critical thinking, problem solving, interpersonal understanding and written communications. These and other skills are encapsulated within the graduate attributes of Edith Cowan University.

Within the Australian context, pressures for the development of generic skills arise from three sources - the government, employers of graduates and universities themselves. The introduction of the Graduate Skills Assessment Test by the government in 2000 now places increased pressure on universities, particularly on their course and curriculum development teams to embed generic skills into teaching, learning and assessment practices of all units within courses. Generic skills are also highly valued by employers. For instance, Allen and Roschecouste state that "businesses rank communication skills as the number one characteristic they were seeking in graduates" and that "excellent communication skills continue to be listed in almost all newspaper advertisements as an important criterion for professional appointments" (Medlin et al., 2003). Similarly, several professions stipulate in course accreditation documentation that graduates should have strong capacities for inquiry, abstract and logical thinking, critical analysis, oral and written communication, and interpersonal skills. From the point of view of universities, the development of generic skills is important for two key reasons. Firstly, it has been shown that within increasingly diverse student populations, the implementation of traditional university teaching, learning and assessment practices do not necessarily result in the development of a broad range of skills to complement a body of subject technical content. This strengthens the need to make explicit the development of generic skills through teaching, learning and assessment practices at university. The second reason is that it is important to be able to differentiate graduates from different universities with regard to their effectiveness in meeting the requirements for different employers and the wider community (Medlin et al., 2003).

As stated by Medlin, Graves and McGowan (2003), the progress made by universities across the country to embed the development of generic skills varies, with several universities experiencing difficulties in

implementing their graduate attributes within the teaching and learning environment (Medlin et al., 2003). The situation at Edith Cowan University is no exception. This paper describes a process of embedding graduate attributes within the teaching and learning environment whilst taking into consideration the issues and concerns facing staff and student as outlined earlier.

2.2 Implementation of graduate attributes at ECU

The adoption of a set of four core and six generic graduate attributes by ECU in 2002 marks a shift in emphasis from content-driven to skills-driven curricula. Despite this shift, subject content remains important as it is the conceptual framework within which skills are developed. Both subject content and application of generic skills differentiate graduates of each degree. The implementation of the graduate attributes framework is uneven across Faculties and Schools. As stated above, staff are faced with ever increasing workloads which lead to time-management problems. They experience competing research and teaching priorities and experience further difficulties associated with the shift to a process teaching approach for which they are often not adequately trained.

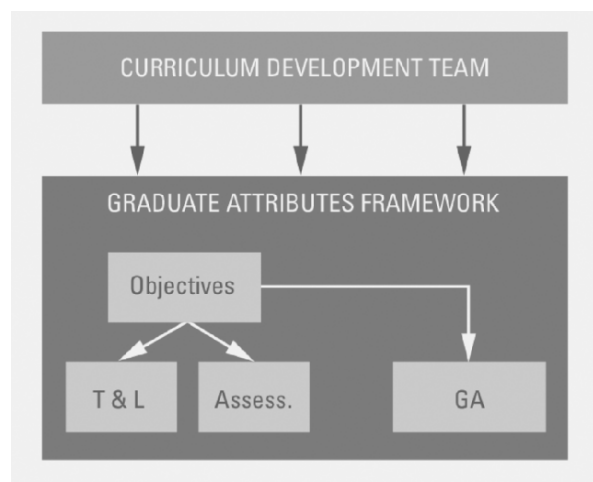
	Graduate attributes
Core attributes	Service Professional knowledge Enterprise, initiative and creativity Workplace experience or applied competence
Generic attributes	Awareness of political, social and ethical issues Communication Internationalisation/Cross cultural awareness Problem solving/decision making Teamwork Use of technology/information Literacy

Table 1: The Edith Cowan University graduate attributes framework

The graduate attributes implementation process at ECU

involves two phases, mapping and customisation, and embedding (Edith Cowan University, 2002). The graduate attributes framework begins at course level and cascades down to the learning opportunities and assessments within units of study. The mapping process involves identifying whether specific attributes are made explicit, are implied or assessed within each unit. Customisation relates to realising the subject specific or professional context for each graduate attribute as this serves to distinguish graduates of different degrees. The attributes are developed progressively as a student advances through a course. The second phase involves embedding the graduate attributes into units. Learning and assessment tasks that address the relevant graduate attributes are identified and mapped. This is achieved by "constructively aligning" the graduate attributes with specific learning outcomes for each unit (Biggs, 1999).

The current initiative is aimed at advancing the second phase of implementation within a particular School. This involves making explicit the links between unit learning outcomes/objectives, developing relevant teaching and learning strategies, and planning appropriate assessment strategies. A starting point for this project is to identify a set of core theoretical



principles to guide the assessment practices.

Figure 1: Phase two: Embedding the graduate attributes

2.3 Assessment and learning: Towards a theoretical base

The theoretical base for this initiative is drawn from Biggs' work on constructive alignment (Biggs, 1999; Biggs, 2002; Biggs, 2003). In short, this means that the curriculum aims, the assessment tasks and also the assessment criteria should match the learning outcomes. It is important that the assessment strategy reflects on the key roles assessment serves within particular contexts, namely: formative (i.e. to provide support for future learning); summative (i.e. to provide information about performance at the end of a unit of study); certification (i.e. selection by means of qualifications); and evaluative (i.e. a means by which stakeholders can judge the effectiveness of the system as a whole) (Hornby, 2003). Therefore, when considering particular elements of assessment, the varied functions of assessment need to be disentangled to avoid situations where too many purposes are sought within a particular assessment. The point is to adopt varied forms of assessment which are more suited to specific purposes.

Furthermore, within a skills and process teaching approach, assessment can have a further powerful role in that it affects not only what students learn but also how they learn (Norton, 2004). Therefore, assessment has a potentially powerful effect on learning because students see assessment as the curriculum, as explained by Gibbs (1999). Biggs makes the same point in saying that students learn what they think will be assessed rather than what is contained in the curriculum (2002). This signals two important pedagogic benefits of assessments. The first is that effective teaching can use this knowledge to strategically enhance students' learning. The second is that assessment can be used as a lever to make students actively engage with specific learning tasks. This means that the potential for learning can be maximised when assessments are designed to test the higher (e.g. critical thinking, development and application of generic skills) rather than the lower levels of knowledge (e.g. recall and simple applications) in the hierarchy of knowledge (Elton & Johnston, 2002). The current initiative identifies several methods of assessment that fulfil these objectives, for example projects, portfolios, presentations, and performances requiring students to demonstrate generic (e.g. teamwork, communication, problem solving, etc.) and professional/discipline based skills in their application of knowledge within particular contexts. Such assessments involve the application of higher order

knowledge involving critical thinking, making judgements, providing reasoned argument, critical reflection and evaluation. This, however, does not mean that there is no place for assessments that target lower levels of knowledge. For instance, in many professional environments, procedural knowledge is essential hence assessment strategies may need to reflect associated learning outcomes. For example, procedures and techniques involving computation, using and taking readings from equipment, following laboratory protocols and procedures and carrying out instructions may be assessed through demonstration, role play, lab reports, or by students producing an illustrated manual with instructions on how to use equipment. The more commonly used assessment methods (e.g. essays, written and oral examinations, reports, and short answer questions) often tend to focus on the lower levels of knowledge as they require students to recall, describe, report, recount, recognise, identify, and relate information. Although critical analysis, application and reflection may be expected within such assessments, they do not sufficiently engage students in knowledge transformation.

Assessment strategies must therefore include methods of assessment that create opportunities for students to apply their knowledge and skills actively and in transformative ways (Scouller, 1998). Additional methods of assessment that articulate transformative strategies may include analysis of case studies, provision of a response to a simulated scenario, planning and implementation of a community service project, making a video, producing a poster/leaflet/brochure, participating in a debate, etc. Such methods of assessment provide students with opportunities to identify problems, pose problems, define problems, analyse and review data, design, plan and implement activities/initiatives, and produce simulated/concrete outcomes that are based upon applied knowledge, thereby creating assessment contexts where students are called upon to apply their knowledge to real/simulated situations. In agreement with others, we are arguing that assessment tasks must be used as a vehicle to promote deep rather than surface and strategic approaches to learning (Entwistle, 1987; Saljo, 1987). This not only prioritises a need for "constructive alignment" but also raises the need to integrate varied forms of assessment to ensure that students are able to demonstrate contextual knowledge and skills.

Apart from the methods of assessment, the process itself must guard against promoting strategic approaches to learning. For instance, when assessment criteria are not explicit and transparent, it may encourage surface and strategic approaches to learning. Elander (2003) and Merry et al. (2000) stress the importance of providing explicit assessment criteria for the following reasons: students do not have the same understanding as their lecturers; it demonstrates principles of equity, fairness and accountability within assessment practices, and it is pedagogically sound on a common-sense level. However, students may sometimes use assessment criteria in "a strategic, marks oriented" and "formulaic way" to achieve the best possible grades (Norton, 2004). Therefore, while assessment criteria are essential, they can pose a problem by encouraging over-dependence on lecturers' guidance and can in some instances result in students "concentrating on the mechanics of the task rather than meaningful engagement with the learning process" (Norton, 2004). A solution offered by Norton is to reconceptualise the assessment criteria as learning criteria (Norton, 2004). Given this, this local initiative stresses explicitness and transparency in the formulation of assessment criteria and the provision of formulaic-style guidelines is discouraged to minimise surface and strategic approaches to learning.

In addition to providing a framework for identifying a range of methods of assessment, the above-mentioned theories also provide a basis to align the methods of assessment with the ECU graduate attributes framework. This is achieved by contextualising generic skills within a selection of appropriate assessment methods. This facilitates both the development and application of process skills and abilities in real or simulated contexts. It also, in the words of the Teaching and Learning Committee of the Australian Technology Network, helps to "shape[s] the contribution they [students] are able to make to their profession and as a citizen [citizens]" (2000).

Overall, these theoretical contributions provide a foundation upon which to build sound assessment practices when implementing the ECU graduate attributes framework within this context. A set of guiding principles is proposed:

1. Promote constructive alignment (Biggs, 1999; Biggs, 2002; Biggs, 2003)
2. Use assessments as a lever to engage students actively with a task. This requires a shift from an emphasis on evaluating declarative knowledge to include the assessment of procedural, strategic, and conditional knowledge and understanding (Biggs, 2002; Biggs, 2003; Gibbs, 1999; Taylor, 1994)
3. Provide opportunities for students to develop and be assessed on generic skills and content in a coherent and progressive way with continuous feedback (Hornby, 2003; Brown et al., 1994)
4. Include multiple assessment methods within the assessment strategy to test for the hierarchy of knowledge (Elton & Johnston, 2002)
5. Make the assessment criteria explicit and transparent (Elander, 2003; Merry et al., 2000; Taylor, 1994) but guard against a mechanistic approach to learning (Norton, 2004; Martin & Saljo, 1997; Norton et al., 1996)

In summary, these guiding principles highlight two things about learning and assessment. The first is the importance of using assessment to enable learning rather than just to measure learning. The second relates to the importance of creating opportunities for students to develop and demonstrate both contextual knowledge and disciplinary and generic skills. Yet to realise these aims it is imperative to explore the use of a wider range of assessment methods, which leads us back to the concerns around the methods of assessment being used in certain situations at ECU.

2.4 Issues to consider when planning an assessment strategy

The implementation of the graduate attributes framework provides an opportunity to address the concerns about assessment practices as outlined earlier. Shifting from a content-driven curriculum to a skills- and process-driven curriculum provides opportunities to reframe the teaching, learning and assessment strategy. In part, this involves integrating the use of different methods of assessment that are better aligned with the learning outcomes. However, it is not just about selecting different forms of assessment and drawing from a wider range of tools. There are several factors

that require careful consideration and planning. Some of these include the particular discipline area and its current orientation, the nature of the course and its learning objectives, the level of the course/unit, the nature and form that customisation of the graduate attributes assumes, particular characteristics of the student population, what resources are available within the environment, the nature and extent of institutional support, as well as consideration of internal and external constraints. These and other factors require careful consideration when planning the assessment strategy.

To facilitate the above-mentioned process and to encourage the use of a wider range of assessment methods when embedding the graduate attributes framework into curricula, a multiple assessment methods grid is provided (See Figure 2). It is emphasised that in addition to mapping and customisation processes, implementation of an embedded approach to graduate attributes requires more than selection of suitable assessment methods. It is essential to formulate relevant assessment tasks (that embed content and process skills) that are "constructively aligned" (Biggs, 1999).

3. Conclusions

Having outlined some of the concerns about assessment practices experienced by both students and staff at ECU, the paper argues that the processes of embedding the graduate attributes into curricula provides a valuable opportunity to address these concerns in the context of planning the teaching, learning and assessment strategy within courses/units. A set of guiding principles based on a review of relevant literature on learning and assessment and a graduate attributes-assessment methods grid is presented.

In conclusion, it is important that the curriculum development processes are done within diverse professional teams as this offers the benefit of integrating multiple perspectives that may enhance teaching, learning and assessment practices. Furthermore, embracing the

Core and generic graduate attributes [1]	Process skills / abilities/ content knowledge [2], [3], [4], [5]	Methods of assessment [2], [3], [4], [5]
Enterprise	Demonstrating initiative and creativity, designing, producing, Applying knowledge to generate innovation	Project, Portfolio assessment, Presentation, Performance
Professional knowledge	Commitment to lifelong learning Professional, vocational and academic competence Recalling, recounting, reporting, describing, identifying, relating and interrelating ideas	Written exam, Oral exam, Report, Essay, Comment on the accuracy of records . . . , Write a response to a client's question, Work-based problem scenario, Applied task - e.g. write an A-Z of . . . , Project, Short answer questions (e.g. true/false, Multiple choice questions, etc.)
Service	Adopting a service ethic towards organisations and communities, Valuing contribution, Engaging in voluntary/community service tasks	Reflection on workplace placement/Community service project
Workplace experience	Gaining exposure to and experience in the workplace Applying learning effectively in practice	Demonstration Role play Case study (real or simulated)
Awareness of political, social and ethical issues Communication	Appreciating the value of ethical action in personal and professional life Developing and managing oneself, being self directed Understanding people and their contexts Effective communication in personal and professional contexts and as part of a local, regional and global community Verbal, written and non verbal communication, Arguing, Describing, Advocating, Interviewing, Negotiating, Presenting	Reflection, Journal, Essay Written presentation Oral presentation Group work Discussion, Debate, Role play Observation of real/simulated professional practice Poster presentation
Internationalisation / cross cultural awareness	Developing and demonstrating cultural awareness Adopting international and cultural perspectives within varying situations	Group work, Report analysing issues within local, regional and global environments,
Problem solving / decision making	Identifying/posing/defining problems, Analysing data, Reviewing, Designing experiments, Planning & applying information, Critical thinking, Making judgements, developing arguments, Reflecting, Evaluating, Assessing	Essay, Report, Journal, Letter of advice to . . . (about policy, public health matter, etc.), Present a case of an interest group, Prepare a committee briefing paper for a meeting, Book review for a journal, Write a newspaper article, Problem scenario, Work-based problem analysis, Prepare a committee of enquiry report, Draft a research bid to a set of criteria, analyse a case.
Teamwork	Good interpersonal skills Working collaboratively and co-operatively, Being self-directed, Managing time, managing tasks, Organising, Discussion skills, Negotiating, Debating	Project, Research report, Producing a poster,
Use of technology / information literacy	Selection and application of technologies appropriate to field of scholarship Accessing and managing information, Researching, investigating, interpreting, Collecting and reviewing data, Computation, Using equipment, Following protocols/lab procedures, Carrying out instructions	Demonstration, Role play, Lab report, Produce a poster, Develop instructional / procedural texts for particular audiences, Observation of a real/simulated professional practice, Annotated bibliography, Applied task/problem.

Figure 2. A framework of selecting methods of assessment when embedding graduate attributes

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graduate attributes framework creates the potential to stimulate necessary curriculum change, particularly in areas of concern (i.e. assessment practices). The theoretical principles and the assessment methods grid provided here may be used as tools to facilitate this change process. Anticipated future challenges lie in the area of achieving cultural change among both students and staff to embrace the shift to a process- and skills-based curriculum that the graduate attributes framework poses. The customisation and application of subject content with relevant professional skills and the innovation and implementation of assessment methods are areas for ongoing improvement.

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Examining Assessment in the Workplace

Combining Novel Pedagogic and IT Approaches to Align the Assessment of Workplace Learning with Criteria for Academic Credit

Stephen Gomez
David Lush
Faculty of Applied Sciences
University of the West of England, United Kingdom

Workplace learning forms an essential part of many degree programmes yet often it does not receive academic credit in the same way as for the taught elements of the course. We are involved in running science Sandwich degrees in which students are on work placement for one year. Until recently students received no academic credit for the year yet their learning was often at graduate level. The reason why academic credit was not given in the past was because of the diverse nature of the placements for each student and the geographical separation of the students from the home institution which made monitoring learning and assuring equivalence of assessment problematic. We have devised a novel pedagogic methodology to address assessment for the award of credit for placement learning but the necessary complexity of the problem needs an IT solution which we have produced, called Profile.

1. Introduction

Employability of graduates is high on the agenda of both the UK Government (UK Government's White Paper on Higher Education, 2003) and HE Institutions (Knight & Yorke, 2002). Arguably, there is no better way to prepare graduates for the world of work than to integrate work experience within degree programmes (Hills et al., 2004). Professional courses, such as medicine, nursing, construction and engineering, etc. already demand the integration of practice with theory. For many non-professional degrees, work placements are either absent or optional.

We run science Sandwich degrees in which students go on placement for the third year of the four year programme. As the placement year offered a highly diverse experience to the student group, assessment for academic credit was difficult. Therefore, the Sandwich year attracted only a notional 120 "p" credits which did not contribute to the degree classification but did confer the title "Sandwich" on the degree. Although not rewarded with academic credit, students benefited enormously from their experience in terms of networking, having greater employability prospects, being better prepared for the final year and improving their academic performance (Gomez, 2004).

Over the years the quality of the placements offered to the students has improved to the extent that many students work at graduate level and an increasing number are co-authors of publications arising from their placement work. Given the students' involvement in cutting edge research and industrial activities, we felt that this high calibre of learning on placement was not being adequately represented by the notional "p" credit awarded to the Sandwich year. This undervaluing of the academic worth of the placement year compared to the taught parts of the degree was also thought to be partly responsible for the increasing proportion of students who were exempting themselves from the placement year.

We therefore decided to address the issue of credit-rating our Sandwich year by producing a transparent, pedagogic system for accrediting work placements that would be generic enough to be adopted by other disciplines. This paper discusses the rational

underpinning the pedagogic assessment model we devised and provides details of the IT solution we created to make the pedagogic approach workable.

2. Development of a pedagogical assessment model for accrediting work-placement learning

2.1 Problems with giving credit

There are numerous reasons why, for nearly three decades, notional credit only was awarded for the placement year within our science degrees. The placement year was viewed as time outside formal academic learning, so the idea of awarding academic credit was not seen to be appropriate. Similarly, the strict quality assurance procedures which define and monitor the quality of teaching, syllabuses, learning support and assessments at the university had no obvious equivalent for students on their placement year. Replicating these to the same level of confidence within the workplace was seen as more difficult to achieve and not cost-effective, especially as individual students would need to be monitored closely. This assessment problem was compounded by our science placements being highly diverse both in terms of type of placement and geographical location.

2.2 Drivers for change

One has been the improvement in the quality of the placement with the shift from basic work experience with students regarded as an "extra pair of hands" to those with greater expectations on the parts of the employer and student. In addition, there has been a growing emphasis on a graduate workforce. There has also been a greater recognition of the workplace as a learning environment in itself (Harvey et al., n.d.), with experiential learning translated into academic credit through schemes such as APEL (Accreditation of Prior and Experiential Learning).

2.3 Basic assessment

Previously, we used a basic assessment system to assess our sandwich year. This involved:

- a. a Visiting Tutor's (VT) report based on a single visit by an academic to the student in the workplace;
- b. a work-supervisor's report completed at the end of the placement and indicating the student's performance; and
- c. a 4-5k word final report written by the student and summarising the work performed during the year.

All three elements had to be passed for the Sandwich title to be awarded, each being assessed by a simple binary pass/ fail.

2.4 Inadequacies of the basic assessment

- a. Limited contact between academic, student and employer. This relaxed approach to monitoring and guidance reflected the notional credit-rating assigned to the year. The visit generally afforded the VT the first opportunity to discover what the student was doing, so it was often more a fact finding operation than an evaluation. Also, this type of visit was highly artificial with everyone on their "best behaviour" and did not reflect the day to day work of the student. Essentially, there was little opportunity for the VT to assess the true performance of the student.
- b. The work supervisor's report coming at the end of the placement was too late for feedback to the student or VT.
- c. The final report gave only the highlights of the placement, particularly those elements that worked.

2.5 Wish-list for accrediting placement learning

We felt that any system designed to assess workplace learning should aim to:

- monitor, steer and provide feedback in an iterative fashion (Mutch, 2003);
- assess students' workplace learning with sufficient rigour to satisfy existing academic procedures for the award of academic credit; and
- award students with HE level 3 (final year) credit even though they had yet to experience L3 learning at that

stage during the degree programme.

- be sufficiently flexible to cope with the diversity of placement experience. We recognise that such diversity would not necessarily permit resolution of assessment beyond a binary pass/fail.

2.6 Criteria for awarding academic credit in HE

We began the process of credit-rating workplace learning by going back to the first principle, namely the development of generic criteria for awarding credit for taught modules. The criteria were:

- credit value (i.e. 10, 20, 30 credits);
- notional learning time. This equated to 1 credit being equivalent to 10 notional learning hours;
- learning objectives or outcomes, with these being stated by the person delivering the learning material;
- level of learning. The use of credit-level descriptors which define the expectations required of students at each level of their learning. We used the SEEC level descriptors (2003); and
- assessments which provided evidence that the learning objectives had been met satisfactorily.

2.7 A modular approach to placements

Any degree subject is highly complex and one popular HE approach to complexity is to break the broader subject down into smaller modular units. This can be a very efficient approach as groups of degrees within a particular discipline can share modules drawn from a larger pool. Furthermore, the criteria listed above can be viewed as applying to a degree programme as a consequence of applying to the modules defining that programme's specification. We adapted this approach to the placement year, considering the relationship between each slightly different placement as being analogous to that between each slightly different degree within a modular scheme. Additionally, just as each degree was defined in terms of its constituent modules (some of which might be shared), so each placement could be defined in terms of a variety of learning opportunities we called "tasks", each of which could be referenced against the generic criteria for awarding credit referred to above. The justification of these tasks in terms of generic criteria could then be used as the basis for awarding "real" academic credit.

As we further considered a task-orientated description of the placement year, we found that the complexity of students' learning within our science work placements was better captured by this approach.

Given the diversity of the placements on offer, we produced a model where students, upon starting their placements, drew up a Learning Agreement in negotiation with their work supervisor and VT which described their placement in terms of these individual learning opportunities or tasks.

2.8 Anatomy of a 'task'

Any task identified within the Learning Agreement was described in terms of:

- a title;
- a brief description of the task;
- the learning outcomes;
- the generic or transferable skills involved in the task;
- the specific skills involved in the task;
- justification of level of learning according to level descriptors; and
- assessments or evidence that the learning outcomes have been met.

Reading through the list above, most UK HE academics would recognise this format as a module description. Essentially, we were requiring the students to write their own module content in terms of standard module descriptors. A benefit to this approach is that its generic structure makes it suitable for workplace learning in degree programmes in many disciplines, not just science.

2.9. First step in implementation

For the placement year to attract real academic credit, it needed to be within our institution's modular scheme. Therefore, the first step was to make the placement year into a module, which we called the Professional Practice in Applied Science module, or PPM for short. The PPM was associated with 20 level three (L3) credits, which was equivalent to 200 notional learning hours at final year level. Students were free to choose to follow the existing Sandwich year assessment (described earlier and worth 120 "p" credits) or to take the PPM assessment

(worth 20 L3 credits). This meant that students successfully gaining the PPM had the option to take 3 taught modules instead of 4 on their return to the final year.

In the early part of the placement itself, students taking the PPM assessment were required to write a Learning Agreement, laying out the tasks they were expecting to contribute to the PPM. During the course of the year, the learning associated with those tasks would be monitored closely and steered towards L3 by the VT, a process facilitated by the students producing task descriptions, learning outcomes, and evidence that the learning outcomes had been met.

2.10 Administrative & pedagogic challenges

In theory, this scheme appeared workable but there were a number of challenges to implementing such an approach:

- For a VT to monitor a student's work closely there needed to be a clear and simple communication channel established between the two geographically-separated stakeholders; ideally, this would also include the work supervisor.
- Communication via the postal system was seen to be slow, time-consuming and administratively cumbersome. Although email addressed the issue of speed, difficulties in organising and administering the PPM via this method remained.
- How could we expect students successfully to take an active part in the formulation and justification of learning at L3 when they had only experienced L2?

For traditional taught modules, the learning outcomes and assessments are designed by the academic staff. In our approach to assessing work-based learning, it is the student who, through negotiation with the work supervisor and academic tutor, sets the learning outcomes and produces the evidence used to assess their attainment. This reflects the paradigm shift from the traditional role of the learner as a passive recipient to one where the learner takes active responsibility for and ownership of the learning objectives. But how could this process be managed?

3. Development of an IT solution to support the pedagogical system for accrediting work-placement learning

3.1 A portfolio approach

The task-orientated approach to evidencing placement learning could be realised through a portfolio (Baume, 2004). However, such an individual, detailed approach to the assessment of work experience could incur a significant administrative overhead.

3.2 Development of an e-portfolio

However, modelling placements in terms of the "modular" metaphor described earlier makes their detailed description ideally suited to a database solution and, furthermore, managing this detail via the internet could address the problem of geographic diversity (Baume, 2004). Therefore, we developed a novel electronic-portfolio (e-portfolio) system, called Profile, to deliver this "modular" approach to the recording and assessment of placement learning (Gomez, 2004). Each student was given access to a secure e-portfolio within which s/he completed web-forms in order to develop and describe their unique Learning Agreement, define selected work activities in terms of the criteria for academic credit and to support assessment; evidence of learning could also be uploaded.

3.3 Different user roles

The student, being the main user, was considered as the owner of his/her portfolio. Certain other people could also gain access to the portfolio at the invitation of the student, the two main ones being the work supervisor and academic tutor; these people had separate logins and could view the material in the portfolio and communicate with the student, providing ongoing feedback. Users with these roles could also 'sign off' work electronically (as described below). The involvement of the other stakeholders in this way allowed students' learning to be both monitored and modified to help them reach their agreed learning goals. This combination of remote tracking and feedback proved ideal for students on placements that were both

diverse and dispersed.

3.4 Communication tool

In addition to tracking the student's progress remotely, the facility to influence the learning process through a conversational form of feedback was seen as important (Mutch, 2003). Invited tutors could log in to the student's portfolio and provide guidance in the learning process by using a communication tool in the form of an audited messenger system (Figure 1).



Figure 1. Screenshot of an example communication page

Messages can be written in the top field by the student, work supervisor and tutor and when the "Post" button is clicked, the message appears in the table with details of who wrote the message and the date it was posted. The messages are stored and serve as an aide memoir for earlier dialogue and as an automatically-managed audit trail. Whenever a message is posted, automated email messages are sent to the stakeholders involved to alert them to the waiting message. In the automated email, a hyperlink is provided which, if selected, automatically logs them in to view and reply the message. This link is single use only for security reasons.

3.5 Features of web-forms

To ensure that the work being reported by the student was indeed his/hers, a sign-off facility was incorporated whereby the work supervisor confirmed the authorship and standard of the student's work. The VT also signed off to confirm that the work has met academic

requirements. To accommodate the sign-off facility, we produced a novel system whereby on the same form different form elements could be restricted to different types of users. For instance, for the majority of forms, the items on the form were restricted to the student to complete except for sign-off checkboxes used solely by the work-supervisor and tutor. This novel approach permitted the natural simulation over the internet of familiar, paper-based processes involving forms.

3.6 Flexibility and devolved management

The system features devolved management in that appointed administrators can set up their own independent e-portfolio areas for their students, and contain their own custom web-forms and standard web-pages designed to meet their own particular needs. The system replicates generic features of paper-based administrative systems:

- **Distribution:** a web-form can be 'released' to a particular type of user.
- **Help:** standard web-pages can be delivered to assist users.
- **Sub-sections:** parts of a web-form can be reserved for filling in by other users.
- **Attachments:** uploaded files can be 'electronically stapled' to a web-form.
- **Hand-in:** web-forms can be electronically 'signed off' which locks their content.

These features make the Profile system a very flexible tool. Instead of a programmer having to modify the underlying scripts that drive the system in order to deliver the required outcomes of a particular administrative task, those needs can be met by the person responsible for that administrative task creating a set of, to them, familiar forms that represents the process. The way the users interact with these forms within the Profile system then achieves the desired outcome. In a way, the person creating the forms to run on the Profile system is performing high-level programming, for the forms evoke certain responses in users designed to collect and collate data in a particular way. Seen in this way, forms within the Profile system are effectively "programs" that "run" on the users. The system is available to all higher education institutions and for further information visit www.profile.ac.uk or

email profile@uwe.ac.uk.

4. Profile e-portfolio forms

4.1 Profile homepage

The Profile e-portfolio web address is: www.profile.ac.uk. The homepage (Figure 2) has a simple design as it serves principally as the login page to the e-portfolios. A few links take visitors to explanatory web-pages. The website is constantly undergoing development and the screenshot below is current as of publication of this paper.



Figure 2. The Profile e-portfolio homepage

Note the two-stage login and the use of the email address as the username (since all email addresses are unique and users can choose to continue to access their e-portfolio once they have graduated if they use an external email address). Once the email address is entered, it is looked up in the Profile database and, if present, another page appears where the user enters his/her password. Passwords are generated when the user first logs into the system and sent to their email addresses. During login, the password is encrypted thereby adding further security.

Once logged in, the user is taken to a homepage (Figure 3). The homepage for the portfolios has two sections. The right hand section contains welcome information and links to supporting help web-pages. The left hand

section provides the navigation menu with links to the student's portfolio web-forms and the communication tool. The items listed in the menu differ depending on whether the user is a student logging into his/her portfolio or a tutor or supervisor viewing the student's work. Each user-type has slightly different rights. As the portfolio "belongs" to the student, s/he has the greatest number, being able to fill in most of the sections of the forms and upload files as evidence.

profile.ac.uk

Logout
Stephen Gomez

Forms
Show Forms

Sharing
My Conversations

Back to
Start Page

WJVE
BRISTOL

FACULTY OF APPLIED SCIENCES

Welcome to your personal, secure, student electronic-portfolio.
The e-portfolio is for students to record their learning on placement for the Professional Practice Module (PPM) and for the work supervisor and visiting tutor to sign-off activities.

Click [here](#) to find out how to use this system.
For general information on the PPM click [here](#).
To report 'bugs', please email david.lush@uwe.ac.uk

News

07/12/2004: fixed a minor problem that may have prevented supervisors taking up offer to 'share'. If this has been the case, then please forward the 'invitation' email received by the supervisor to david.lush@uwe.ac.uk and he will activate it.
11/11/2004: fixed problem with academics/supervisors accessing their students' conversations.
10/11/2004: 'live' web-site launched

Proposed activities or tasks HELP

List proposed activities with starting & ending dates;
eg: Task 1: Maintaining bacterial culture collection (Oct 04 - Dec 04)

Figure 3. The homepage of an individual Profile e-portfolio

A student logging in views only his/her material. A tutor or work supervisor views only the portfolios of those students who have invited them in.

4.2 Learning Agreement web-form

The Learning Agreement (LA) web-form allows the student to show his/her learning during the placement period. The activities during placement are described in terms of tasks, with each task representing a learning opportunity. For science students, typical tasks may involve: learning a particular laboratory technique or procedure; data analysis or synthesis; formal presentations; report writing. The LA web-form consists of several sections which, in the diagrams below, are separated for ease of explanation. The following screenshots are of low resolution but the forms are available on request for you to view in more detail.

i. Identification fields

The LA web-form, like all other forms used to monitor placement learning, starts with student identification fields where the student enters his/her name and unique

university student number (below).

Student name:	<input type="text"/>
Student number:	<input type="text"/>

ii. List of tasks

The next field on the web-form is a text-area into which the student enters the list of tasks they are hoping to perform on placement. The number and type of tasks are first negotiated with the work supervisor and agreed with the tutor. Each student lists between 5 and 10 tasks.

Proposed activities or tasks HELP
List proposed activities with starting & ending dates; eg: Task 1: Maintaining bacterial culture collection (Oct 04 - Dec 04)
<input type="text"/>

iii. Task deadlines

Four deadlines are set for the completion of the portfolio material. The final deadline is determined by us as all portfolios needed to be completed by 1 September for administrative purposes. The other deadlines are set by the student and agreed by the work supervisor and VT; these can vary according to the individual working practices of the placement but are spaced to ensure that the student works steadily on the portfolio rather than completing all the sections towards the end of the placement period.

Deadlines for Assessment of the Portfolio	
There are four deadlines within the LA. You set 3 of them and the final one is the deadline for the Faculty. Ensure that the first deadline is within the first 6 weeks of the start of the Profile web-site going 'live' and that the other two deadlines are evenly spread. Your VT will need to be satisfied that these dates are reasonable.	
Deadline 1: For submitting the LA and Health and Safety form (usually 6 weeks from the start of your placement).	End of: <input type="text" value="Select"/>
Deadline 2: For submitting first assignment.	End of: <input type="text" value="Select"/>
Deadline 3: For submitting second assignment.	End of: <input type="text" value="Select"/>
Deadline 4: register for your student project module on line.	<input type="text" value="01 Aug 05"/>
<i>Please note that failure to meet these deadlines are likely to result in you being transferred from the PPM.</i>	

iv. Sign off

The final section of the LA web-form contains three similar sub-sections, one each for the student, work supervisor and VT. The student ticks a checkbox as a 'sign off' that the form is complete and ready for assessment. A text area is also provided for any comments the student wishes to make. A similar section is provided for the work supervisor to sign off to confirm agreement with the LA; again, a box is provided for any comments. A third sign off area is for the VT to confirm agreement with the LA and that the task meets academic requirements. When all three sign-off checkboxes are selected, the form is locked so that the student cannot go back and make changes.

Student Sign-off:
Tick the box to confirm that you have completed the form.
Use this space to write any comments specific for this form:

Work Supervisor sign-off:
Tick the box to confirm agreement with the tasks listed.
Use this space to write any comments specific for this form:

Visiting Tutor Sign-off
Tick the box to confirm that the Agreement equates to Level 3 activities and occupies about 200 'notional' learning hours.
Use this space to write any comments specific for this form:

v. Submit button

At the bottom of the web-form is a Submit button which saves any valid changes made to the form when clicked.

4.3 Task form

The Task web-form is used by students to document the individual tasks contained in the LA; one task form per individual task. Like the LA, the task web-form consists of several sections which are again separated into smaller sections below for ease of explanation. Whereas there is only one instance of a LA, the task web-form was made "clonable" in that students could make as many copies of this form as required.

i. Identification fields

This is similar to the fields for the LA, shown above.

ii. Description of the task

The first main section of the task web-form allows the student to describe the intended task in terms of: a title, period when the task would be performed, a brief description of the task for the layman, and the intended learning outcomes. Context sensitive help and examples available through hyperlinks guide the student through this process.

[Click here to access LIBRARY of Examples](#)

Title of task*

Date from **Date to**

Brief description of the Task*
Keep it clear and succinct.

What you hope to learn from the Task *

iii. Transferable skills

There is much discussion concerning the integration of key skills within HE programmes (Fallow & Steven, 2000). Making students aware of the transferable skills they use on placement is important as previously these were neither recognised nor valued. This section on the task description web-form provides an extensive table of transferable skills. Only two skills are shown in the screenshot below but the full list includes:

- Communication
- Information technology (IT)
- Application of number
- Working with others
- Improving own learning
- Problem solving
- Professionalism

For each of these skills, a checklist of salient features is provided which students check off as appropriate, as well as a text area where students explain how that skill is involved in the task (not every skill needs to be justified for every task, only those that are appropriate).

Transferable Skills involved in the Task
 Complete **only** those sections that apply to this particular task.
 Click here for notes on Transferable Skills [HELP](#)

Communication [HELP](#) *Give a brief explanation of how the selected 'Communication' skills were involved in the task:*

Tick as appropriate:

- Written skills
- Verbal skills
- Group discussion
- Give a presentation
- Read & synthesize information

Information technology [IT] [HELP](#) *Give a brief explanation of how the selected 'IT' skills were involved in the task:*

Tick as appropriate:

- Plan & use different sources.
- Explore, develop & exchange information.
- Present the task using IT methods.

iv. Specific skills

The next section allows the student to document the specific skills required for the task. If the student is involved in a particular laboratory procedure, those skills specific to carrying out that procedure can be mentioned. Again, examples and help are provided through hyperlinks to support web-pages.

Specific Skills involved in the Task *

[HELP](#)

[Examples](#)

v. Supporting evidence

Filling out forms is all very well, but we require the student to provide us with evidence to support the claims s/he is making. The task web-form contains a facility for uploading electronic files which are then 'attached' to the form. When a file is uploaded, a hyperlink to that file appears above the Browse field; clicking that link allows the file to be opened and viewed (if the appropriate program is installed on the computer) or downloaded onto the local computer. Any electronic file can be uploaded, such as: Word, Excel, PowerPoint, or text documents, image, audio and video files, etc. No limit was imposed on the file size but we make students aware that large files take a lot of time to upload or download for viewing and advise them on how to reduce the size of files (particularly files containing scanned images). This facility can be thought of as an 'electronic paperclip'.

Evidence to support the Task [HELP](#)

vi. Justification of task at Level 3

The portfolio forms part of the assessment for awarding academic credit at L3. The students, therefore, are required to justify individual tasks at this level. They are assisted in this by the "Criteria for Level 3" section on the web-form. Seven areas are covered (2003):

- Knowledge and understanding
- Ethical issues
- Analysis
- Synthesis
- Evaluation
- Application
- Autonomy in skill use

The screen shot below only shows the first two of these.

Criteria for Level 3
 Complete those sections that apply for this particular task.
 Click here for notes on Criteria [HELP](#)

Knowledge and Understanding
 Briefly explain how the task relates to your discipline (eg Biosciences, Environmental Science) and extends your previous knowledge at L2.

Ethical issue
 Does the task raise any ethical issues? If so, explain your personal responsibility or how the task relates to professional codes of conduct.

For each category, an explanation is provided as well as a text area to be completed by the student explaining how the task is justified. Like the transferable skills section, not every section needs to be completed, only those relevant to that task.

vii. Sign off

This section is similar to that for the LA, except that the work supervisor signs off to confirm that the work has been performed by the student to a standard satisfactory to the needs of the workplace. The VT signs off to confirm that the work has met L3 standard.

Task sign off

The form becomes 'locked' when the work supervisor and visiting tutor have ticked their boxes.

Student:
Tick the box to confirm that you have completed of form

Use this space to write any comments specific for this form.

Work Supervisor:
After the student has confirmed completion of the form [see checkbox above], tick your box to confirm that the work has been performed by the student and is of a satisfactory level

Please also tick this box to allow sections (above) marked with * to appear in library anonymously

Use this space to write any comments specific for this form.

5. Generic nature of Profile e-portfolio

Although Profile was designed to address our particular needs, we have made the design of the software such that any user can upload any sort of form to manage students' learning. If you would like to use profile to track your students' learning, please contact: profile@uwe.ac.uk

6. Conclusions

Profile has now been used for two years to monitor placement learning and to award academic credit for diverse workplace learning. About 50-70 students go on placement each year and of these about 90% opt for the PPM assessment of their placement. Using Profile has allowed tutors to successfully track students' learning and influence progress remotely.

This has, by necessity, increased the workload of individual tutors but this is in line with the fact that the assessment of placement learning has changed to permit

the award of final year credit rather than notional credit. Our evaluation indicates that the academic workload associated with this placement module is no greater than any taught final year modules of equivalent credit value. On the other hand, the administrative load associated with the placement module has reduced since we have moved to the electronic system. Furthermore, from our own evaluation of the students' experience, though the students' workload increased, they valued this form of assessment because they:

- appreciated the academic recognition of their placement learning;
- preferred to complete the portfolio on-line rather than paper-based;
- favoured a staged approach to assessment rather than a final report;
- valued the communication channels within the system that permit a remote yet supported iterative approach to learning;
- preferred a spread of level 3 assessments over both their Sandwich and final years.

As a result of all these factors, there has been a 100% pass rate.

Because Profile can be used for any task that is conventionally managed by paper-based forms, the system can be, and is being, used by a number of departments in other universities to manage not only workplace learning but also activities such as Personal Development Planning (PDP) and Continuing Professional Development (CPD). Additionally, Profile is suitable for administering professional qualifications, especially where the users are geographically dispersed and where they are using a portfolio approach to evidence learning.

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Ecology, Identity and Assessment: The Implications of a Case Study of Police Students' Learning in Community Placements for Assessment

Catherine Layton
School of Policing Studies
Charles Sturt University, Australia

Reflective practice is often cited as the goal of work placements. In this paper, I consider the outcomes of a study of New South Wales policing students' learning in community placements, which had, as its stimulus, comments that the academics involved could see that students were learning, but not what they understood as reflection. Examination of the students' work showed that changes in feelings, thoughts, beliefs and actions could be tracked in their daily logs of events. Drawing on Burkitt's ecological perspective, I argue that, in work placements, neither the work environment nor the student can be isolated from each other or from other life-worlds, and placement processes and assessment need to be designed with interactivity, unpredictability and intentional aspects of learning clearly in mind. Action learning projects are suggested because they inevitably draw people in the placement into the action, and into reflecting upon what is happening.

1. Introduction

Reflective practice is often cited as the goal of work placements. In this paper, I consider the outcomes of a study of New South Wales policing students' learning in community placements (Layton, 2004), which had, as its stimulus, comments that the academics involved could see that students were learning, but it was not through reflection. The required work included activities and reflections based on readings and personal experiences (current and autobiographical) as well as a daily log of activities. Examination of the students' reflective tasks showed that this work rarely connected theoretical readings to their experiences, but that shifts in attitudes, actions, feelings, beliefs and thoughts could be tracked in the daily logs of events. So, too, could events that were likely to limit reflection, such as highly stressful or complex situations, even though they changed students' understandings. If reflective activities in isolation fail to capture learning, and tracking events and experiences can capture tacit learning that changes practice, feelings, beliefs and understanding, how do we best go about assessing students' learning in the world of practice? This paper considers just one aspect of a larger study focused on the impact upon selves and self-positioning of being in new or novel circumstances.

In terms of assessment, portfolios have been suggested as the way to best demonstrate breadth and depth of learning and to build in reflection on that learning. The focus is not necessarily on the ways in which students encounter and deal with problematic experiences as they occur, and the contexts and interactions upon which they are built are not necessarily recognised as having a key role to play. An alternative approach is to conceptualise the placement as an action learning project: this inevitably draws people in the placement into the action. This re-conceptualisation would have the added strength of recognising the inevitable uncertainties of practice for each individual.

2. Conceptualising learning and its assessment in community placements

Police, at least in Sweden, Northern Ireland and New South Wales (albeit short-term in the case of the latter), have incorporated community placements into recruit training, with the aims of increasing professionalism, and of increasing police recruits' level of understanding of the circumstances typically faced by sectors of the population they will police. These community placements are quite similar in their aims, and the assumptions that underpin them, to 'service learning', an American initiative in schools and universities, where students undertake placements in disadvantaged communities, accomplishing 'tasks that meet genuine human needs in combination with conscious educational growth' (Stanton et al., 1999, p.6). Establishing a fair and appropriate assessment regimen is particularly problematic in community placements, above and beyond the problems with professional placements, because of the greater diversity in organisations and students' roles within them.

The immersion of individual students in what are intentionally unfamiliar environments, especially for a brief period (in this case, four weeks), means that the way in which learning from and through experience might occur becomes a critical issue. Misconceptualising it can mean that assessment items are designed that measure the wrong things, or only a part of the intended learning. In the case of New South Wales between 1997 and 2000, the learning model underpinning the community placement was that of reflective practice. The sources of this model were Schön's (1987) notion of the reflective practitioner, combined with Brookfield's (1989) notion of critical reflection, and the experiential learning cycle (Boud & Walker, 1991; Boud & Miller, 1996; Boud et al., 1996). Each of these frameworks poses a problem for learning and assessment in community placements. Schön's identification of reflection-in-action as a characteristic of expert practice translates poorly across to temporary sojourns in unfamiliar work environments; critical reflection is seldom a feature of students' work, even when placements occur in their chosen profession (Kerka, 1996; Bartrop, 1992; Wilmot, 1995); and few theorists have explored the intentional,

future-oriented aspects of the experiential learning cycle discussed by Walker & Boud (1994), when all that may sustain students in an unsuitable or difficult placement may be that completing the placement will allow them to pursue their chosen profession.

During the marking of the students' work, this hybrid model of reflection was identified as inadequate for the task, in that learning was evident in students' work, but this learning lay outside the assessment rubrics. If, as Packer & Goicoechea (2000) have asserted, ontology (our theory of being) precedes epistemology (our theory of knowledge), or even if it is merely that there is a pattern of mutual influence (Wilson, 1998), then it is important to address our understanding of what it is to be a learner or a member of a profession. Much contemporary literature on adult learning, although not using these specific terms, refers to the need to take actor, *habitus* and context into account, and considers that learning is linked to changes in selves and self-positioning (Billett, 2001; Wenger, 1998). That there are tensions between understanding individuals as autonomous and as socially constructed is also identified (Garrick, 1999).

Burkitt (1999; 1997; 1991), a sociologist, uniquely incorporates notions of embodiment, thought, feelings, actions, social and natural contexts, pasts and futures into his 'ecological' understanding of selves in the late modern context. In articulating his ecological approach to identity, he draws on very similar intellectual traditions to situated learning theorists, as well as those interested in experiential learning. Burkitt also considers the importance of action, the need to recognise the embodiment of selves, as well as the situating of selves in the late modern context, with its complex interplay of public and private worlds. Although the ecological perspective is not alone in reinforcing these aspects of being and identity, importantly Burkitt's ideas suggest that *interaction* between the embodied individual and his or her contexts (remembering, following Giddens (1991, p.53), that the late modern era involves us simultaneously in multiple contexts for action), and the multiple *affordances* inherent in this interplay (those of the individual and the multiple contexts), must be recognised in considering learning and its assessment.

It is not just the multiplicity of interactions within and outside the placement that need to be taken into account

in considering learning. It is also important, particularly in education that is closely tied to an intended career, to consider how learners see their futures, and how this understanding of their future might affect their actions in an unfamiliar situation. The future is an under-researched area in adult education - the focus has largely been upon retrospective aspects of reflection. It is worth revisiting Giddens' descriptions of the consequences of modernity, particularly people's attempts to negotiate an unpredictable and potentially dangerous future against a background of a complex and ill-understood world. As he puts it, '[...] living in the modern world is more like being in a careering juggernaut [...] than being in a carefully controlled and well-driven motor car' (Giddens, 1991).

All in all, then, taking a holistic and interactive stance on selves opens the door to a more far-reaching and complex view of learning. In work placements, neither the work environment nor the student can be isolated from each other, nor can past, present and future. Placement processes - and assessment strategies - need to be designed with interactivity and unpredictability clearly in mind. Recent developments in assessment (Barab & Kirshner, 2001; McIntyre, 1996; , Kerka, 2002) highlight the difficulties in assessing performative skills, and suggest a shift in focus from summative to formative assessment, and to students tracking their own learning and achievements through the production of portfolios. Are these processes sufficient for the assessment of learning in community and other placements?

3. Research methodology

This research aimed to examine issues of identity, context and action as recorded in written records of experience, and was not specifically focused on assessment issues, even though the latter were, as mentioned earlier, the stimulus. The study was based on work written by twenty six policing students¹, that is, their assignments, over the course of a four week placement in a community service organisation, with a

particular focus on the experiences of five students. In addition to working from a largely pre-set learning contract with the placement supervisor, students submitted four assignments. The most heavily weighted item involved the completion of twenty critically reflective activities, based on readings about class and social inequality as these issues related to the students' own lives and those of the people in the placement. They also submitted a daily record of activities, which was to comply, in terms of its presentation, with the format of the police notebook. Finally, they provided two reflections on their experiences, one at the end of the first week, and the other at the conclusion of the placement. The items constituted a type of portfolio, and the 'portfolio' was assessed and given a grade.

I worked from the assertion that context can be accessed through individual accounts. It is in such accounts that 'the intersection of individual, context, and activity over time (knowing in the making)' (Barab & Kirshner, 2001) can *best* be accessed, and this is, from an ecological perspective, the unit of analysis, although few people have examined the subjective and the social simultaneously (McIntyre, 1996). Nowadays, given that educators believe that reflective inquiry into one's own practice can be based on such documents and that journals foster learning (Kerka, 2002; Moon, 1999; Brookfield, 1995), interest is increasing in using diaries for researching adult learning.

It should be noted that the proliferation of qualitative research approaches creates a highly contradictory domain to traverse, with many tensions, ambiguities, hesitations and gaps in a still-developing and fluid field (Denzin & Lincoln, 2000; Miles & Huberman, 1994). Nonetheless, the common focus of qualitative approaches is the exploration and description of lived experience in natural settings, and the complex interrelationships that this involves (Denzin & Lincoln, 2000; Marshall & Rossman, 1999; , Cresswell, 1998;

Stake, 1995).

Marshall and Rossman (1999) and Allport (1978) remind us to view autobiographies and diaries with some scepticism. Their usefulness as a data source may be limited because they are a form of 'mute' evidence (Hodder, 2000), not always articulate about people's reasons for doing things, or understanding things in particular ways, and they therefore have many possible meanings. Thus my research process was inherently one of interpretation, both of students' experiences that altered meanings (Denzin, 1989, p.10), and in identifying patterns of anticipated and unanticipated relationships (Stake, 1995). Reliance on this type of material demanded that I avoided erasing students as narrators of their own lives, addressing their remarks to the lecturer they imagined would be assessing their work (Denzin & Lincoln, 2000, p.39; Denzin, 1997), by ensuring that I drew as much as possible on their descriptions of their experiences without adding my own descriptive and evaluative overlays.

However, I am not going to focus on the interpretation process here, rather I am going to focus on examples drawn from students' work of those issues which have implications for assessment. Suffice it to say, the work that was intensively studied was selected on the basis of maximum variation and a deliberate hunt for negative instances (Miles & Huberman, 1994), and cases that offered the opportunity to learn the most (Stake, 2000). Within the framework of the case study approach, I was a *bricoleur* (Denzin & Lincoln, 2000, p.39), using a variety of interpretive strategies to try and arrive at the meaning of the data, and, as any explorer would, to 'map' the territory, using a range of instruments that suited my purposes. This was by no means a matter of following a set plan. Rather, it involved an iterative and hermeneutic process of tacking between reading, writing and data entry (using N-Vivo) and analysis, and the insights which followed these activities.

¹Students were enrolled in the Diploma of Policing Practice, a course for intending police officers, jointly offered by Charles Sturt University and the New South Wales Police. The placement was undertaken in their second session of study. No details are given as to the cohort or years, to protect the identity of the informants. This paper is also based on marking over 300 assignments, and my marking of these, as well as attending briefing and debriefing sessions.

4. Results, analysis and discussions

In reviewing the students' work, what was immediately noticeable was the variety amongst informants, placements, experiences and learning trajectories. The students, men and women, were between the ages of 18 and 50, identified their social class as varying from working class to upper middle class and, although they were predominantly Anglo-Celtic in their backgrounds, some were from other cultural backgrounds. Informants wrote very differently about their experiences, and seized the opportunities presented to them in order to demonstrate their engagement with their studies - and because of the differences between contexts and amongst students, did very different things.

As limited coverage of the issues raised in the study itself can be offered in this paper, only a few examples of the diversity of students' experiences, feelings, thoughts, actions and relationships are described here, clustered under learning processes and learning outcomes.

4.1 Learning processes

4.1.1 Qualitative differences in placement experiences

There were qualitative differences related to being in the placement that were seen as likely to have an impact on the learning. The first area of difference was related to whether or not the experiences were 'new' or 'novel'. This is a distinction that exists in German, and not in English, but which is helpful here, in that 'new' experiences are those which have some similarity to previous experiences and 'novel' experiences are totally foreign to everything one has encountered before. Novel circumstances, it appears from this study, will raise the question of appropriate action more starkly than the new (Figure 1).

The type of work was also an issue: dealing with large numbers of demanding children, talking with parents coping with the impending death of their child, and so on have a high emotional and relational load compared to writing policies, or handing out food vouchers (Figure 2).

At the end of the day I was run off my feet and glad to finish. Kids are a handful and I was pleased to get home to some peace and quiet. Nonetheless, a great day! (Leonard, early 40's, general hospital)

[A client pulled a knife on another client.] After this incident I was even more unsure of how to talk to the women, I thought, I'm just going to have to do it. (Serena, late 20's, daytime 'home' for street women)

Figure 1. Examples of the new and the novel

The most difficult part of my community placement for me was tolerating the bureaucracy and deck-chair shuffling which goes on in a public service environment, I observed hours being spent on the pecking order on a white board containing a list of names. (Jay, early 30's, community agency, final reflection)

After completing this duty [walking around the dormitories] my emotions were unsettled at times because of the smell of the men. (Karl, age unknown, hostel for homeless men, Day 4)

My relationship with the kids was developing much better than I could ever have imagined. I am gradually gaining their trust & respect & each day certain things happen that feel like major break throughs. I'm attempting to communicate with them on their level & I think so far it has been really effective. They seem to have accepted me & enjoy my company, which made me feel great [...]. (Brittany, early 20's, 'home' for Aboriginal children, Day 15)

Figure 2. Differences in types of work

The intensity of the work was the third area of variation: some students had little to do, and were even encouraged by staff in the placement to undertake their reading in work-time, while others rushed from one job to another in 12 hour shifts, sometimes with a heavy emotional load (Figure 3).

Didn't want to get up because of the boredom in such a low place, but my will to pass this course motivated me, and I decided that I would find things to do. (Gareth, late 20's, hostel for homeless men, Day 4)

I don't deny that I am scared of [Ben's] behavioural problems, I hope I'm alright to say that - I am being very truthful in what I write. I'm given 2 very long days which all very draining for me. I respect the clients that we deal with but when you're being asked the same thing every 2 minutes and pretending to laugh when you really feel like being sick, it takes a lot out of you. I haven't been able to eat anything yet but I'm trying very hard to be good at this. I am learning a lot - and losing weight!! (Annabel, under 20, day care for severely disabled adults, Day 2)

Figure 3. Differences in work intensity

I pretty much know all about the staff and Tone [the other student] in their professional and personal lives. The working relationships between them were close and trusting. The place is only small so you got to work close together which made getting on a highly important aspect. (Cameron, early 20's, methadone clinic, Day 12)

We spoke to Lionel this morning and [...] I think he is getting a little too attached to us now towards the end. It will be hard for him for us to go. I think that I won't go and say goodbye to him, it would be easier to just leave. I don't like to say goodbye to people because I don't like to upset them. The reactions are sometimes hard to take. (Chloe, early 20's, residential care for people with disabilities, Day 25)

Figure 4. Differences in relationships

Relationships differed too (Figure 4). Some students were in small agencies with quasi-familial environments, others had teacher/pupil relationships either with the workers or the clients, and still others were seen as co-workers, representatives of the police, and so on. Sometimes the students had to trust their own judgement about what best to do about the relationships they had developed.

Chloe's solution leads into the final issue, which was that the level of guidance differed widely (Figure 5). This largely depended on the everyday composition of the workforce in the placement - in professional environments, students received guidance; where workers were largely well-meaning volunteers, there was often no guidance at all, and even inappropriate treatment. The students' capacity to improvise, and need to focus on the future, was far stronger when there was little guidance.

From day one they made us feel like members of staff ourselves. Nothing was too much trouble and we were certainly made part of the team. [...] What this meant was that they could rely on me to hold the fort should they have to leave class for a short while. I even got to take a pottery class. [...] At the end I was told that I had made their job easier which felt great. (Hector, mid 30's, 'school', Day 29)

Had a meeting with Conrad, my supervisor. I've got a feeling that he's as confused about this whole thing as much as I am. Conrad is friendly enough but didn't really explain what I would actually be doing. I met a few of the other staff members who all seem really friendly. I'm hoping the kids will be also, but I'm not so sure they all will be. I'll be starting at 1230h on Monday & working through till 2030h, doing what, I still don't know. I'm not too sure what to expect, but I am looking forward to starting. (Brittany, early 20's, 'home' for Aboriginal children, Day -5)

I would love to get [the girls] all involved & am currently in the process of working things out with my club & the house parents. Glendale will almost have its own team soon at this rate!! (Brittany, early 20's, 'home' for Aboriginal children, Day 16)

Figure 5. Differences in the level of guidance

The variations in learning experiences cut across what students sensed, saw, heard, felt, thought and valued as they interacted with different people and practices.

4.1.2 Affordances and bricolage

Stepping back from the immediacy of students'

accounts, one way of describing these qualitative differences is to see the work placements as offering different 'affordances' (Burkitt, 1999) - opportunities for action. The affordances of the workplace are in interplay with the affordances of the student's own background and capacities. The task for the student, upon entering a work placement, is to work out, sometimes explicitly but more often implicitly, what actions will take them towards their goal. Thus they, more or less effectively, cobble together responses in familiar and unfamiliar situations that they believe will lead them forwards. Each intervention and response has effects on people and the environment.

This observation allows for the foregrounding of bricolage as the mechanism through which people learn in placement contexts. The term bricolage is used to incorporate both spontaneous improvisations in response to immediate demands, and the conscious problem-solving (which still has an improvisational quality, in that it draws, for the most part, on what is to hand) that occurs when people are working towards the achievement of a project (Giddens, 1976; Lave & Wenger, 1991; Goffman, 1972; Goffman, 1976). The process of bricolage in addressing problems has the effect of (and maybe even the implicit aim of) refining the focus of activity, and, paradoxically, of both increasing and reducing the number of alternative courses of action to those that are likely to have the desired results. Recognition of the role that bricolage plays in negotiating a path through a placement is central to enhancing assessment strategies and processes, most particularly in the first day or two, when the affordances of the environment can be identified (and, if necessary, enlarged), and patterns of interaction are set in place.

4.2 Learning outcomes

Despite all of the above-mentioned variations in experiences, there were three types of learning evident across most of them. These were the acquisition of practical knowledge; changes in self-positioning as a result of acquiring that knowledge; and, contrary to the markers' comments that there was no reflection evident in the diaries, reflection on that change.

The practical knowledge that students acquired should not be underestimated, or dismissed as technical

competencies. As Forester 2003 points out, 'ordinary' work is a 'thickly layered texture of political struggles concerning power and authority, cultural negotiations over identities, and social constructions of the "problems" at hand' (Forester, 2003). It is as a consequence of this texture that students saw themselves and their relationships with others differently - students moved from anxiety and bewilderment to feeling capable of handling difficult situations on their own, without knowing how this had happened (Figure 6).

The reflection evident in the diaries was not consistent with marker expectations that students would be able to link theory with practice (the definition of reflection implicit in the assessment rubric). Reflection was directly derived from experiences, rather than a process of starting with the readings and seeing how concepts such as class might apply to the client group. Often, however, it was not possible to ascertain exactly what a student had concluded as a result of his or her reflection, even though the process of reflection was evident (Figure 6). The first extract in Figure 7, from a diary largely written in the third person (an ongoing reminder that this was an assessment task and the student's future was at stake), shows how the experiences in the placement might reverberate in another of the students' worlds:

The whole experience was fascinating, and dealing with people with a mental illness is not as difficult as people make it out to be. (Frances, late 20's, mental health services, final reflection)

Today started horribly. Ben demanded that we take him shopping again for that bloody black jacket. Again as none were big enough to fit him being the size he is, he had another incident. Unfortunately he punched Blanche [the worker] and anything else he could get his hands on. he punched the cars that passed, signs, trolleys, he kicked things and screamed abusive language at anyone and everyone. Blanche went round a corner of the shop and tried to ring the supervisor for help which meant I was left with him.

He screamed as he chased me down two roads in town. As it's illegal for a worker to physically restrain a client I found myself walking ahead of Ben telling shoppers walking towards him to "get

out of the way, don't go near him walk the other way," and pointing the flow of people in different directions. My next thought was to walk away and pay him no attention so that I wasn't adding 'fuel to the fire' but he was already too far gone. He raised his hand up to a little baby boy so I locked his arm behind his back and pulled him back toward me. This triggered him to go off at me again but I've seen Ben in action before and didn't want to risk the safety of the boy. I didn't tell anyone at [the agency] about any of that because it was not a large incident and I feel that I had it under control.' (Annabel, day care for severely disabled adults, Day 21)

I didn't think it was my place to get too involved. I guess the learning part happened as I went along, when I saw what happened from day to day. I didn't try to learn a lot, it just happened. (Anice, under 20, charity organisation, final reflection)

Figure 6. Practical knowledge & changed self-positioning

Sadness experienced by the student when assisting a carer [the wife of a respite care patient] to take her husband out to the car for the journey home. This chap was suffering from [a degenerative disease] and was managing well. The student has a father who suffers from this unfair (another one) ailment. The chap observed today was twenty years older than Dad, at times its bloody difficult. (Kelvin, early 30's, aged care, Day 14)

It was interesting to talk about how he deals with sad cases (cancer etc.) by not becoming too involved. Good food for thought.' (Leonard, early 40's, general hospital, Day 16)

More and more the tragedy of mental illness hits home. (Gareth, late 20's, hostel for homeless men, Day 16)

Figure 7. Reflection upon experience

Where there was (rare) evidence of the concepts being taught having been considered, this was not necessarily

an issue at work (Figure 8).

My girlfriend and I went to "Home World", this is a place where you can look at houses and walking through the houses, I found that people have different tastes and different styles and they vary according to their upbringing. I mean people from the Western suburbs tend to want to have nice size blocks and things like BBQ areas and the size of the house is not the most important thing for them, but some of the so-called "upper class" people wanted houses that were very large and of an expensive nature [and were concerned about] the views they would get from the home that was in mind (Denis, early twenties, charity shop, Day 27)

Figure 8. Reflection using the literature

Nor was the reflection necessarily a private activity (Figure 9).

It is depressing me to be here - I prefer to turn my back than have to force myself to deal with it. I had a chat with one of the workers this afternoon, and I must admit I did cry. She said it was hard and my feelings were normal, and this afternoon I am feeling a lot better. (Courtney, early 20's, residential care for disabled children, Day 3)

Figure 9. Reflecting at work

4.3 Contributions in the placement

Students also made their own contributions to the organisations in which they were placed, generated by the skills, interests and capabilities that they brought with them and the affordances of the environments in which they were placed. Some of the students, such as Hilary, who was in her forties, were immediately recognised as having the requisite capacities, and were offered a job during the placement. Others, not amongst the participants in this study, whose assessed work forms part of the background to the study, were asked, however inappropriately, to use their trades qualifications in improving the buildings and amenities of the buildings in which they were located.

Far more appropriate was the ongoing development of

organisational services, particularly where children and teenagers were the clients, when the policing students had sporting prowess, at State, national, and even international levels. Brittany was a case in point. She began her placement with the hope that she would be able to 'win the wary kids over', and that she 'would really love to be able to honestly feel that these kids have benefited in some way, or gained something from me also' (Day 1). She achieved both (Figure 10).

Four new [...] players made their debut this morning. We now have more than half the [...] team coming from here. Cecil had taken them all down to Rebel this morning so they were all decked out in new gear.

Most of the girls have a fair bit of potential, which has already been mentioned by numerous spectators. I am so proud of them all for giving it a go & it brings me much joy to see them all so excited & enjoying themselves so much. (Day 12)

Figure 10. Contributions to the work environment

She initiated and fostered the girls' participation in her sport, to the extent that, after a fortnight in the placement, each Saturday involved some of the girls playing sport with Brittany's club, including a trip to another town during which Brittany and her sister taught the girls the songs they usually sang. The staff supported this development, not just by buying the necessary sports clothing, but also by watching the matches. The girls' participation in the local team was expected to last well beyond the placement itself.

4.4 Summary of findings

The richness and unpredictability of the learning, which resulted from chance affordances for particular students in particular work-places (the inevitable consequence of travelling in the 'juggernaut of modernity?'), had a significant impact on feelings, actions and relationships for all of the people in that social environment, and therefore for the students' learning and assessment outcomes, and, on occasions, for staff and clients in the placement. Moreover, the study raised some ethical issues: given the variety amongst placements, particularly in terms of the support they have for

learning. Some students faced extremely risky situations, and others were not able to bring the 'hothouse' relationships developed over the four weeks to an appropriate, client-centred, conclusion.

My research showed that community placements, in which uncertainty about what is to happen is a constant feature, can leave learners to their own devices, and this often leads to the use of 'survival strategies' - a short-term focus on addressing immediate problems in the journey towards a long-term project, particularly where the learning environment offers few opportunities for setting context-specific goals. Some of the 'survival strategies' may be highly constructive, and go well beyond the expected outcomes of the placement, changing the organisation itself. The central issues in this problem-solving approach were the resources that were to hand in dealing with those problems - without a strong formative assessment process, students developed their own strategies as best they could.

5. Implications of the study for enhancing assessment

5.1 Questions raised by the study

The questions raised by this study about assessment practices in work placements cut across three main areas: the conceptualisation of learning; the problem of context; and the problem of action. As such, in assessment terms, they primarily concern issues of the alignment of assessment with learning that is likely in the work context, and ethics.

In terms of the conceptualisation of learning, a focus on cognition and purely retrospective interpretations of the role of reflection in learning cannot be to the exclusion of practices, relationships, emotions and a sense of future, if the assessment is to align with the learning that is likely to occur (Biggs, 2003). Nor, by the way, does a focus on competencies devoid of contextual influences suffice (Coll et al., 2002). Assessment in

work placements can and should encompass far more than reflection upon key concepts as they are manifest in the practice environment, partly because the key concepts may not be manifest, or may appear in ways that support rather than challenge taken-for-granted understandings. Indeed, some students expressed disappointment with their grades, when 'good' workplace performance (i.e. where students made a difference) was not matched by high quality performance on the set assignment tasks. Whilst the learning contract and experiences were to link in with the readings and activities, and were to allow for reflective practice, the expected alignment rarely eventuated in the hurley burley of students' encounters with practice. Then, too, although the value of the experiences was recognised, it was not incorporated into formative assessment processes. The constructive alignment (Biggs, 2003) of the curriculum and its assessment mean nothing if the types of learning most likely to occur have not been captured.

Then there is the problem of context (the diversity, messiness and noise in differing work and personal environments), and the extent to which interactions between learners and these differing contexts need to be taken into account. It was evident in this study that diversity between contexts was inevitable, but that certain work environments constituted impoverished contexts for learning. Sometimes the guidance and feedback available in situ was inadequate to the students' needs, and students were left to generate their own solutions, which could be totally off-track. This is a particularly disappointing outcome when the aim is to immerse the student in a work-relevant environment which is results-focused and audience-influenced, that is, it aims to present, in a supported context, students with the opportunities to negotiate the ambiguities of professional life, which, on campus, can only be provided in the form of scenarios or simulations. Some structured means of the lecturer knowing about any potential problems, and of enriching learning environments to enhance the inevitable bricolage, was required (Duignan, 2002). Moreover, there needs to be some recognition, in the learning contract, of the fact that the people in the workplace may change as a result of a student's contribution.

Finally, there is the question of how to deal with the problem of action, both as encountered by the individual

in terms of their values, beliefs, feelings, knowledge and skills, and as occurring in an unequal society. Boud & Walker (1998) pointed out that clinical placements can generate levels of distress and throw up ethical dilemmas that cannot be resolved by taking notes - or recording them in a journal for a lecturer to discover post facto.

Thus work placements, while they offer realistically messy and noisy environments, may fail to meet some key requirements, in that there may not be:

- an obvious-to-the-student and constantly present and overriding purpose to guide performance and adjustment, including clear and obvious standards for self-assessment (according to Wiggins (1998), these might involve intent versus effect, and actual versus ideal performance);
- a distinct audience for the work that will determine the shape and focus of the work and feedback and self-adjustment en route;
- appropriate resources available;
- assessment of those skills which are critical to, and likely to be manifest in, the learning context;
- equivalent opportunities to succeed, even if experiences are not identical;
- recognition of the experience- and skills-base that students bring to the placement.

5.2 Action learning as a path forward

The contemporary debate about the assessment of complex performances such as that evidenced in work placements would suggest that portfolios are likely to be the most effective assessment tool (Biggs, 2003; Loacker, 2005; Tai, 2005), with the placement experiences potentially providing some examples of the quality of a student's performance that they might like to include in their portfolio. An emphasis is also placed on the value of formative assessment processes when the summative process is unlikely to measure the performance, and on institutionally based low-stakes approaches to assessment (Knight, 2005).

However, placements form a part of learning in institutions at many different stages of development, some of them quite traditional. In the latter instances, particularly where service learning is seen as an add-on

rather than a means of acquiring or demonstrating complex performance skills, the complexities of the learning and its assessment must be recognised in slightly different ways. An approach is needed that takes account of contexts, relationships, uncertainty and complexity, as well as individual learning. It needs to be an approach which is not mechanistic, and, as Lockett & Lockett suggest, this may best be 'action learning' (Lockett, S. & Lockett, K., 1999).

Action learning has its origins in quality management, in programs for managers on how to manage better in the course of their risky, unpredictable and emotional daily working lives (Garratt, 1991; Pedler, 1991). The premise that 'responsible action is our greatest disciplinarian as well as our most sympathetic helper' (Pedler, 1991) means that action learning processes recognise the importance of moral imagination and of the feelings that underpin right action (Pedler, 1991). Rather than learn what should be done prior to action, learners focus on the action before them, and then learn what is necessary to improve the current situation.

The process is characterised by an action learning 'set' (a group of people sharing similar problems). The group tackles the problems in real time and freely criticise, advise and support their fellows, drawing when they choose, on appropriate specialist help. One practitioner tells participants, 'I don't know where we're going, or the route. I only know that you'll experience it, and it may not always be great' (Hughes, 1991). The open nature of the process develops the micro-political skills of diagnosis and 'ally' identification (allies are those who might assist with the problem) (Pedler, 1991). In some instances, particularly organisations already engaged in this type of approach, the action learning 'set' would be workplace-based, using the lecturer as the 'set advisor'; in others, it would be student cohort-based, again with the lecturer as 'set advisor'. Having the lecturer as the 'set advisor' would allow for early feedback on, and discussion about how best to deal with, differing affordances in the environment, as a form of coaching and formative feedback (Brown & Knight, 1995 ; Coll et al., 2002). Training and ongoing support for lecturers would also be required (Gould & Masters, 2004).

How might one assess students' work given this complexity and unpredictability in action, and what can be

assessed? The action learning literature has a personal and organisational development focus, and pays scant attention to external assessment. Nonetheless, it provides one life-line in terms of the how: self- and peer-assessment is a minimum requirement. There are many examples of how best to do this (Boud, 1995; Chin et al., 2005; Farooqi & MacDonald, 2005). In terms of what could be assessed, the work of Angelo and Cross (1993) and Nightingale et al. (1996) would suggest that aspects of learning that would be amenable to assessment might include synthesis and creative thinking; problem posing/solving; application and performance; attitudes, values and self-awareness; and managing and developing oneself.

The focus of, and processes for assessment would be discussed by the action learning set, in terms of an action plan/learning contract, in which the goals are specified, the resources that might be drawn upon are identified, the types of learning strategies that will be employed are discussed, along with the identification of possible measures of success and how these will be demonstrated (this could be a portfolio, before and after videos, entries on the forum, etc.). It should be noted that what may be lost in this process are the subtle shifts of positioning that are evident in naïve accounts of the day's experiences: it is doubtful, for example, that Brittany would have said to everyone in her placement that her goal was to 'win over the girls' (which she mentioned in her diary).

6. Conclusions

The interface between student and placement is an extremely complex phenomenon. Despite the small number of students involved in the study, and because of the frankness of the students' writing, my research highlights the need to counterbalance a focus on what happens for individuals as they learn in workplaces with a focus on designing learning that recognises the impact of the interaction between student and workplace. Assessment processes that fail to take account of the complexity of the inter-relationships involved may miss

the target entirely (as was the case with a model of reflection as being the application of theory to practice) and fail to assess the very things that will contribute to a learner becoming a skilful practitioner. It is possible that the most fruitful starting point for enhancing assessment practices in work placements is the notion of action learning, although, with a critical absence of any literature on the assessment of action learning, all that can be offered is some promising leads. Further research is required into how best to structure a sufficiently flexible system.

Using community or service placements in professional education requires that far more attention to be paid to what is being assessed, how, and why, if students - and clients - are not to be disadvantaged by the happenstance of the organisation in which students are placed. The questions raised by this study will be of use not just in service learning or other work placements, but also in continuing professional education courses undertaken by distance education.

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Implementation and Feedback on the Use of Reflective Writing as a Component of a Clinical Assessment

Pauline Cho
School of Optometry
The Hong Kong Polytechnic University, Hong Kong SAR, China

Catherine Tang
Educational Consultant

Assessing final year students' placement in a Contact Lens Clinic (CLC) using direct observation by supervisors using a rating scale did not encourage reflection. Reflective writing (RW) is seen as a powerful medium for learning and a means of facilitating reflection-on-action. The purpose of this paper is to report on the implementation of RW as an additional component of CLC assessment to encourage reflective learning, and the feedback from the students (via a questionnaire) on its effectiveness. All students who responded agreed that they learned more because of the RW component. The majority of the students responded that they reflected more, became more aware of/alert to what was going on between themselves and their patients, and between themselves and their supervisors during clinical sessions. They were also motivated to communicate more frequently with staff and peers, to critique own practice, and how theory was handled/applied in practice. RW also provided an avenue for clarifications of misunderstandings, misconceptions or misinterpretations. Most of the students indicated a preference for more RW.

1. Introduction

Education in Hong Kong is very much assessment-driven but there are signs that this is becoming unsatisfactory. In clinical courses, such as Optometry, there is an increasing pressure for a change from emphasis on factual knowledge and didactic teaching to emphasis on professional and personal skill development. With the pressure to change, it is time to take a look at the assessment system of a training clinic, to identify problems from the perspective of the students and to solicit information on the implementation of reflective writing as an assessment tool to enhance clinical learning. Problems identified may perhaps be solved or minimized via some changes but some, no doubt will remain unsolved or, to be more optimistic, to be solved. The latter however should not be from lack of trying.

In the Department of Optometry & Radiography of The Hong Kong Polytechnic University (PolyU), the Contact Lens Clinic (CLC) assessment (referring to the on-site assessment of students' clinical performance) had undergone various changes over the years. End-of-year clinical examination was phased out years ago, as it is the opinion of the faculty that a single assessment is artificial, does not say much about the competency of the student, compromises the standards of patient care, and is time-consuming. Each optometry student has to attend one CLC session per week in his/her final year of study and may see up to four contact lens patients per session.

For some years, students were given a grade (criterion-based) for their overall performance, irrespective of the number of patients seen. This was introduced because students had raised the concern that some supervisors graded them by taking into account all the patients they saw in each session while others did not, and supervisors had complained about the numerous forms to be completed at each session if each patient consultation was assessed.

For our students to be effective practitioners, it is desirable for them to become reflective practitioners -- to develop critical thinking and self-evaluation. However, the situation in our CLC did not encourage or facilitate on-site reflection. Time constraints limited students' reflection on their cases, feedback from

supervisors and students' exposure to different types of cases. Since reflection and critical thinking are very important in clinical education, reflective writing (RW) was considered to be a potentially good exercise to introduce to the students as it has been claimed to be a powerful medium to facilitate reflection (Walker, 1985; Hettich, 1990; Ballantyne & Packer, 1995). Hence, in the academic year of 2000/2001, reflective writing (RW) (reflective diaries or reflective journals) was introduced to final year students to encourage reflection.

The objectives of this study were to:

1. obtain feedback from the students on the usefulness of RW as a component of CLC assessment in enhancing/facilitating clinical learning and reflective thinking in CLC,
2. compare RW scores and CLC (on-site assessment) scores,
3. invite students to comment and suggest ways of improving the use of RW in CLC assessment.

2. Methods

Before implementation of the CLC assessment with RW component, the final year students were briefed about the use of RW as an element of assessment in CLC. Students were given the opportunity to raise questions and to make suggestions about CLC assessment and to decide on the weighting of the RW component. I (PC) went through the requirements expected of them, the goals of CLC, the new assessment form, guidelines on how to do RW (Appendix 1) and assessment criteria for the RW (Appendix 2). An example of RW written by a previous year student was also presented and I went through the example with them, identifying the strengths and weaknesses, and given ideas on how it could be improved.

So, in the new CLC assessment model, apart from the normal continuous on-site assessment, the student had to do RW, and as agreed by the students, the weightings of the two components were 80%:20%, respectively. On-

site assessments were conducted by different supervisors assigned to each clinical session and the RW items were marked by one member of staff only (PC).

To ensure reliability, at the end of the year, six RW of different grades (two 'A', two 'C' and two 'D' grades) were submitted to an experienced senior member of staff (whose expertise was in education) for her grading, based on the same assessment criteria. (The inter-rater reliability was 83.3%).

After using the new CLC assessment model, at the end of the academic year, a questionnaire was sent to the students to obtain feedback on the use of RW as a component of CLC assessment. Before use, the questionnaire was submitted to the same senior staff mentioned above for comments and suggestions. The final version is presented in Appendix 3.

3. Procedures

The questionnaire was emailed to 25 (all) final year optometry students. All students were invited to complete and return the questionnaires. An introduction of the purposes of the questionnaire was included in the email message and also shown on the first page of the questionnaire. Students could return the questionnaire by email or they could download it and return the hard copy. The questionnaires were not marked in any way and the students were not required to put down their names.

4. Data analyses

4.1 Qualitative analysis

A qualitative analysis of the data obtained from the

questionnaires was performed.

Students' responses to close-ended questions were presented as bar graphs and their opinions on and suggestions for change (responses to open-ended questions) of changes were analyzed and compared with their responses to the close-ended questions.

4.2 Quantitative analysis

Statistical analyses of the scores of RW and CLC (if available) were also performed. To test for relationships between RW and clinical scores, Pearson correlation coefficient tests were carried out and a p (probability) value of less than 0.05 used to indicate statistical significance.

4.3 Ethics clearance

The feedback from students was also intended for the annual subject reports to the department. Hence, no ethics application was submitted. Permission to use these feedback results was obtained from the Head of Department.

5. Results

Seventeen students (out of a class of 25) returned the questionnaire (Appendix 3), giving a response rate of 68%.

Only eleven students returned their questionnaires via email, and the rest returned their questionnaires by mail. Responses from the students were coded as S# in the following paragraphs since six students were anonymous.

5.1.1 Close-ended questions (Q1-13)

Figures 1(a) - (i) show the distribution of responses to the close-ended questions.

All the students either strongly agreed or agreed that

the RW exercise (one reflective journal (RJ) and one reflective diary (RD)) had made them more aware and alert of what was going on between them and their patients in a clinical session. All students, except one (S13), (94%) strongly agreed or agreed that RW made them more aware of and alert to what were going on between them and their supervisors during a clinical session (see Figure 1a). All reported that the RW exercise helped them to reflect quite a lot on their contact lens cases or related issues (Figure 1b), and also prompted

them to try to find out more about one or more uncertain CL-related issue (Figure 1c). All the students strongly agreed or agreed that they communicated more with their peers but only three students (S3, S5, S7) (18%) disagreed that they were also communicating more frequently with their supervisors to discuss contact lens-related issues (Figure 1d). Of the 17 students, only one student (S17) (6%) disagreed that s/he looked up books/articles about uncertain CL-related issues as a result of having to do this RW exercise (Figure 1e)

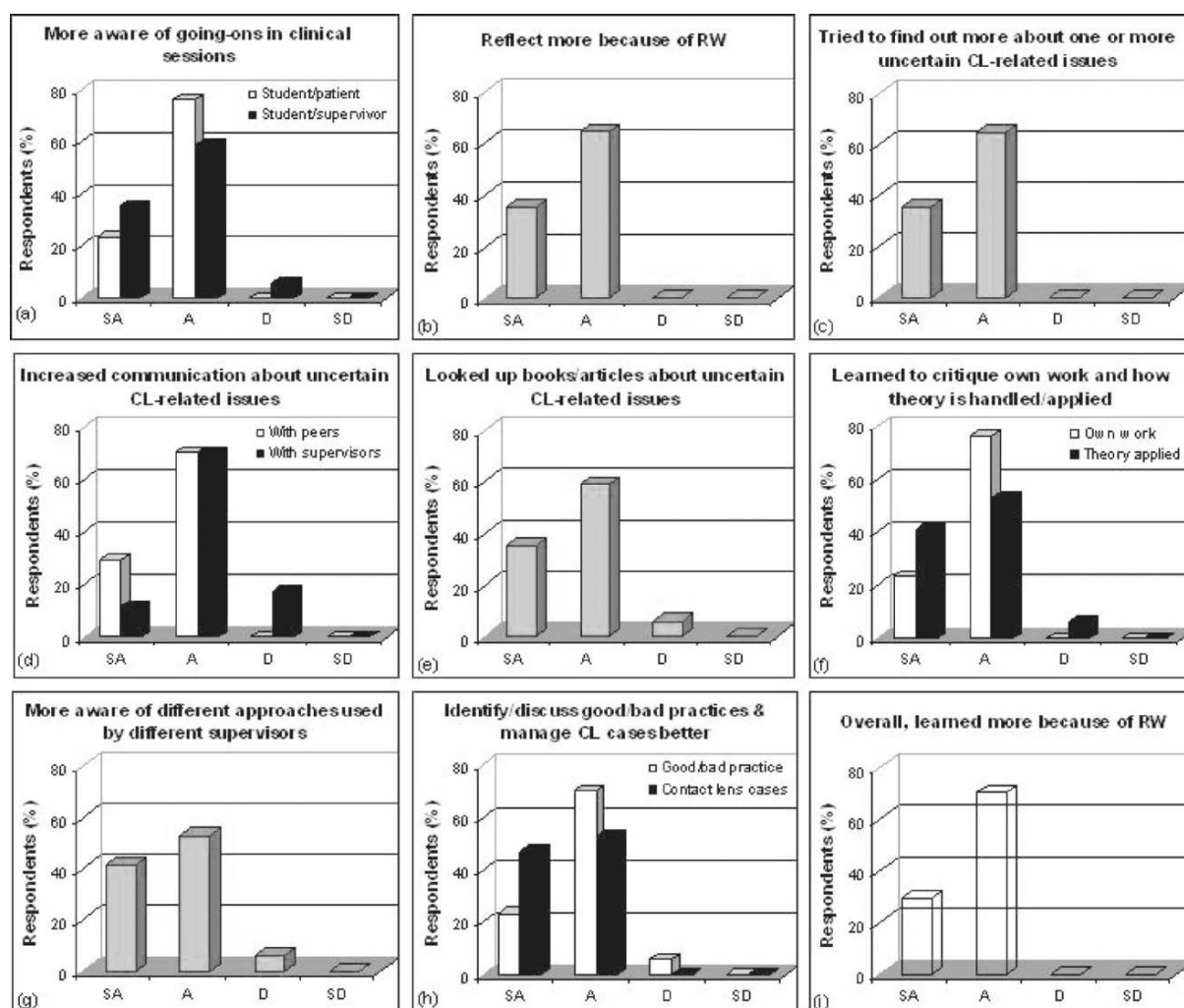


Figure 1. Distributions of responses to the close-ended questions (Q1-Q13) on the usefulness of reflective writing in Contact Lens Clinic Assessment in enhancing clinical learning. (SA - Strongly Agree; A - Agree; D - Disagree; SD - Strongly Disagree)

All students also strongly agreed or agreed that they learned to critique their own work. Only one student (S7) (6%) disagreed that RW helped her to learn to critique how theory was applied in real practice (Figure 1f) and to identify and discuss good or bad practices (Figure 1h).

Another student (S5) disagreed that s/he became more aware that different practitioners may take different approaches in a similar case (Figure 1g). All students agreed that from the RW exercise, they learned how to manage CL cases better. Overall, all students strongly agreed (29%) or agreed (71%) that because of the RW exercise, they had learned more about CL practice.

5.1.2 Open-ended questions

Of the aspects of RW that the students liked best, most students (53%) enjoyed the discussion with peers and supervisors. The next most reported aspect of RW that students liked was the thorough and serious thinking

and criticism of their own work (41%). This was followed by feedback from the teacher (35%), exposure to different perspectives (35%), identifying strengths and weaknesses (12%), clarifying misunderstanding and misconceptions (12%), freedom to express themselves (12%) and recalling of information (12%).

Of the aspects that could be improved¹, 59% of the students suggested having the exercise in both semesters instead of cutting it down to just one semester. Most of the students (53%) also favored increasing the number of pieces of RW to be handed in to be assessed. With regard to the weighting of RW in CLC assessment, seven students (41%) suggested either decreasing the weighting or status quo (i.e. 20% of CLC assessment); only two (12%) suggested increasing the weighting of RW. Other suggested improvements were: increasing guidelines (12%), changing the current structure of RW (12%), resubmitting of RD or RJ after the feedback sessions (12%) and sharing via class discussions to further explore each identified issue (6%).

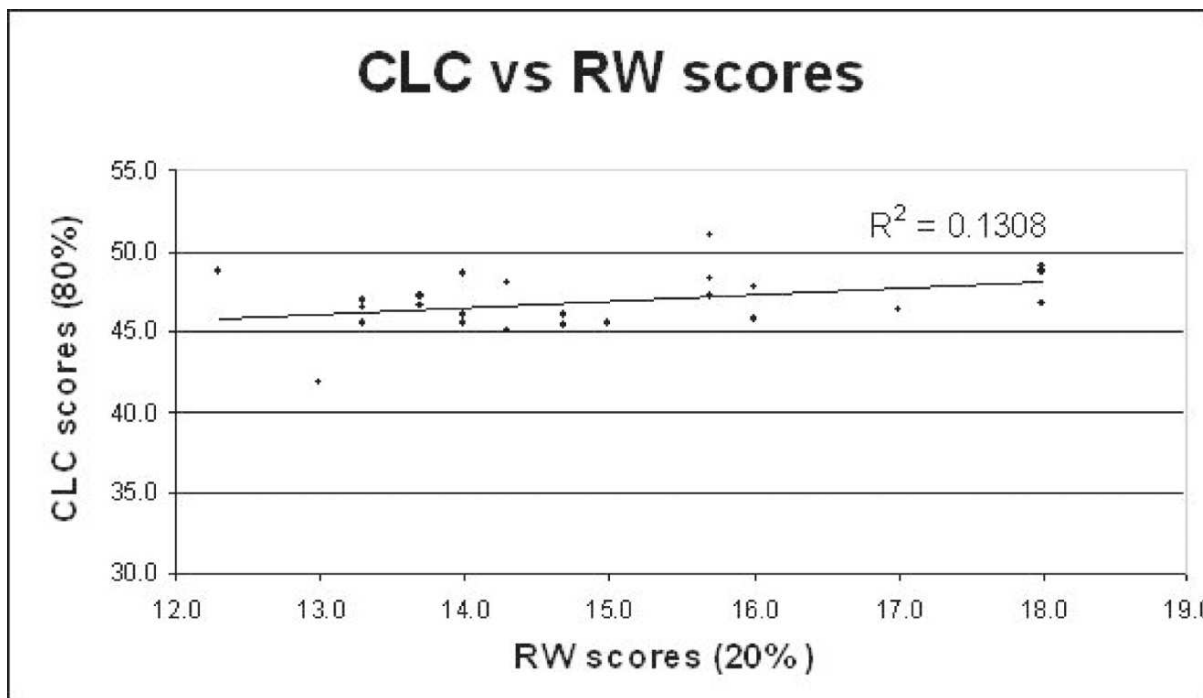


Figure 2. Relationship between clinical scores and RW scores. (CLC - contact lens clinic; RW - reflective writing)

¹ Examples of issues that students could raise were given and unfortunately, this led to many students just addressing these issues instead of raising their own.

5.2 Correlation between RW and CLC scores

To test for significant relationship between RW and CLC scores, scores (of both RW and CLC) of all the students in the class (n=24) were used since six of the 17 respondents were anonymous. No statistically significant relationship between RW and CLC scores was found (Pearson $r = 0.361$, $p = 0.076$) (see Figure 2). However, the graph shows a tendency for CLC scores to increase with increases in RW scores.

collectively, I believed, played an important role in increasing the students' acceptance of RW and in encouraging them to use it.

Only one student did not agree that the RW exercise helped her/him (student's identity unknown) to become more aware of what went on between the student and her/his supervisor during a clinical session. However, s/he agreed with all the other items in the questionnaire, and s/he expressed that what s/he liked best about RW was:

"A way for serious thoughts about contact lens related issue."

6. Discussion

6.1 Reflections on the effectiveness of RW

The responses to the close-ended and open-ended questions showed the students to be cooperative, responsible and willing to voice their opinions. Eight students (32%) did not return their questionnaires.

There may also be an inadvertent mistake in the questionnaire used in this study which led to a restricted response by the students to one question. In an attempt to make it clear to the students what was meant by 'aspects of RW that can be improved', examples of issue that could be considered were given. Unfortunately, a number of students only addressed these issues only when they responded to this question, and did not raise any other issue.

In this study, all the students reported that overall, via RW they learned more about CLP than if they had not done RW. This group of students had done RW the year before (in a related subject) so, RW was not something new to them. Therefore, they were probably more receptive to the use of RW in CLC assessment. Also, after using RW in the previous year, I had the chance to improve the RW exercise based on my experience with them the previous year, and the comments and suggestions made by them then. Improvements included better and more comprehensive guidelines, assessment criteria, sample examples, and better control over timing of RW submission and feedback sessions. All these

Of the aspects of RW that can be improved, the student appeared to be happy with the current format of the RW component in CLC assessment, i.e. carried out in both terms and two pieces of work to be submitted, but s/he suggested increasing the weighting of RW.

Three students (18%) (identity known) disagreed that RW increased communication between the student and the supervisor, though they agreed that the exercise increased communication among peers. Of these three students, one was the top student of the class (S7), one was an average student (S5) and the third was a relatively poorer student (S3). Student S7 also disagreed that from the RW exercise, she learned to critique how theory was handled/applied in practice, and that she learned to identify and discuss good and bad practice. It may be that, as she was the top student, she was intelligent and would have worked hard to achieve a high standard regardless of RW, and hence did not find RW useful in this respect. However, she agreed with the rest of her peers that overall, RW was a useful component in CLC assessment which helped to enhance clinical learning. For this student, the reason why she did not find RW helped her to communicate more frequently between her and the supervisor may perhaps be found in what she wrote about the aspects of RW that she liked best:

"I have an opportunity to express some feeling that not only related to the case, but also some misunderstanding between my supervisor and me, and my patients... During our CL clinic, we are afraid to disagree with our supervisor, but we can express this in RW."

Student S7 also wrote what most students experienced in CLC - the fear of confrontation with their supervisors - though none of the other students raised this issue. This is a recognized limitation of clinical supervision, as in a threatening environment (on-site assessment), students are more likely to just do what they are told to do without question, without motivation to clarify uncertain issues for fear of losing self-esteem and being marked down (Ende, 1983). The other two students (S3 and S5) did not raise this issue in their responses, but it was likely that they had this problem as well as they were both rather shy and lacked self-confidence in their presentation. Students S3 did not disagree in any other questions. Student S5 agreed to all other questions except that she became more aware of how different practitioners would take a different approach to the same practice. She was the only student who disagreed with this issue. This was rather unexpected as like all the other students, she was rotated among a few supervisors during CLC sessions, and one issue about this arrangement was that different supervisors were likely to take different approaches to the same practice in some cases. For many years, there have been difficulties getting students to understand that difference in approaches to the same practice can be acceptable provided that they are adequately backed up by facts and acceptable ethical and professional practice. Students are supposed to learn the 'whys' behind the different approaches but unfortunately, in many cases (as admitted by some students), students considered these differences to be the particular likes or dislikes of different supervisors. They were neither encouraged nor motivated to ask 'why?'. This was in fact one of the objectives of the RW exercise - to encourage students to be aware of the different approaches and to find out the 'why'. One reason why Student S5 disagreed could be that she did not particularly focus on this issue when she did her RW exercise.

6.2 Aspects of RW that students like best

To learn effectively, to be exposed to as many different scenarios (cases) and perspectives as possible, communication among peers and with supervisors cannot be overemphasized (Cooper, 2000). While these issues are not easy to achieve in the clinical situation where time constraint is a main concern and where the

environment is viewed as threatening, RW was seen as a potentially effective alternative and was therefore used in conjunction with existing CLC assessment. This objective of the RW exercise was realized as over 50% of the student respondents reported increased discussion with peers and supervisors as the aspect of RW that they liked best. Their comments on this aspect included ([...] are corrections by the teacher (PC) to clarify meaning):

"The opportunities to discuss different aspects about CL and hence increase our exposure to different CL problems" (S2)

"Provided chance for me to revise the texts and discuss with others. This in turn gets me used to discussing cases with others." (S8)

"RD is an active learning process... [lessons are passive], I may forget some points or remember them wrongly even after I read for many times. However, if I write it in my diary, I will search related information in the journals and discuss with my superiors and classmates. Thus, I feel more confident and remember them more easily in my practice." (S10)

"Can communicate & discuss between supervisors & classmates to learn more I have never hear or seen." (S16)

Although different descriptive terms were used by the students in their comments, it was clear that RW also encouraged them to develop critical thinking or reflection, another popular aspect of RW that the students liked best, as some students acknowledged,

"Sometimes, we may forget some important issues in our practices. C/L is a quite large field and we will meet lots of patients with different ocular situations. How we can manage depends on our experience and good thorough thinking is a must to have a good management. Besides, we always cannot apply on our learned knowledge into our practice, RW can help me to know more on my weakness and how to improve it." (S3)

"Besides, during doing the reflective diary, this

forced or helped us to think how to apply theoretical aspects to become practical aspects. This would increase our impression to such aspects and apply them in our future practice." (S5)

"The feedback given by Dr Cho help us a lot in order to further thinking about things we missed and neglected. It would help us to think more detail and careful in CL session." (S17)

Critical and constructive thinking are important in clinical training and should be encouraged in CLC. Unfortunately, due to various reasons, with only on-site assessment (and no RW), this was not happening to the extent desired, if at all. It was therefore rewarding and encouraging that the incorporation of RW in the new CLC assessment model was successful in facilitating reflective learning.

Timely and regular feedback is essential for the students to learn effectively. In a study on student perceptions of what helped them learn and develop in higher education (Drew, 2001), students rated feedback as one of the most important factors which helped them to learn and develop. Feedback sessions serve not just to inform students what they did well, their strengths and weaknesses, the areas that could be improved and how, but also serve as a channel for students to share their writing and experience. This was also reported by students in Hyland's study (Hyland, 2000).

Another important function of feedback sessions is that they allow clarification of misunderstandings or misinterpretations raised in students' writings. This has also been reported by Ballantyne and Packer (1995). These misunderstandings or misinterpretations could well have gone undetected if it had not been for the RW exercise.

It was therefore not unexpected that feedback was the other aspect that the students liked best about RW. Some examples of what they said about this aspect:

"This exercise was marked by Dr Cho and returned to us with feedback. This was the most helpful aspect. ... Besides, during the feedback session, Dr Cho raised some points from peers' writing. These points may be our common mistakes or that we

were not aware of. Thus, during the feedback session, we could learn a lot." (S5)

"I can know more about my strong and weakness in contact lens practice with some revise on my cases procedures and compare them with the management or suggestions from other classmates." (S10)

"The feedback given by Dr Cho help us a lot in order to further thinking about things we missed and neglected. It would help us to think more detail and careful in CL session." (S17)

From the increased interactions with peers and supervisors, consultations with books or journal articles, it was expected that RW would provide an avenue for students to be exposed to more and different perspectives, to learn that it is acceptable to ask for help or advice, and also to give help to their peers where appropriate and to show empathy. According to some educators (Stevenson & Jenkins, 1994; Buehl, 1996; Jasper, 1999; Hiemstra, 2001), when given the opportunity to write down their self-reflection, their frustrations and concerns after extended thinking, after discussion with peers and other teachers, students can see a more holistic picture of the event. RW can also help them to make sense of their experiences and heighten self-awareness (Jasper, 1999; Hiemstra, 2001; Welch, 2000), hence increasing the possibility of gaining new insights not only about their learning but also about themselves. They also learn to be more self-critical and tolerant of others, to learn from each other and be willing to discuss and change their own opinions. Students in the current study also liked these aspects of RW:

"The opportunities to discuss different aspects about CL and hence increase our exposure to different CL problems." (S2)

"Ask second opinions (supervisor, classmates) about the contact lenses problems." (S6)

"It made me think about every CL issue deeply, even some simple one." (S14)

"I had more chances to discuss with my classmates and got some different opinions in some case that

I hadn't thought before." (S15)

In any situation where students are being assessed on-site, via direct observation by their supervisors, it can be difficult for students to challenge supervisors' opinions. Stressful situations are therefore more than likely to surface in clinical training, particularly when students are rotated through a few supervisors who may have different individual biases in the way they think the students should practice. Many educators have suggested that RW may also be an important way for students to manage stress arising from their learning environment (Stevenson & Jenkins, 1994; Fulwiler, 1980; Staton, 1980; Cooper & Dunlap, 1991; Gormley, 1997; Peterson & Jones, 2001). In the current study, two students liked this aspect of RW best as they wrote:

"This not only helps us to correct what we thought wrongly, but also encourages us to express ourselves in the diary." (S5)

"I have an opportunity to express some feeling that not only related to the case, but also some misunderstanding between my supervisor and me, and my patients and me. During our CL clinic, we are afraid to disagree with our supervisor, but we can express this in RW." (S7)

In the current era of education, life-long learning has become increasingly important. The use of RW is likely to encourage students to remember the usefulness of reflection as a means of continuing self-directed learning after they have graduated and when they entered the profession, as expressed by one of the students:

"Besides, during doing the reflective diary, This would increase our impression to such aspects and apply them in our future practice." (S5)

6.3 Aspects of RW that could be improved

As mentioned earlier, of the aspect of RW that could be improved, in the questionnaire, the students were given examples of issue that they could comment on - the number of RW, how many semesters and the weighting etc. Unfortunately, these examples may have restricted students' responses to this question as many of them only directed their responses to the examples given. It

may be assumed, however, that these students (who directed their responses to the examples only) probably did not have any other pressing opinions on what other aspects of RW could be improved. The majority of the students suggested having the exercise in both semesters and increasing the number of RW to be handed in for assessment. This is in line with the recommendations of Doel (1987) that there be a move towards assignments which would provide for continuous, varied, student-made assessments and away from single reports.

In the current study, some students also suggested more feedback sessions.

"I think for each rotation with different supervisors, we may learn different issues from different supervisors, so that in my mind, it is better for us to submit a RW after each rotation. We can conclude on what we can learn in each rotation and get an improvement in the following rotation." (S3)

"I suggest it can be carried out in both terms but in the first few diaries, it don't not carry marks and encourage students to exchange them within classmates. And give one or two feedback sessions so that everyone knows what the requirements are. I think starting earlier can help the classmates learn more in the contact lens sessions." (S10)

These suggestions may be taken to confirm the usefulness of RW in helping students to learn. At first glance, more RW and more feedback sessions as requested by the students would be desirable, however, the implications of resources and time have not been considered by most students, though a few raised concern about the increased workload.

"3 to 4 diary is enough, because I think it is more important to train the aspect and motivation in the learning process but not force too much and push up the workloads." (S10)

"I think 3 RD were enough, but after marking, you would give some points or question in our RE, which stimulated me to think more, if I can correct the RD again after you give me back, it is better

for me to understand more." (S15)

A few students did express their thoughts about which aspects could be improved in spite of the examples given. They wrote:

"Some of my peers felt that it was quite difficult to find out "case" to do the RW, I think it may be some misunderstanding of the propose of RW. It may be necessary to emphasize that RW is not a case summary." (S7)

"Can arrange a time for whole class discussion of RW after handing in so that other students know what their peers are doing. Arrange whole class discussion with brief informal presentations (just talking in front of the class without any preparation) and Q & A session. We can learn more from these as the topic or case can be shared." (S16)

As mentioned before, while it is desirable to allocate more time for feedback sessions, unfortunately one has to be realistic. In this case, there was a limit as to the amount of time and resources that could be allocated to this RW exercise which, after all, was just one component of a clinical assessment model.

Students suggested better guidelines for RW. As mentioned early, the current group of students had done a RW exercise before, and more comprehensive and better developed criteria and guidelines and sample examples were not only given but were gone through with them in a one-hour briefing session before commencing the RW exercise in the CLC assessment. Students were also encouraged to consult with me should they had any problems with their writing and a few did approach me. However, in spite of the increased effort to prepare the students to do RW, it appeared that some students did not find this adequate:

"To improve, more guideline should be given. Clearer explanation on the part of self-reflection would benefit us in writing. Changing the structure of the homework would make us put more effort on it"

Probably whatever steps we teachers take to clarify and

explain procedures and criteria to students, even including going through sample examples, there will always be one or two students who failed to understand, misunderstand or do not know what to do. Nevertheless, this confirms the importance of what Higgins and co-workers (Higgins et al., 2001) said about preparing students for RW. They argued that discussion, clarification and negotiation with the students can better prepare them for what to do and to produce what they are expected to achieve before or as they begin to write. Just giving them a set of objectives and a list of assessment criteria is not adequate.

6.4 RW versus CLC grades

We did not find any statistically significant relationship between RW and CLC scores though there appeared to be a trend for CLC scores to increase with RW scores. The reason why we did not find significant relationship may be due to the fact that RW were marked by one teacher only (PC) while CLC scores were average grades from a few supervisors, and grades given by clinical supervisors tended to cluster together.

It may be argued that students who did well in CLC tended to be more reflective and hence did better in RW. Or it may be that doing well in their RW helped the students to do better in CLC. Whichever was the case, the responses from the students confirmed the usefulness of RW in facilitating communication and sharing among peers and with supervisors, encouraging students to think reflectively and critically. It also encouraged self-assessment, motivated independent learning and helped students to develop skills in clinical reasoning and problem-solving - all are sure signs of deep learning and important learning outcomes of CLC. Clinic supervisors had also noted the significant increase in activities related to peer and supervisor consultations compared to the years when RW was not used at all.

In clinical sessions, students may be able to correctly perform procedures by rote but may fail to understand the rationale behind them (Ladyshefsky, 1995). If they are then assessed based on observed performance only, there is the danger of assumed competency. Time constraints in busy clinical sessions are likely to limit quality discussion and feedback, hence restricting students' potential to learn, and achievement of the

goals of clinical learning. Ladyshevsky (1995) suggested that observation alone does not allow the supervisor to determine how much the students know the underlying theoretical knowledge and clinical reasoning skill, and hence it should not be used alone. The incorporation of RW as a component of CLC assessment was, from students' responses and my own observations of the effort students put in and the RW they wrote, very successful in facilitating clinical learning and reflective thinking. For most of the students, RW provided a novel approach to learning which was only non-threatening, but increased communication, encouraged self-assessment and reflection, allowed freedom for self-expression, and was actually enjoyable.

However, writing does not come spontaneously to everybody. For students who cannot express themselves well in writing, RW can heighten anxiety (Stockhausen & Kawashima, 2002; Walker, 1985). To be able to write reflectively and introspectively requires a bit of self-confidence and time to grasp the key issues (Brown & Knight, 1994; Holly, 1984), and not every student will be able to achieve this quickly, or indeed, at all. Evidence of reflection is the main issue to look for in RW as critical reflection, whether or not the students wrote well, is really what teachers want their students to do to enhance learning and awareness of self and others. Not all students will embrace RW (Beynon & Forchuk., 1998; Buehl, 1996), and some may consider it as an unnecessary workload. Students do need to spend time and effort to reflect, interact with peers and teachers, and seek information/evidence from books and journal articles (Beynon & Forchuk., 1998).

RW can also be taxing on the teacher's time (Walker, 1985), though some educators did not find it so (Ferrario, 1999). It all depends on how RW is used and implemented by the teacher. Initially, before students fully understand what they are required to do, more frequent feedback on students' attempts at RW (which obviously the teacher has to read carefully first) is required (Ballantyne & Packer, 1995; Fenwick, 2001). However, most educators who have attempted RW thought this extra effort and time worthwhile (Walker, 1985). Placek and Smyth (1995) reported that it was difficult to teach students to reflect. In their study, 19 students (pre-service teachers) were required to write about reflective teaching in physical education. The

result of their study showed that students showed a low level of reflectivity which did not improve significantly over time - but this may be, according to the authors, due to inappropriate learning activities employed and the conservative viewpoint of students.

Self-evidently, only the students themselves can reflect on their own experiences and learn from this process (Kottkamp, 1990). The teacher can only facilitate and guide but will only have access to students' thoughts and feelings through what the students themselves choose to reveal. RW is essentially student-centred and basically the students have the control.

The teacher should also realize that s/he cannot depend on RW alone to assess students' understanding. Some students may be unable to articulate themselves properly in writing and some may feel uncomfortable with the personal element of RW - but that does not mean that they are incapable of doing it or that their understanding of the process is limited or inadequate. Some students may also prefer to think and/or write along a different line from what the teacher expected (Callahan, 2000). So, it is important for the teacher to be receptive to different kinds of thinking and writing preferences.

In their review paper on RW, Boud and Walker (1998) discussed various problems with RW and how to minimize or avoid them. Teachers preparing to use RW would benefit from reading this article. Here, only some of the problems are mentioned. While allowing the students freedom to write whatever they want is desirable, there is also a potential problem that students may include inappropriate disclosures in their RW that may be disturbing to the teacher or include issues that go beyond the expertise of the teacher.

Some teachers may have problems marking and grading the RW submitted by their students in view of the openness and personal nature of RW, and educators and scholars have yet to come up with a set of widely-accepted assessment procedures for RW. A few educators - Kember et al. (1999), Wong et al. (1995) - have made this attempt, and with the increasing popularity of RW, it is hoped that there will be more research into RW before we enter the next decade.

RW is therefore not meant to, nor should it, be the one and only method for clinical assessment. At best, it should be viewed as a potentially useful exercise to facilitate successful learning in clinical training. Indeed, current trends in clinical supervision and assessment are moving away from a one-method clinical evaluation to multi-method assessment models.

7. Conclusions

The responses from the students confirmed the effective use of RW in facilitating critical thinking, self-evaluation and independent learning in the new CLC assessment model. There was no statistically significant relationship between RW scores and CLC scores. This may be due to the clustering of CLC scores which were actually average scores with adjustment to minimize variations between supervisors.

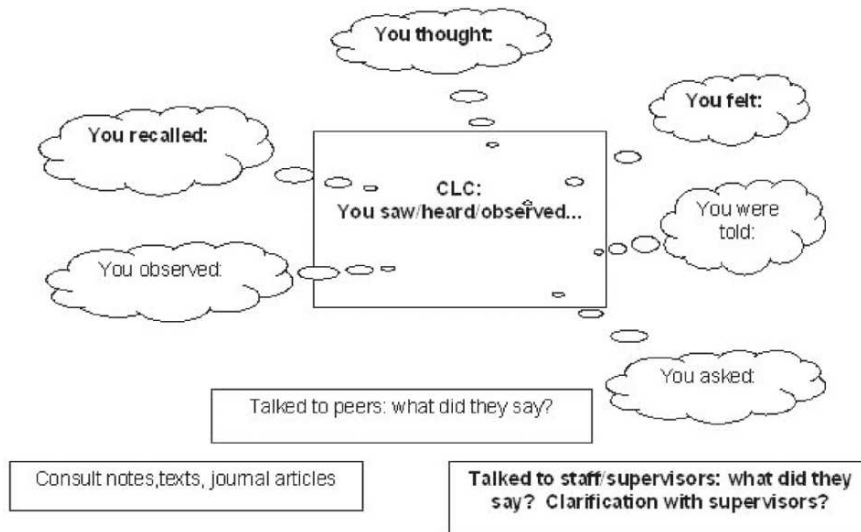
The majority of the students suggested having the RW exercise in both semesters and increasing the number of RWs to be handed in to be assessed. Most of the students were happy with the weighting of the RW component of RW in the new CLC assessment model.

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Appendix 1 Ideas for reflective journals/diaries



Questions that may help you in your preparation of your Reflective Diary/Journal:

- Did you identify areas/issues that you were unclear of, or disagreed with your supervisors/peers, or different from what you learned in your past lectures? Did you clarify with your supervisors or peers about the issues identified (If not, why? Are your actions justified? Did this help you in your learning etc. SELF ASSESSMENT)
- What actions did you take and what are the results (what did you learn)?
- What did you learn about yourself with regard to your learning attitude, your knowledge about CL practice? (You need to be frank and honest in your entries. If you did not, why? Talk about how you felt, your fears etc.. How could you or staff help you overcome these fears?)
- What have you learned from interacting with others (peers/supervisors/staff etc)?
- Have you been open to share with others and to listen what others have to say?
- How is practice different from theory? (Did this exercise help you to understand your theory and the application of theory better? How? Why? etc...)
- Did you learn anything that helped you to better understand a theory, the use of a test that you were taught in lectures/labs?
- What did you learn that were not taught in lectures (e.g. communication with patients), and how did you cope or learn more about this to improve your performance? Or how can this be incorporated into lectures?
- What did you learn from writing this reflective journal? Did your peers gain anything from YOUR involvement in this exercise and vice versa?
- Have you paid attention to both your strong and weak points? (Can you identify them...?)
- Did you learn that different situations call for different strategies in management? (CLC)
- How did CLC/supervision/RW help you in your clinical experiences in relation to your professional growth? (eg. did it encourage you to be more independent, to become more confident in professional activities and behaviors etc)
- What has helped you most in doing this RW? Did this exercise help you identify areas that need to be changed, improved etc..... in yourself/peers/staff/clinical training etc... Why and how?
- What were your feelings doing this exercise - did you find it helpful? challenging? enjoyable? change the way you learn? (how, why and why not?). Were your feelings different from your peers? Why?
- Did this exercise help you to remember or recall later other aspects of previous experiences that you had forgotten?
- Did this exercise encourage and facilitate communication?
- Did this exercise lead to a deeper appreciation of your learning process and increase your awareness of how you learn?
- Etc.....

Appendix 2 Contact Lens Clinic Assessment

Reflective Writing (RW) (20%)

Aim

The main aim of this exercise is for students to critically reflect and meaningfully reconstruct and analyze their clinical experiences, to encourage greater self-awareness and cultivate an integrated professional and personal identity related to the roles of an optometrist.

In their writing, students should achieve all the objectives of this exercise where applicable.

Objectives

	Demonstrate (with respect to Contact Lens Clinic)
1	Evidence of reflection and a higher degree of reasoning, decision making and judgment
2	Evidence of self assessment of own performance, learning and development
3	Evidence of creative interaction (i.e. sharing/discussion of experience, reflection and opinions (including feelings, attitudes) with peers and staff)
4	Evidence of assimilation, consolidation and application of various principles/theories that govern patient management, and suggest appropriate treatments or actions (bridging theory to practice)
5	Initiation, resourcefulness in seeking information/advice, and be able to propose modification of decisions or alternatives in the light of new information and considerations, or to overcome learning gaps (if any) (i.e. apply knowledge/skills learned to new problems and situations)

Grading of Reflective Writing (RW)

F	Irrelevant, inaccurate or misjudged evidence or information. Actions suggested for each entry grossly inadequate or not carried out properly. Breaches of regulations (e.g. dishonesty, plagiarism). Failure to submit on time.
D+/D	Evidence/information presented are mostly relevant and accurate. Poor coverage, weak justification in the decisions and judgments made. Work suggests a reproduction of theory without evidence of understanding of how the theory is adopted in the clinical environment. Actions suggested for each entry weak but demonstrate understanding in a minimally acceptable way.
C+/C	Evidence/information presented are relevant and accurate. Most of the objectives have been covered but there is inadequate application or integration. Evidence of reflection and self assessment. Work suggests a good understanding of the material but little evidence of application of theory to practice. Fair justification on the decisions and judgments made. Actions suggested for each entry adequate and able to discuss content meaningfully, and know a reasonable amount of the content.
B+/B	Evidence/information presented are holistic, relevant and accurate. Good evidence of putting together a coherent piece of work covering all the objectives . Good coverage and analysis. Clear appreciation of application or integration. Very reflective and very good self assessment , and good justification in the decisions and judgments made. Actions suggested for each entry very good and demonstrate clear understanding (analysis) of the case/issue, recognition of good and poor applications of principles . Evidence of personal development, creative interaction, and application of learning that indicates a deep well integrated understanding with application of theory to practice.
A+/A	As in B but to a higher degree of originality. Very clear and good evidence of analysis, application, synthesis and reflection. Critical self assessment and excellent effort made to remedy unsatisfactory actions or decisions, or suggestions on improvements. There is evidence of insights and original thought into the clinical application that indicate a personal development leading to a deep understanding that is greater than that normally expected at this stage of progress.

Appendix 3 Feedback on reflective writing (CLC)

This questionnaire is aimed at obtaining feedback from students who have gone through the exercise of reflective writing with the aim of determining;

1. if the objectives of the exercise have been met
2. if the objectives are perceived as being suitable for enhancing clinical learning in Contact lens Practice (Clinical training)
3. which aspects of this exercise are perceived as being useful, and which can be improved or changed.

Your comments will be **VERY USEFUL and IMPORTANT** to determine if this exercise is **effective**. So, please give each question some **serious thought** before you answer:

Writing reflective diaries meant that: (compared to on-site assessment only without Reflective Writing component)	Strongly agree	Agree	Disagree	Strongly disagree
Q1. During a clinical session, I was more aware and alert about what is going on between my patient and me.				
Q2. During a clinical session, I was more aware and alert about what is going on between my supervisor and me.				
Q3. After/during the clinical session, I reflect (quite) a lot on my cases or contact lens (CL)-related issues.				
Q4. I tried to find out more about one or more uncertain CL-related issues which added to my knowledge about CL practice.				
Q5. I communicate more frequently with my peers about uncertain CL-related issues, not just about issues for my own RW, but also about issues for the RW of other students.				
Q6. I communicate more frequently with staff/supervisors about uncertain CL-related issues.				
Q7. I look up books/articles about uncertain CL-related issues.				
Q8. I learned to critique my own work in CL clinic.				
Q9. I learned to critique how theory is handled/applied in practice.				
Q10. I became more aware of how different practitioners will take a different approach to the same practice.				
Q11. I learned to identify and discuss good and bad practices (e.g. what works particularly well or bad and how or why)				
Q12. I learned how to manage CL cases better.				
Q13. Overall, I learned more about CL practice because of RW (i.e. I would NOT have learned more if I had NOT used RW).				

Q14. Using reflective writing has been helpful/not helpful* for me to enhance my clinical learning in Contact Lens Practice.

* (please circle)

Q15. The aspects I have liked best about this exercise are:

Q16. The aspects that can be improved are:

For example: consider the following:

- *Would it be better to have RD in Terms 1 & 2?*
 - *How many RD should be assessed?*
 - *How many marks should RD carry?*
-etc.

Thank you for your valuable contribution.

From University to Workplace: Assessing Experiential Learning

Kevin O'Toole
Faculty of Arts
Deakin University, Warrnambool, Australia

A significant issue for learning in the workplace is how students are assessed in the application of theory to the experience of the workplace. In specific professions there are key indicators of success shared by workplace and academic supervisors. Beyond specific professions assessment become more diffuse in workplaces that do not have explicit criteria established to judge performance of students in experiential learning. Assessing learning in these workplaces is often associated with methods that rely upon student self-appraisal and workplace supervisor reports. This paper reports on a process of assessment used for public policy internships in an Australian University. I argue that before students embark upon a policy internship they need to understand how to critically analyse their work. I outline the processes involved in this critical analysis and how they can apply it to a specific task that will be required of them in the workplace. I then discuss how the students negotiate their tasks in different workplaces and how they produce the criteria by which they will be assessed. The outcome for both academic supervisor and students is that there is then a clear set of criteria for assessment of their work.

1. Introduction

A broad definition of experiential learning is quite simple in that 'there is nothing more obvious than saying that people learn from experience' (Evans, 1994). In this sense experiential learning is the knowledge and skills acquired through life and work that are not credentialed in a formal educational sense (Evans, 1994). At the same time however, experiential learning is not merely a collection of experiences. There is a further process where the learning begins with the experience but is followed by reflection, discussion, analysis and evaluation of that experience (Wight, 1970). Experience in and of itself is not learning unless there is some reflection upon how the experience fits within a more general framework of an individual's knowledge (Kolb, 1984). For Evans it is the systematic reflection upon experience that constitutes the learning process (Evans, 1994).

Experiential learning then is used to test out our values, ideas and assumptions rather than passively accepting the practical outcomes of repetitive practice (Watkins & Marsick, 1993). It is an active exploration whereby learning can occur at both the practical and the conceptual level. Experiential learning is not the same as discovery learning since teachers must carefully design the processes of learning (Gibbs, 1987). However for experiential learning to take place it is incumbent upon learners to reflect upon their experience in a critical way such that conceptual skills become an important part of learning the practical applications of knowledge. It is the emphasis on critical reflection that is central to experiential learning where there is a recognition, a judgement and a justification of a person's ideas and actions (Brookfield, 1987). For Mezirow 'learning is understood as the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience in order to guide future action' (Mezirow, 1996).

There may be a number of reasons for using experiential learning within the more formal educational system such using it as a means to promote the growth and development of individuals or for empowering individuals by developing their self-confidence or giving them greater access to and participation in other forms of knowledge (Evans, 1994). However it is most often

used as a teaching technique for practical activities such as field work or work placements.

The approach taken in this paper focuses on the notion of experiential learning as a practical activity especially in what has been termed 'work-based learning' (Brown et al., 1997). Put simply work-based learning can be defined as a 'special form of experiential learning in which the students can develop as part of their course, a range of social skills, academic and technical knowledge and expertise in the work place' (Brown et al., 1997). Generally work place learning requires some type of student placement in an organisation external to the formal learning institutions of schools and universities. Such placements involve some partial training arrangement within a minimum period of time. Generally, work placements have specific outcomes attached to them for student skill development and on completion of the placement students should have acquired new skills and have a broader knowledge base. In most instances the placement is meant to help them in their future career.

An important issue for workplace learning however, is assessment, especially in workplaces that do not have explicit professional criteria established to judge the performance of students. This paper reports on a process of assessment used for public policy internships in one Australian University. The argument in this paper is that assessment in this type of experiential learning requires an evaluation process that involves students, workplace supervisors and academic supervisors. This means that before students embark upon a policy internship they need to understand how to critically analyse their work. Secondly, once they understand the processes involved in this critical analysis, they need to know how to apply it to specific tasks in the workplace. Finally they need to discuss how to negotiate these tasks in different workplaces and how to produce the criteria by which they will be assessed.

2. Assessment in experiential learning

In specific occupations there are key indicators of assessment shared by both workplace and academic supervisors since the workplace and the university course share common course accreditation criteria. For example entry into professions such as social work and nursing are regulated by professional bodies that have significant input into the structure and content of university course. There is a shared set of conceptual and practical skills that have to be assessed by both academic and workplace supervisors. The types of assessment may vary but at the end of the course the students are meant to demonstrate competency in practising the professional skills in the workplace. To that end there is a range of work specific skills that a student needs to acquire and these can be assessed in their practical and theoretical work.

Beyond specific professions though, assessment becomes more diffuse. In workplaces that do not have explicit criteria established to judge performance of students in experiential learning, assessment becomes more problematic. Assessing learning in these workplaces is often associated with methods that rely upon student self appraisal and workplace supervisor reports. The range of skills may vary from workplace to workplace even though there may be congruence in the theoretical frameworks. For example public policy students may work in government or non-government agencies where the types of skills required will vary from giving ministerial advice to preparing a brief to lobby a specific government department. In both instances the aim is to review and change public policy however the skills required for the different workplaces may vary markedly. The theoretical frameworks for understanding the public policy process will inform the pathways for critical review of the different workplaces. However, as there is a range of theoretical approaches to public policy, the student has to choose the one that best suits their critical approach to the specific situation.

According to Gibbs there is a range of strategies that can be used for assessing workplace learning (Gibbs, 1987). First there are action plans where learners are given general rules about undertaking particular tasks from which they derive action plans about applying these general principles to the workplace. Here assess-

ment is based upon how the student applies the specific tasks judged against the general principles outlined by the teacher. A second approach allows students to set objectives for themselves before embarking upon their placement. In this instance assessment is based upon how well the students achieve their own objectives. A third approach is to allow students to design their own set of problems to solve. This approach can be problematic in a workplace situation in that students will have little understanding of the particular workplace before they enter it. However assessment under these circumstances will be based upon how well the students can indeed solve the problem that they have set.

A fourth approach is to give students a checklist that they will use as a way of testing their ability to understand the processes that are occurring in the workplace. This approach has inbuilt assessment as there will be a list of outcomes that the student will be expected to notice. Essentially checklists are a form of student test that have minimum requirements. Checklists may have drawbacks in that student experience will be circumscribed by the particular lists and other experiences may be excluded as inconsequential. A fifth approach is to discuss with students the criteria that they would use for the evaluation of their work placement. Here the idea is to get the student to make some judgements about what they think the conceptual aspects of their practical experience are.

The final approach is a combination of setting objectives, devising criteria and developing action plans that can be formulated in a formal learning contract between the academic and workplace supervisors, and the student. The idea of this approach is to combine the ideas of the students with the experience of the workplace held by the workplace and academic supervisors. In this process the student is able to establish the criteria for assessment in a multi-faceted manner. By setting objectives the student is able to test whether they have achieved their desired results. Next by devising criteria for workplace experience in conjunction with workplace and academic supervisors the student gives both supervisors the means by which to assess their work. Lastly action plans allow both the student and supervisors to evaluate the progress of the workplace experience.

According to Earl et al. an important element here is the use of the learning contract that helps the student to focus their attention in a number of ways (2003). First it gives the student a central place in the outcomes of the placement by giving them responsibility for negotiating the agreement. Secondly it helps the student to understand the rationale for the placement and the types of actions that are intended to occur. Thirdly it can assist the student to plan the learning within the placement in a manner that best suits their skills and time. Fourthly it can be used by both the student and the supervisors to measure the progress of the placement. Fifthly it can outline how the output and the results will be presented. Finally it reveals the criteria that will be used for assessment. This final point is important in the context of this paper as getting the students to elicit their own criteria involves them in a collaborative process; a vital ingredient for work place assessment (Marshall & Mill, 1993). It is also constructive and responsive to the needs of the students as they perceive them.

In developing a learning environment for students in a workplace Evans suggests a fourfold approach. First there needs to be a systematic reflection on experience. That is students need to write down their experiences in some form of log or diary that records their reactions to particular workplace events. There are other strategies that may be used here using video or audio recordings, peer appraisal in seminars or workshops (Gibbs, 1987). This record is not a mere story of the event but an analysis that reflects upon the implications of their experience in a broader theoretical framework. Stories can be instructive but they are merely the evidence that supports the broader understanding of the experience. This leads to the second element, that of 'significant learning, expressed in precise statements, constituting claims to the possession of knowledge and skills' (Gibbs, 1987). Students need to be aware of either the new knowledge that they are attaining or the evidence that they are compiling to substantiate or critique their theoretical understanding of the issues with which they are dealing. Thirdly and following on from the third element students need to be able to synthesise their evidence to sustain an argument about the issues or problems they wish to solve. Finally, the work that students produce from their reflection must be capable of assessment within a theoretical framework that can

be evaluated against some broad criteria.

Any assessment of students in formal education involves choices on the part of the teachers and learners as to the best way to achieve the learning outcomes. In this respect teachers have to use some forms of summative assessment to assure quality of standards in the certification of the levels of achievement their students attain (Falchikov, 2005). Wiliam and Black (1996) define summative assessment as 'those assessments given at the end of units, mid-term and at the end of a course, which are designed to judge the extent of students' learning of the material in a course, for the purpose of grading, certification, evaluation of progress or even for researching the effectiveness of a curriculum' (Wiliam & Black, 1996). The aim of summative assessment is to test for shared meanings between the given (or teacher supplier) and the student (or learner receiver). Teachers are also accountable to a range of stakeholders including their employer, professional bodies, students, governments and the general public for ensuring that students achieve appropriate learning outcomes (Banta et al., 1996). Accordingly teachers need to use some forms of summative assessment to fulfil their part in the accountability chain.

At the same time though, teachers may also use different types of formative assessment that can include 'diagnosis, motivation, feedback and improving learning' (Falchikov, 2005). According to Black and Wiliam (1998) 'innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains' (Black & Wiliam, 1998). That is, formative assessment can be employed as a tool of learning in itself as its aim is to review and build upon previous iterations of learning. The aim is to help students learn in a meaningful and productive manner that leads to greater motivation for further discovery learning in the future (Athanasou & Lamprianou, 2002). In this sense formative assessment is quite central to experiential learning as it helps students to ground their theory in practice and thus strengthen their commitment to lifelong learning. Accordingly choosing appropriate assessment tools is essential if the workplace experience is to be treated as deep learning. As Wight suggests '[t]he assumption is that we seldom learn from experience unless we assess the experience, assigning

our own meaning in terms of our own goals, aims, ambitions and expectations' (Wight, 1970).

3. Deakin case study

The Policy Internship program at Deakin University, Australia was established in 1998. The initial proposal was that third year students should have the option of working with and doing research for both public and private agencies. The plan was to place students in organisations for a period of one day per week for a semester in third year where they could demonstrate their skills to prospective employers. Following discussion within the Politics and Policy Studies Stream it was suggested that the internship would need to be supported by other subjects in the program if students were to be prepared for the complex tasks involved. The final proposal included a preliminary subject that focused on the skills required to understand, analyse and evaluate policy processes with special reference to issues of research methodology.

In developing the internship program there were three major processes to consider. First there were the pedagogical issues of how to achieve the best learning outcomes for students and then how to assess those outcomes. This had two parts; preparation and implementation. Secondly there were the administrative processes that ranged from student communication to insurance matters. Finally there were the network issues of ensuring that students could do their internships in places relevant to their own interests. The way to ensure that the student experience was optimised was to make each of the processes relate to teaching and learning objectives.

In the first instance, the students need preparation for the internship and this is achieved through a preparatory subject called "Working with Government" that is done in the semester prior to the work placement. The "Working with Government" subject is designed to give students an understanding of the professional, industrial and social contexts in which the internship

takes place. In this respect the unit poses questions about the political nature of all research and how students should be wary of the major pitfalls.

In the "Working with Government" subject students are asked to choose a government or non-government report that assesses, evaluates or delves into a specific aspect of public policy. In making their choice students are informed that they should opt for a report that is of special interest to them whether that be social policy, sport, drugs or whatever holds their interest. The subject then requires that the students critically assess the underlying values of different elements of their chosen report in terms of a range of issues including: structure, layout and presentation; discourse and ideological assumptions; methodological approaches; ethics; policy networks; and organisational location in the public policy arena. By constantly seeking to decipher the underlying values in each of the above areas the students are able to establish a number of criteria for evaluating the relative merit of their chosen report. It is the emphasis on learning about assessment of the report in a variety of different ways that helps them to understand the processes involved in making judgements about the report.

The formal assessment for the subject is progressive in that each piece of assessment leads them to a final critical essay on their chosen report. There are four minor pieces of work that contribute to the final essay: the process of finding and choosing a report; a literature review; a methodological evaluation; and a Cabinet submission. The assessment for finding and choosing a report helps the students to place their chosen report in its public policy context. The literature review helps the students understand where the report sits in terms of its theoretical approach. The methodological evaluation gives the students understandings of the political nature of the choice of methodological approaches as well as some insight into the drawbacks of different techniques used to access and develop data. The Cabinet submission gives students an insight into the manner in which information needs to be organized for submission to Cabinet in the political system. All of the above assessments also concentrate on giving the students specific skills such as literature searching, précis writing and recognizing distortions in language and data presentation. In the final essay students then

use the skills developed in the minor assessments to develop an overall critique of their chosen report indicating what criteria they have selected in making their final assessment.

Once students have completed the "Working with Government" subject they are then ready to begin the processes associated with the applying for the Internship. There are a number of administrative tasks to begin with that are used as the basis for selection into the Internship. First there is the application form that can be used as a means to help students understand discernible outcomes. An application form has been developed where students are asked to produce a portfolio, give reasons for wanting to do the internship and outline the places they would most like to do the internship. Developing a portfolio is a skill that students need to learn early on in their career. In this case they have to tailor the portfolio to the specific area in which they hope to do their placement. Students are requested to seek assistance through the Student Services Division in the University where there are trained advisors employed to coach students in the development of portfolios.

They are also asked to reflect upon why they should do the internship which gives them a baseline from which to judge what they may learn from their placement. The students are asked to write their reflection in terms of what they may learn about the public policy process and it is the precision and clarity of their arguments upon which they are judged. Next students must do some research into the places they would like to do their internship. This gets them used to the idea of researching workplaces, an important skill in preparation for work interviews, and it serves as an important indicator for selecting suitable students into the internship. Finally students are asked to read the appropriate documentation before they fill in an indemnity form that alerts students to their responsibilities in the workplace as interns. It also alerts them to the more general issues of workplace security and confidentiality and in the selection interview students are asked about these and other issues relating to their responsibilities in the workplace.

Overall the assessment of the suitability of students for the internship is based upon their ability to research

workplaces and then adapt their applications to meet three basic criteria. Firstly they need to demonstrate that they have the skills that are needed for research in the workplace they select. Secondly they need to show that they have a sufficient understanding of public policy processes that can be used in a reflective approach to their internship. Finally they need to have a good working knowledge of their responsibilities as interns in the workplace.

An important part of contract research is establishing the research design of the project. For this reason once students have had their placement confirmed it is then up to them to begin the negotiations with their workplace supervisor about the tasks they will perform. In the negotiation process students need to develop:

- The aims and outcomes of the project
- The research methods to be used
- The duties of the student in the workplace
- The resources that the host organization will supply

The students are guided in the process by their academic supervisor who has to ensure that the students are capable of achieving the agreed outcomes. For the students the whole exercise gives them a good insight into the importance of good research design including scope of project, relevance of the proposed methods and the resources required to achieve the agreed outcomes.

It is at this stage that students need to reflect upon the assessment processes they used in evaluating their chosen report in the "Working with Government" unit. This enables them to develop a set of aims and outcomes by which their own work will be assessed at the end of their placement. In other words the contract that the students develop is the basis of their assessment and they need to be sure that the tasks they set themselves are achievable.

Once a contract has been agreed upon and signed by the students and their workplace supervisor the students are required to spend 100 hours spread over a thirteen week semester in their workplace. During that time they produce a substantial piece of research of around 7,500 words. The type of research will vary according to the requirements of the task and type of

workplace in which they are located. However the students are expected to set a deadline for their final report as part of the research contract. They are also advised to plan their work to cover a range of contingencies including absence of work supervisors through sickness and the like.

The final research output goes to both the academic supervisor and to the workplace supervisor and this involves a balance of good academic writing and plain language skills. In this respect students are encouraged to support their research with adequate citation of their sources and a comprehensive bibliography. However they are also encouraged to show drafts of their work to their workplace supervisor to ensure that they are fulfilling the terms of their contract as the criteria for their assessment are based upon that research contract.

While students are involved in their research project they are also encouraged to think about their workplace experience so that they can write a reflective essay. The reflective essay is a chance for students to analyse their experiences in the light of knowledge derived from their previous study of public policy. While students are encouraged to keep a journal of their activities the reflective essay is not merely a story of their time in the placement. The journal is seen not just as written diary but also as a collection of supporting material such as workplace newsletters and public documentation about the workplace. In this respect students must focus on the broader policy framework of their placement. Such an approach ensures that they link their previous theoretical study of public policy to their specific case study. The assessment of the reflective essay is determined by how well the students are able to critically evaluate their particular placement in the light of the public policy literature.

Finally, students are encouraged to take advantage of the networking opportunities offered to them in their placement. For many of them it offers a unique opportunity not only to experience the workplace but also to discover and make contact with important people in the specific policy network. While this aspect of the unit is not formally assessed the students are constantly reminded of the importance of making as many connections as possible both within their workplace and in the broader policy network where possible. The

networking is seen as an important element in that by the end of the internship students have not only achieved academic success they have also achieved lifelong skills that have in some cases led to employment in the specific policy area. All students must attend at least two seminars during the placement where issues of progression in their tasks and discussions of networking opportunities are raised.

4. Discussion

The assessment approach used in the Deakin Policy Internship is a combination of summative and formative approaches that is negotiated between the student learner, the employer and the academics. In the subject preliminary to the Internship (Working with Government) students are involved in an iterative process of learning about different tools of assessment. While the subject outlines a number of approaches to the critical evaluation of report writing it also gives the students a chance to apply an evaluation process to a special case study of their own (their chosen report). The purpose of the assessment in the subject is to allow the students to learn a process of evaluation that can they can later apply to their own work. In this sense it is a formative assessment process in which students can apply an evaluation framework in a progressive way as the subject unfolds. They have the opportunity to revisit their work as they proceed towards a final summative assessment that becomes a first indication of their readiness to tackle an internship.

The next stage in the assessment process is unashamedly summative in that students prepare for and partake in a selection process. The development of a portfolio in which students present their skills and the short reflection on what they hope to learn from the internship are indicators of their knowledge and understanding of public policy. Both are in fact tests of the student's ability in a given field of knowledge and are thus summative. Furthermore the interview that includes knowledge of and an understanding of student responsibilities in the workplace are also summative.

The selection process is part of the overall assessment for acceptance into the internship but obviously is not part of the formal assessment for a particular subject.

It might be argued that the selection procedure is also part of a formative assessment in that students are learning to process a number of skills in preparing for and partaking in an interview. Indeed students who fail to proceed to a work placement are given feedback as to why they have not been chosen. Wiliam and Black (1996) however argue that feedback 'requires that the information generated is actually used to close the gap between actual and desired levels of performance' (Wiliam & Black, 1996). Thus if the feedback is merely given to a student who lacks the knowledge or the power to change the outcome, the learning loop cannot be closed, and there is really no formative assessment for the student or the teacher (Sadler, 1989). An important element in the process, then, is that information given to those students who are not selected for the Internship program does help them to alter the gap between their present and future levels of performance (Ramaprasad, 1983).

The development of the research contract begins the assessment process for the work placement. As argued by Gibbs (see above) the process is a combination of setting objectives, devising criteria and developing action plans that can be formulated in a formal learning contract between the academic and workplace supervisors, and the student (Gibbs, 1987). By establishing the criteria for assessment in a multi-faceted manner the students are involved in formative assessment in that they are suggesting actions that are intended to close the gap between desired and actual levels of performance (Wiliam & Black, 1996). Furthermore, by devising criteria in conjunction with workplace and academic supervisors the student gives both supervisors not only a guide to assist the student towards the established goals but also a set of criteria for a final assessment of the placement. There are also spin off affects for the workplace in that engaging employers as assessors helps them develop their organization into a learning environment as well (Evans, 1994).

The reflective essay is designed to fulfil the fourfold approach outlined by Evans (1994). The students are

required to write down their experiences in some form of log or diary as their work placement proceeds. They are reminded that the reflection is an analysis about the implications of their experience for the broader theoretical framework of public policy. They are made aware that what they are doing is collecting evidence to substantiate or critique their theoretical understanding of the issues with which they are dealing (Cox & Gibbs, 1994). In so doing this they are increasing their understanding about how what they are learning is integrally tied up with a theoretical understanding of public policy. They then demonstrate this through a final reflective essay that synthesises their evidence into a sustained argument about the issues or problems they have faced. Finally, the work that the students produce from their reflection is assessed within the theoretical framework adopted by the students for their analysis.

The assessment used in the reflective essay is both a formative and a summative approach in that the students are being asked to reflect upon their experiences in the light of given theoretical positions as they progress through the placement. It gives the students a chance to test and retest their assumptions about the workplace. It is also a test of their ability to apply what they have learnt in previous public policy subjects to a particular case study. In this sense the final assignment is summative in that what they produce is judged against particular a priori criteria. So while the students do acquire additional subject matter it is the application of a particular disciplinary knowledge to that material that is assessed.

So far we have discussed assessment in terms of two elements; acquisition of additional subject matter and application of subject knowledge (Evans, 1994). However there is a third element that includes a range of knowledge and skill related to the operation of day to day work in employment (Evans, 1994). This last element is not included in the formal assessment of the Deakin Internship but is seen as important for student learning in another sense. All the students in the Internships are encouraged to build networks of contacts while they are in their placement. In this sense students learn how to fit into and take their place through interaction with others in their work environment. This forms part of student learning and self-assessment that can be shared with others in the

Internship program through discussion in seminars.

One specific way in which students are able to assess their impact on their chosen workplace is whether they receive some affirmation of their work through letters of support or in most instances the chance to use workplace supervisors as job referees. Learning in this sense is assessed by the students through the exchange of goods or favours and not in the formal sense of achieving a priori goals.

5. Conclusions

What the Policy Internship program at Deakin University shows is that it is possible to design a learning environment that is collaborative, constructive and responsive to the student's needs in the workplace. The challenge has been to design an assessment regime that suits that learning environment, one that allows the students to firstly understand an evaluation framework and then apply it to their own circumstances in the workplace. The assumption is that if students are able to learn how to assess they can then apply it to their own experience. Consequently preparation for learning is an important element of an assessment regime in experiential learning. What the Deakin program does is draw together the three major elements of preparation, collaboration and reflection into a holistic approach to assessment.

First preparing students to develop assessment criteria for their own experiential learning requires that they in fact have an initial experience of assessing the work of another. This also means that they be allowed to develop the critical skills required to apply an assessment regime. At Deakin the "Working with Government" subject is designed to engage the students in an evaluation that allows them to produce a final task that applies a range of assessment approaches. By progressively evaluating different aspects of a public policy document they build the skills necessary for use in the ensuing workplace task.

Secondly through the collaborative process of negotiating a research contract the students are able to set down the basic goals for their placement. These goals are a combination of setting objectives, devising criteria and developing action plans that can be formulated in a formal learning contract. Using the skills obtained in the "Working with Government" unit the students are able more easily to focus on a range of approaches to their goal development. By formulating these goals in conjunction with workplace and academic supervisors the student not only develops a guide for progress in the project but also a set of criteria for a final assessment of the placement.

Thirdly by engaging in a reflective approach to their experiences in the workplace students are able to focus on the broader policy framework of their placement. In this way they link their previous theoretical study of public policy to their specific case study. The emphasis is on critical reflection where there is a recognition, a judgement and a justification of the student's ideas and actions. The final reflective essay synthesises the evidence they develop in their journals or diaries into a sustained argument about the issues or problems they have faced.

The Deakin Policy Internship can be seen as a model of experiential learning that allows students to conceptualise, synthesise and integrate an assessment process into their planning and implementation in the workplace. Through preparation, collaboration and reflection students and supervisors alike can build an assessment regime that has the imprimatur of all concerned. In this sense assessment becomes an integral part of the experiential learning.

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Making Use of Technology in Assessment

But did they Learn? Assessment Driving the Learning, Technology Supporting the Process

Sue Trinidad

Faculty of Education, Languages Studies and Social Work
Curtin University of Technology, Perth, Western Australia

Robert Fox

Faculty of Education
The University of Hong Kong, Hong Kong SAR, China

But did they learn? That is the purpose of the assessment tasks designed and developed to focus on the student's learning and not just the teaching of a module with students completing the Master of Information in Technology Education at the University of Hong Kong. A series of rich assessment tasks are used where students compose elements of group and individual tasks to construct their own knowledge in a social context to produce quality learning outcomes. This paper illustrates how such assessment tasks, supported by technology, can drive the learning and prevent students from regurgitating plagiarized facts.

1. Background

The University of Hong Kong provides on-going education for teachers and education professionals within the Faculty of Education through a two-year part time Masters degree in Information Technology in Education or MSc[ITE]. This Masters degree has specialisations in IT in Education [ITE], Library Information Science, e-learning and leadership and change. The MSc[ITE] is offered on a two to four year part-time study basis and offers a flexible modular structure enabling students to progress according to their own pace. The course is delivered in a traditional face-to-face mode supplemented by an online course room - Interactive Learner Network (ILN) which supports computer-mediated-communications. Up to 90 students are enrolled in the programme each year reflecting the demand for this kind of taught postgraduate programme in the community. About 70% of students taking the course are serving teachers from primary and secondary schools, the remaining 30% are education professionals from outside the school sector, including teachers and librarians in post-secondary institutions and staff from government departments as well as professionals working in publishing and personnel training.

2. Using the technology to support the teaching and learning process

ILN is a community-building environment designed to scaffold virtual education communities of practice where teachers and students work together as teams and engage in reflective, collegial patterns of work. ILN facilitates both cognitive as well as social scaffolding, which enables educators and students to become progressively more involved in the community and to sustain their commitment and interests. This environment is designed to support academic programmes that rely heavily on pedagogies that emphasize the emergence and growth of autonomous collaborative learning, rather than teacher-directed delivery of learning materials (see <http://iln.cite.hku>).

hk/).

The experiences discussed in this paper are based on those used in the foundation module of the MSc[ITE] programme of eight modules MITE 6004 Teaching and Learning with IT. This first module sets the scene for the course by modeling sound learning, teaching and assessment practices. It uses a series of rich assessment tasks (Trinidad & Albon, 2002) where students compose elements of group and individual activities to construct their own knowledge. A social constructivist approach is used where the class learning experiences are structured with the philosophy that learning does not take place in a solitary manner but in a social, active, learning environment where the learner is given every opportunity to construct their own learning in a social context. This learning is supported by the structure of the room with tables of laptops in groups and the use of the online technology using ILN.



Figure 1. The two computer rooms that can become one large room

Figure 1 provides a view of both rooms that contain 35 and 40 laptops respectively arranged around tables which allows for small group work accommodating two classes of between 30-35 students or one large class of 65 students with the dividing doors folded back.

3. Expectations of students

At the beginning of the module students are asked to reflect on, write down and then discuss their expectations with peers. Students then upload their combined expectations online to ILN for other groups to review. These uploaded student expectations for the course are also used by the lecturers to fine tune the module to better match students stated needs. Overall however, the desire of most of the Masters students is to improve their own understanding of information technology (IT) and its potential use in supporting their own teaching whilst providing motivation and new opportunities for their own students to learn. The opportunities provided within the module are intended therefore to not only inform students of new ways of teaching and learning with technology but to 'walk-the-talk', offering students an opportunity to experience learning new things in new ways, which are pedagogically appropriate as well as being innovative. At the same time, there is an explicit expectation amongst some students, that technology per se, can somehow improve both teaching and learning and that by having access to technology, classroom practices will improve as will their teaching and their students' learning. This latter expectation is likely to be held more by students with less teaching experience and in particular, those teachers that see their primary role as transmitting facts and skills to their students (Watkins & Biggs, 2001). There is also a desire to improve qualifications in order to improve their chances of promotion or in gaining a better job. A number of student undertaking the course already have Master's degrees in other areas and several students hold doctoral degrees.

The present school system in Hong Kong is highly

competitive, with a strong sense of hierarchy within the structure. Secondary schools are divided into 'bands' of ability. Students are chosen for schools based on the results of a normative referenced examination system, where students in the lower band can expect to fail. Therefore these student-teachers are often more comfortable with materials that encourage students to absorb information from them and essays or tests to see if they can regurgitate facts as that has been the norm in their education system. As stated in Teaching Effectively in Higher Education in Hong Kong (TEHE) (2002) "Hong Kong students are often perceived as particularly exam-oriented in their study and that they prefer spoon-feeding to pass exams rather than learning for learning's sake" but given the opportunity to learn through rich assessment tasks, as outlined in Figure 2, students can reach higher achievement targets that enable knowledge and skills important to know and do, and enduring understanding.

Achievement Target	Assessment method Most Commonly Used
Level 1: Knowledge worth being familiar with	Standardised tests; traditional quizzes and tests; paper-and pencil exams, constructed responses.
Level 2: Knowledge and skills important to know and do	Traditional quizzes and tests; paper-and-pencil exams, constructed responses; performance tasks and projects with complex, open-ended, and authentic activities.
Level 3: Enduring understanding	Performance tasks and projects with complex, open-ended, and authentic activities.

Source: Nelson (2001, p.47)

Figure 2. Matching achievement target and assessment methods

4. Building quality teaching, learning and assessment environments

There is a growing movement towards designing electronic learning environments that recognize the communicative powers of the Internet to support an active and constructive role for learners (Oliver & Omari, 1999; Salmon, 2000; Trinidad & Albon, 2002). This module is used to model such modern ways of learning, teaching and assessment. There are many factors that influence the learning experience such as the infrastructure, the quality of content and assessment, the quality of learner support systems, the assumptions made by learners and educators about the learning experience itself, the educational design and peer

support networks for learners and educators (Aldridge et al., 2003; Macnish et al., 2003; Trinidad et al. , 2001). Considering the complexity of these factors can have on the learning experience the module content and assessment tasks are carefully structured to assist the students to learn in a supported and effective learning environment where the assessment tasks drive the learning and the technology supports the learning process (Albon & Trinidad, 2002; Trinidad & Albon, 2002). The module consisted of authentic activities, materials and assessment tasks that involve real life challenges through engaging and collaborative efforts as shown in Table 1. Herrington et al. (2001) guidelines for pedagogies used in producing quality learning, teaching and assessment materials for the 12 sessions are used with the students.

	Description	Examples
Authentic tasks	The learning activities involve tasks that reflect the way in which the knowledge will be used in real life settings	Problem-based learning activities using real-life contexts Learning tasks based in workplace settings Tasks are complex and sustained
Opportunities for collaboration	Students collaborate to create products that could not be produced individually	Tasks are set that require students to collaborate meaningfully Peer-evaluation, industry mentors Buddy systems employed to connect learners
Learner-centred environments	There is a focus on student learning rather than teaching	Teachers role is one of coach and facilitator Inquiry and problem-based learning tasks Activities support and develop students metacognitive skills
Engaging	Learning environments and tasks challenge and motivate learners	Interesting, complex problems and activities rather than decontextualised theory Activities arouse students curiosity and interests Activities and assessments linked to learners own experiences
Meaningful assessments	Authentic and integrated assessment is used to evaluate students achievement	Assessment is integrated with activities rather than separate from them Opportunity to present polished products rather than simple drafts Opportunities exist for students and their teachers to provide support on academic endeavour

Source: Herrington et al. (2001, p. 267)

Table 1. The pedagogies used in quality learning materials

5. The rich-assessment tasks that drive the learning

This module is successfully run by forming groups of two to four members and these groups participate in both online and face-to-face activities for the 12-week duration of the module. During the 12 sessions students are expected to complete two assessment tasks which are made up of an individual component worth 60% of their grade and a group component which is worth 40% of their grade. The individual assessment task takes the form of an e-portfolio, which consists of a number of compulsory components, including reflections from each session using the KWL process (Ogle, 1986), documenting roles, responsibilities and participation undertaken in the group assignment and a 2000 word report and presentation in week twelve on the following topic:

Conduct a small-scale evaluative study on the implementation of ICT in your own workplace. Discuss what technology is available, how it is presently used and analyze what you feel needs to be done in the organization to make better use of the technology, including a vision for future developments.

The group work consists of two parts. Part 1 is where the students are asked to form groups of four members and each group is given a topic with one "suggested" reading to comment on in-class and online. The readings reflect on sessions 2 to 11 topics. Student groups are asked to critically evaluate the usefulness of each topic, the group's comments on the reading and then submit their findings to the online course room ILN. Each group has to critique at least two other group's papers and reviews and complete the quiz/questions provided. Therefore each group, in an attempt to analyze, synthesize and evaluate new information, has to prepare a summary of a minimum of one paper within their group, one book chapter, and prepare a quiz or set of questions that can help the other groups learn about the topic. Group work, then, consists of two parts. Part 1 of the "suggested" topic involves:

- A critical appraisal of at least one journal article/paper on the given topic;
- Recommendation with a brief summary of one book/

chapter on the given topic;

- Linking to a minimum of one Internet article and one website relevant to the given topic;
- The creation of a quiz or set of questions to help peers learn more about the topic; and
- A critique and comment on two other groups' topics.

For Part 2 of the group component assignment, members need to construct a report that compares and contrasts the practical application of the use of ICT in their own individual workplaces. This summary report is constructed from the group member's individual reports and shared on ILN for comment. This gives the group an opportunity to again analyze, synthesize and evaluate data within the group and within the class as a whole. Such data is produced with a purpose and for an audience not just the lecturer to grade. All assessment components require original thought and comment by one or more members and therefore there is less opportunity to regurgitate facts or to plagiarize. The group's design and comment on the assessment rubric is used to give feedback to peers during the process. A diagrammatic representation of the rich-assessment tasks is given in Figure 3 showing the individual and group components.

6. Using text comparison software

The Masters program has adopted, for a trial period, the text comparison software Turnitin (<http://www.turnitin.com/>). Students are encouraged to pre-check their work in Turnitin before they submit their assessments. This enables students to check that their work is plagiarist free before formal submission. Although assessment tasks in this foundation module are based on personalized research and comment on student's own individual workplaces, they are encouraged to include references to relevant research literature, quoting where appropriate from other sources than their own. Turnitin has become fully integrated into ILN, allowing individual students and teachers to submit and view reports, while whole class submissions are automatically batch loaded into Turnitin, via ILN.

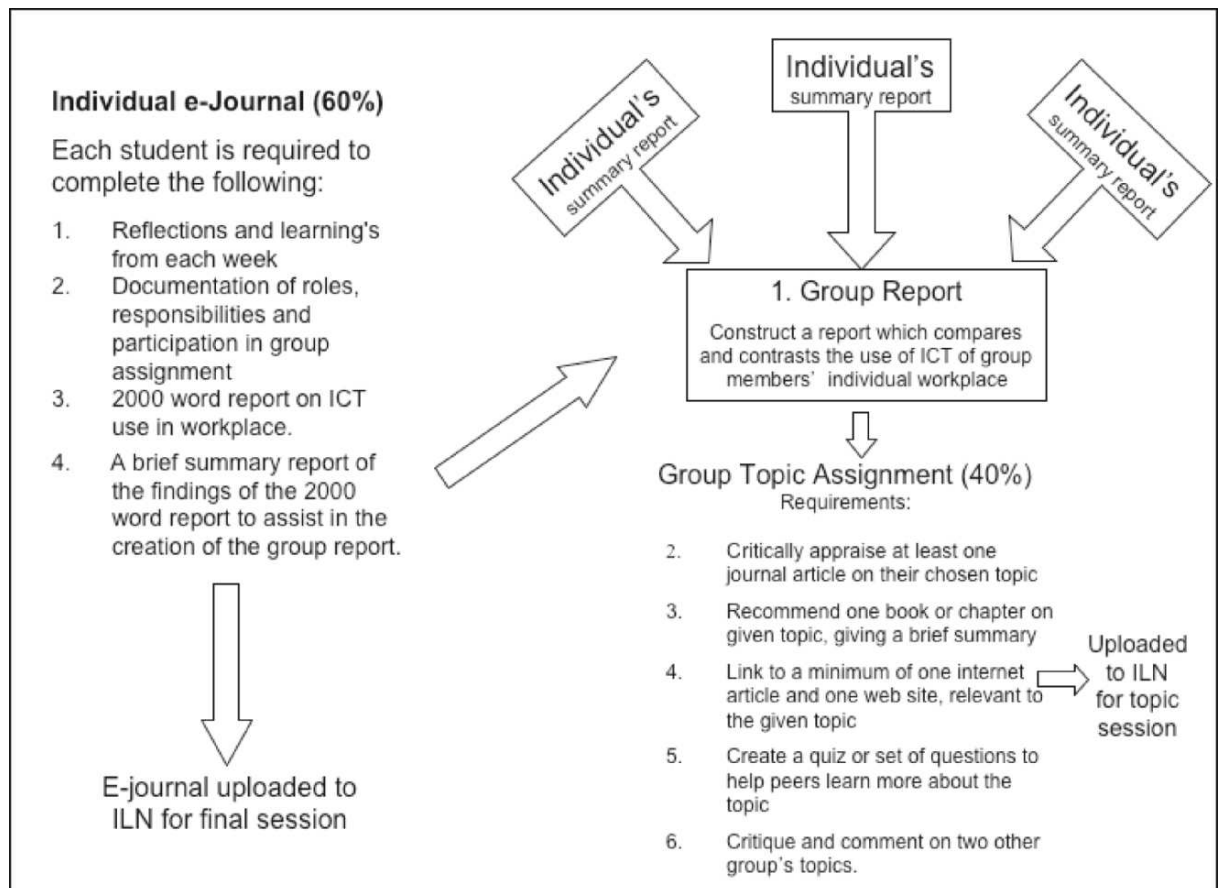


Figure 3. Diagrammatic representation of the rich-assessment tasks.

Turnitin automatically searches through all electronic submissions and compares them with a 4.5 billion document database, which includes resources from websites, journals, books, newspapers and previous student assignment submissions. Turnitin uses web crawlers or spiders to search the billions of pages, phrases and words that are electronically stored, in fractions of a second and compares its database with the submitted student assignment. "Turnitin's spiders are adding 40 million pages from the public Web, plus 40,000 students' papers each day" (Tenner, 2005). Any passage or phrase that bears resemblance to submitted student work is noted and displayed in a generated report sheet that colour codes the degree and quantity of similarity between the submitted work and other texts in the database. The similarity index (<http://www.turnitin.com/>) can then be scrutinized to ascertain whether plagiarism has actually taken place.

Turnitin for this purpose has proved a useful tool as it allows students to take responsibility for their own writing, correct citing and referencing. As one student said: 'it has forced me to adopt a much more rigorous approach to citing other people's work ... this more academic disciplinary skill will be very useful to me in future modules on the course'. However, not all students have been positive about the introduction of Turnitin into the course, as one student noted 'I am not sure I want my assignment to be permanently kept in Turnitin databases for others to see'. It should be noted however that only the class lecturer and the individual student have access to individual assignments submitted to the Turnitin database. It is important to set the foundations of good learning early in the MSc[ITE] programme along with the use of such tools to assist students in developing sound study practices.

7. Qualitative comments from students

Whenever students have to undergo new learning or are positioned outside of their comfort zones, there is some sense of disequilibrium. A well structured e-learning environment coupled with careful facilitation from the lecturer guides the students through the process of learning so that they have an understanding of how to approach the topics and actually learn using a 'deep' learning approach instead of just memorizing and regurgitating facts resulting in 'surface' learning. The rich assessment tasks coupled with tools such as Turnitin allow students to work using higher order cognitive thinking skills such as analysis, for example, comparing and contrasting data, and the synthesis and evaluation of that data where students are required to integrate components into a new whole. Representative comments gathered from students after two successive semesters of the running of this module illustrate the success of this process:

What has your e-learning experiences been like?

"e-learning in class can be mapped to a project-based learning environment. We were often given tasks and the group worked together to complete the task. We can learn efficiently from fellow group members and from other classmates. Since each of us has our own computer terminal, we usually divided the tasks up amongst ourselves ... each of us ... looking at a specific area. Then one member of the group summarises the gathered information and packages the outcome and uploads to ILN to be shared online with other students beyond our group. I find this interaction stimulates each student to think, reflect and participate in class activities."

"I was amazed by the amount of work (or words) that can be generated in each session. I think I have been guided to produce some products that I can use later out-of-class. The materials in the course and developed in class are useful, not only for the final assignment for this course but also for other MITE courses and beyond."

Have you been able to learn within this e-learning

environment?

"Yes, I have had e-learning experiences before, but I did not get as much information nor learn as much as I did in this course. I gained experience and some insight into the enormous knowledge available in the world. ...[Also] I could learn at my own pace [and] I could choose what I needed [to learn]."

"Wow! It was really great. Although we did not meet face-to-face [every session] we had a great learning environment to collaborate with each other. It was completely a new environment that has given me a new perspective and a new learning experience."

"I liked e-learning during MITE [this course]. It was challenging, fun and brainstorming. I could practise my language and develop my thinking as well."

Have you been provided with authentic experiences?

"Yes. For instance, sharing and comparing our [various] schools' ICT situations were good and useful."

"Yes, the instant response in the website was encouraging. Although I was a slow learner and responder, I could follow with the help from my group members during the lesson. After lessons, I could spend more time to think, read the content and give my response again."

"It is often hard to encourage students to contribute at a high level when they expect to be taught exactly what they need to know instead of developing their own understanding. ... [the] methodology was very open to personal development and focused on what 'we' as professionals in the field had learned and how it applied to the state of ICT in developed countries. The assessment format reflected this."

"Group assignments made me learn more from other groups."

However, it became obvious that some students need more scaffolding and support as they may not appreciate being expected to be more self-directed and achieving at a higher cognitive level, which is expected of the students through the learning, teaching and assessment in this e-learning environment. While the KWL process was well received by the majority of students as a process to help them reflect on and construct their own learning, there were some who could not find anything to say about the 'L' in the KWL process during class. It appears it is not a normal practice for students to think about what they have learnt at the end of a class, perhaps a symptom of previous "spoon-feeding" (TEHE, 2002). Reflecting on and then further developing their learning through writing out-of-class was an important strategy used. The following comment is representative of this:

"I 'hate' having to do the KWL. I don't buy the idea of completing the 'K' and 'W' at postgrad level. And perhaps I am a 'slow learner', I can't write anything for 'L' during the class. ... Furthermore, I do not agree with the idea of assessing the KWL for marks. Every person will have their own way and method to keep track of their learning."

It was also noted that for many students the only time they spoke English was during these classes. Providing quality English e-learning environments for Chinese students allows them to review the materials at their own pace to gain greater understanding, and working in groups allows students to reinforce their knowledge in their native language (Cantonese) giving adequate cognitive processing time to go back and forth between the two languages to further understand meaning. The lecturers felt that their module had allowed their students to achieve this.

8. Conclusions

This paper has reported on the teaching, learning and assessment tasks used in the module MITE 6004 Teaching and Learning with IT, which is the foundation

module for the Masters programme within the Division of Information and Technology Studies, Faculty of Education at the University of Hong Kong. In this module, technology is used to support a pedagogical practice which is important for students in a programme where the integration of the technology, study and assessment strategies, and collegial work are fundamental to the teaching and learning process. The learning experiences used in this class and offered through the e-learning environment, ILN, provide students with a rich experience that enables and empowers them to extend their study beyond the face-to-face class and continue individual and group work activities at a time and place convenient to them outside the four walls of the classroom. The learning, teaching and assessment processes provided through the e-learning activities also give students an opportunity to work, reflect on, share and develop new ideas and learning experiences which is critical to constructing new knowledge and enduring understanding.

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Enrichment of Interaction in Online Assessments

Paul Lam

Centre for Learning Enhancement and Research
The Chinese University of Hong Kong, Hong Kong SAR, China

Paula Hodgson

Centre for Professional Development
University of Auckland, New Zealand

Josephine Csete

Educational Development Centre
The Hong Kong Polytechnic University, Hong Kong SAR, China

Interaction is central to learning from the viewpoint of the constructivist model of learning. Online learning can facilitate at least three main kinds of learning-enhancing interaction: interaction with content, interaction with instructors and interaction with peers. In each of these areas, interactions can be roughly classified into simple (unidirectional, with limited feedback) and enriched (bidirectional, with negotiation of meanings possible). The investigation described in this paper focuses on, first, the overall picture concerning the various kinds of online interaction that students generally engage in by studying a pool of 45 cases supported by an e-learning support project in Hong Kong; and, second, exemplars to showcase how e-learning interactions can be enriched for the students' online experience through assessment.

1. Background

Learning occurs when learners impart meanings and structures to knowledge and information (Taylor and Maor, 2000). Learning is thus thought to be enhanced by engaging students in an interactive learning environment, as feedback and reflection effectively help knowledge construction (O'Connor, 1998).

The engagement of learners in a learning environment of this kind is a key reason for bringing learning technologies into teaching (Baldwin et al., 2000). Learners are thought to be active conceptualizers. They need to be actively engaged and to develop skills in analysis, synthesis and evaluation as part of their course requirements (Institute for Higher Education Policy, 2000). They can manipulate and organize resources while interacting in the inquiry tasks (Grabe, M. and Grabe, C., 2004). They can then synthesize, evaluate and reflect on how they develop skills, knowledge and values in their subject areas.

In contrast to conventional paper-based assessment, more interaction is likely to occur in online assessment. This is particularly true when online assessment is used as a formative evaluation tool, and it contributes to learning by providing feedback relating to performance. In general, it can be said that the contribution to learning provided by assessment will be enhanced by better learner engagement through improving the interactivity of the assessment.

Interaction comes in many different forms. Swan (2003) explains interaction as "the reciprocal events involving at least two actors and/or objects and at least two actions in which the actors, objects, and events mutually influence each other" (p.4). She sees e-learning as being able to facilitate at least three main kinds of learning-enhancing interaction: interaction with content, with instructors and with peers.

The present paper employs Swan's model (drawn from Moore (1989)) to investigate the interactivity in online assessments. Figure 1 illustrates how, under the model, a student can act on and obtain responses in all three areas: content, peers and instructors.

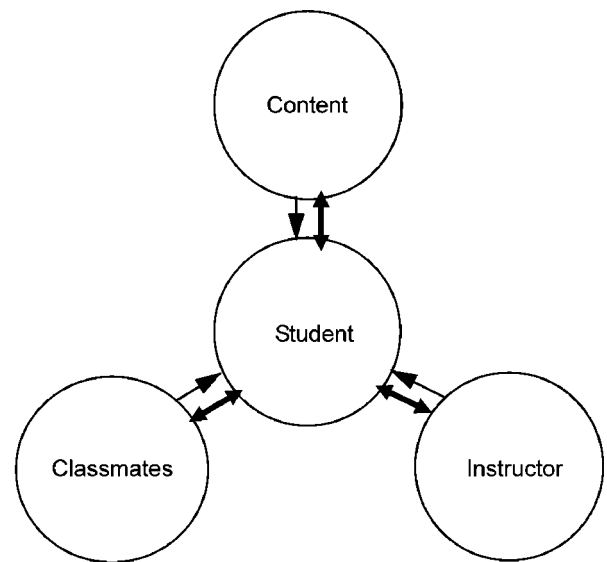


Figure 1. Interactions in online assessments

Online assessments, for the purpose of this study, may employ either a formative or summative function. Here are some examples of online assessment:

1. **Content:** online quizzes and exercises can be used for students to assess their understanding of content materials. Students may be allowed multiple attempts to interact with quizzes in a question bank or clarify misunderstandings though feedback on incorrect answers.
2. **Peers:** forums can be provided for students to take part in discussions on assigned topics. Individual or group contributions to the forum can be assessed quantitatively and/or qualitatively.
3. **Instructors:** the online submission of assignments can allow both learners and instructors to discuss areas for improvement before the final submission and grading.

2. Enriched interactions in assessments

The presence of two kinds of arrow to signify the

interactions in Figure 1 indicates the belief that interactions can be roughly classified into simple (unidirectional, with limited feedback) and enriched (bidirectional - negotiation of meanings is possible).

Table 1 illustrates how different online activities that involve students interacting with content, peers, and instructor can bring either simple or enriched interactions.

Simple	Enriched
Interaction-with-content	
After completing an online quiz, students are given immediate feedback in the form of percentage of correct answers.	After completing an online quiz, students receive immediate feedback including: <ul style="list-style-type: none"> • which answers were correct and why; • which answers were incorrect and why; and/or, • more information on areas students have to improve upon.
Interaction-with-peers	
In an online forum, students publish their finished work for teacher and peers to read.	Students post draft versions of assignments and peer review each other's work for the sake of improving the work.
Interaction-with-instructors	
After submitting an assignment, students receive a grade and possibly comments on performance from the instructor after a delayed period of time such that students are not given the chance to discuss the feedback with the instructor.	After submitting an assignment, students get grades and immediate constructive comments from the instructor. Students are given the chance to remark on teachers' comments, or do other kinds of follow-up work.

Table 1. Examples of simple and enriched interactions

For example, the provision of clear explanatory notes as feedback after learners have submitted their answers to an online quiz is a way to enrich content-student

interaction, in contrast to the typically summative quantitative results when learners complete a quiz which may indicate as little information as percentage of correct answers.

Student-student interaction can become bidirectional when in-depth discussions are encouraged rather than having online activities that merely require students to publish without peer review.

Lastly, online interaction between students and teachers is enriched when a teacher provides prompt feedback on students' performance through the online environment, in contrast to the delayed feedback that is inevitable in the conventional post-examination situation.

The authors argue that assessments that provide enriched interactions have greater potential for learning engagement and will result in improved quality of learning. With the distinction between simple and enriched interactions in mind, the authors carried out an investigation to determine, first, the overall picture concerning the kinds of online interaction that students generally engage in by studying 45 cases (which were in higher education semester-long courses) that were supported by an e-learning support project in Hong Kong (the e3Learning Project); and, second, to identify exemplars to showcase how e-learning interactions can be enriched for the benefit of students. A general picture helps to identify the current situation and indicates areas into which more effort can be put. The exemplars then help to illustrate practical ways in which these improvements can be made.

The e3Learning (enrich, extend, evaluate learning - hence e3L) Project was designed to support e-learning across three universities - the Hong Kong Polytechnic University, the City University of Hong Kong and the Chinese University of Hong Kong -over the period 2003-05. It helped teachers to use the Web in education by providing a range of services, from introducing teachers to practical ideas for using the Web in education to developing complete course websites for teachers. Full details of the design of this project can be found in the project website:

<http://e3learning.edc.polyu.edu.hk/main.htm>

The project supported the web development of over 130 sub-projects, and the outcomes of 45 of these are reported on in this paper.

3. Findings and discussion

3.1 Overall picture

The traditional end-of-course written exam is still the main assessment method used by universities. However, teachers are being encouraged to practise alternative assessment methods. Of the 45 websites studied, online assessments were found in 26, although there were actually 32 instances of assessment, as some of the sites had more than one online assessment. The distribution of assessments involving unidirectional and bidirectional interaction is illustrated in Figure 2.

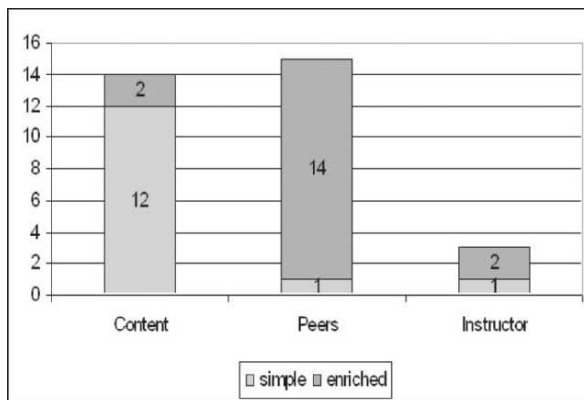


Figure 2. Simple and enriched interactions in assessments

It should be noted that the identification of simple and enriched interactions among the 45 cases was not completely unambiguous but required a certain degree of subjective judgment on the part of the evaluators. For example, the present study considers interactions in websites that provide only 'yes' or 'no' feedback to learners in online quizzes (an interaction-with-content design) to be simple rather than enriched, the rationale being that this kind of yes/no quiz is easily achievable

with exercises in paper format. The study considers interactions in online quizzes to be enriched when the online content explains and suggests ways for improvements based on particular input from students: e.g. the website further explains the related problem when the student makes a particular mistake. As it turned out, five of the quizzes evaluated did not provide any feedback to learners, seven provided a yes/no type of result, and two supplied explanation: one was an MC exercise with further help on the right and wrong answers, and the other was an exercise that required students to interact with an electronically simulated machine online where the system gave students realistic feedback based on how the students used the 'machine'.

As for the interaction-with-peers type of website, the study considered interactions to be simple when the students simply posted their comments or ideas but generally did not remark on each other's work or comments as recorded messages on the forum. The judgment was based solely on what was observable online and therefore does not include what happened face-to-face in the classroom. Also, the decision was made independently of whether this kind of peer interaction was a required part of the course set down by the teachers or was a result of self-motivation on the part of the students. Fourteen forums in our study recorded enriched interactions, while one forum recorded very few student-student exchanges of ideas related to the subject matter.

Similarly, the interaction-with-instructors type of website was evaluated on whether the teacher had systematically and regularly made online replies or remarks to the students' comments. The judgment was based solely on what was observable online and was regardless of what happened face to face in the classroom. Also, the decision was made independently of whether this kind of structured interaction was a predetermined characteristic of the forum laid down by the teachers early in the course or whether it was a development as the forum progressed. The study found two forums with enriched teacher-student interaction and one where the teacher did not react to students' work online.

As can be seen in Figure 2, the most noticeable result of this study is that assessments that involve interaction

with peers and interaction with content were far more popular than those involving interaction with instructors (ratio is around 5 : 1).

Engaging learners with peers in online assessment was widely adopted in these cases. Also, the online assessment activities were not used to replace conventional teaching but to play a complementary role. Thus, a balance of time and effort in the preparation for and implementation of these activities is an important consideration.

Comparatively, it appears that designing activities that require students to communicate with learners online is easier. When this type of assessment task is implemented, teachers are taking on a less active role as facilitators or moderators, especially to provide a focus for discussions, to motivate learners, to provide feedback and to monitor unacceptable behaviour (Salmon, 2000).

Also shown in Figure 2 are the differences in the nature of interactions that students find in the different types of website. Enriched interactions were comparatively fewer in number among assessments that were of the interaction-with-content and interaction-with-instructors types.

The teachers in the study seemed to be quite capable of facilitating enriched interaction where students communicated with their peers. Some learners who were less active in face-to-face classes became much more participative in the online environment. When learners are provided with an online open channel through which they can receive individualized feedback between peers, they become more critical and develop different perspectives through the activities provided (Laurillard, 2000).

Although the interaction-with-content type of assessment can provide individualized feedback, teachers currently design this activity for assessing student performance for grades. This is illustrated in the cases and by the fact that the ratio of simple to enriched assessment was 6 : 1. The effort needed to prepare enriched interactions in interaction-with-content types of assessment can be very demanding. A great deal of development time and effort has to be put

in to build interactive content materials that provide customized feedback. Teachers have to spend much time and effort monitoring students' comments and providing further feedback if they want to assist students who require extra support or demand more challenges.

The interaction-with-instructors category is noticeably the smallest, represented by three of the 32 total cases of assessment. The amount of time needed for teachers to enable enriched interaction in interaction-with-instructors assessment may explain the comparatively rare use of this type of assessment and the even rarer presence of enriched interaction in this category.

The data above seem to indicate a need to promote enriched learning experiences, especially when learners are to engage in interaction-with-content and interaction-with-instructors types of online assessment.

Among cases with enhanced interaction through assessment in this study, some cases are thought to be able to shed light on good practice that may be transferable to other courses. It is with this belief that the paper showcases some of the exemplars below to illustrate how the Web can be used to deliver enriched interactions through content, peers and instructors.

3.2 Exemplars

3.2.1 Content

Interaction with content in an online environment can be accomplished in an ever-increasing variety of ways. However, to date the most widely used format continues to be online quizzes. This was supported in the present study in which 13 of the 14 interaction-with-content examples were in the form of quizzes.

Providing **elaborated feedback on quizzes** is one of the more prevalent ways of creating interaction-enriched assessment where students interact with online content. A teacher of chemistry technology prepared online tutorials with a rich collection of pictures and animations to better illustrate the movement of electrons under the influence of strong magnetic fields when teaching about magnetic resonance imaging (MRI).

This was done because many former students who had taken this course found it difficult to master these abstract concepts. Thus a number of questions were designed to let students cross-check their understanding. Apart from providing simple 'yes' or 'no' feedback to students when they attempted these questions, the teacher went to the trouble of writing detailed explanations, some with animated diagrams, as feedback when students tested their understanding (Figure 3). Giving students a better preparation before assignments and examinations in this way can ensure prompt feedback and clarification of misconceptions during the course of study.

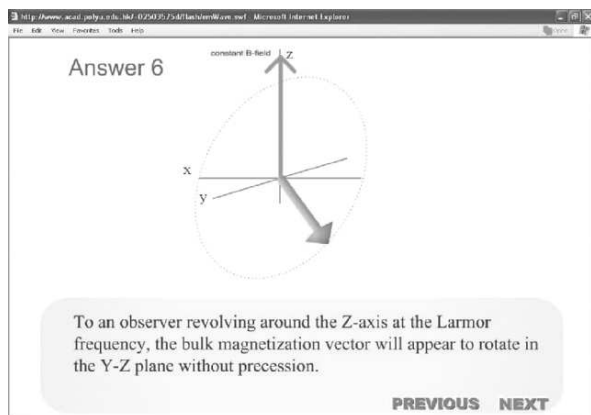


Figure 3. Detailed feedback in online quizzes

Another example of enriched interaction-with-content type of assessment is in developing simulations that react to students' actions in a similar way to a real-life situation. The teachers of an optometry course felt that their student optometrists had limited practice with real clients in eye examinations using an apparatus known as a retinoscope. They therefore created a virtual retinoscope for their students to practise examining patients' eyes online. The retinoscope simulation is programmed so that its operation very closely resembles how the real equipment operates. For example, adjusting the 'knob' horizontally would simulate a yellow light beaming into a client's eye. Just like would happen in a "real" eye examination, the student optometrist then needs to adjust the angle of the beam until it is parallel to the reflected beam appearing in the pupil as a red band observed in the middle of the lens. In the simulated retinoscope the student optometrist must then adjust a lens of different focal lengths by clicking the figures

on the screen until the reflected red band makes the correct response (stops moving in the opposite direction to the yellow light). After completing the test on the right eye, a similar procedure is then carried out with the left eye. When examination of both eyes has been completed, the student can then check their findings against the correct answer. In this way, the virtual machine is able to provide very accurate feedback that reflects the level of skill required to handle the actual apparatus (Figure 4). An enriched bilateral interaction between students and the online content is thus achieved when students can repeatedly practise and be assessed on accuracy.

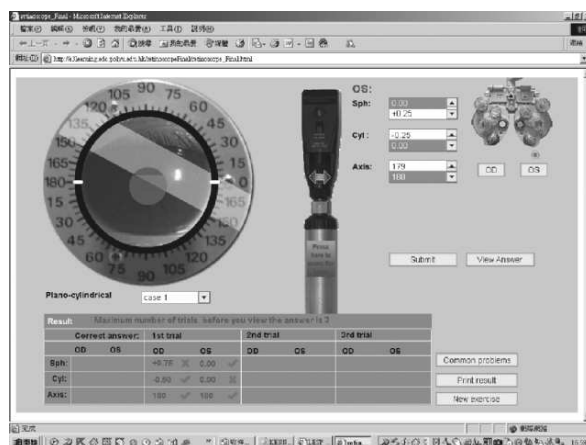


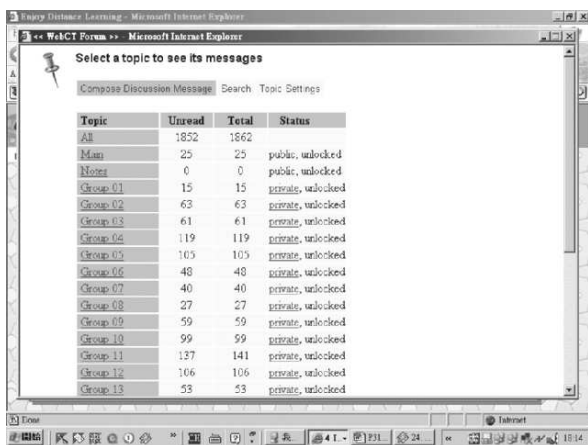
Figure 4. A simulation on eye examination with retinoscope with computerized feedback

3.2.2 Peers

In the present study the use of student-to-student interaction was even more prevalent than student-to-content. The following are two examples illustrating the range of methods that fall within this category.

Online peer review of assignments is a good strategy to encourage students to interact and engage in focused discussions with each other. A design to enhance student-student interaction was implemented on the assignment of a course on nursing for an undergraduate programme where the teacher first required her students to submit their assignments, done in groups, to their pre-assigned private forum on the course website (Figure 5); she then specified a timeline for group members to review each others' work and provide

comments online. In this case, these students were taking on dual roles as authors and evaluators. Students were engaged actively in the group activity. A high level of interaction between group members was observed in the assignment discussion forums, although some group's participation levels were higher than others. Multiple contributions from peer group members facilitated a broadening of perspectives in the learning process. Furthermore, the asynchronous mode of discussion provided a better opportunity for students to reflect and learn flexibly in their own time. Ultimately, these students' skills as reflective practitioners may be enhanced.

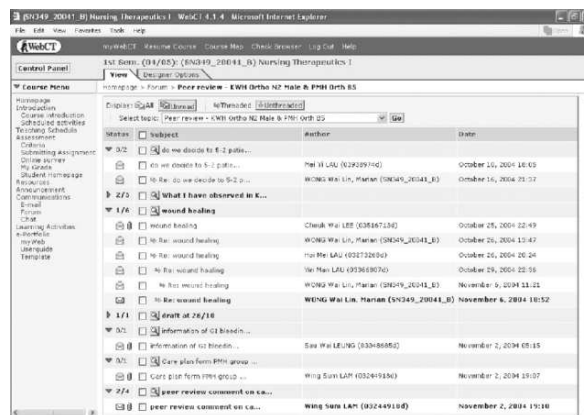


Topic	Unread	Total	Status
All	1852	1862	
Main	25	25	public, unlocked
None	0	0	public, unlocked
Group 01	15	15	private, unlocked
Group 02	63	63	private, unlocked
Group 03	61	61	private, unlocked
Group 04	119	119	private, unlocked
Group 05	105	105	private, unlocked
Group 06	48	48	private, unlocked
Group 07	40	40	private, unlocked
Group 08	27	27	private, unlocked
Group 09	59	59	private, unlocked
Group 10	99	99	private, unlocked
Group 11	137	141	private, unlocked
Group 12	106	106	private, unlocked
Group 13	53	53	private, unlocked

Figure 5. Student groups submit their assignments in their assigned private forums

Building online journals/blogs is another way to encourage students to interact with each other. As illustrated in the previous case, developing reflective skills is important for student nurses. In the workplace, they need to communicate well with other clinical professionals and develop critical thinking skills to make sound judgments. To promote supportive peer learning in developing these skills in nursing, the students were asked to post reflective journals in an assigned online forum. They submitted their experiences and reflections of clinical practice for their peers to review and comment (Figure 6). In order to encourage the postings of journals and the provision of feedback for others' writing, grades were allocated depending on both the original journal entries posted and the quality and quantity of feedback that students provided to their peers. The majority of students were motivated in this case because the effort

needed to provide good-quality feedback was recognized. Students did not perceive themselves as taking on more work, and they were appreciative of the heightened awareness of the quality of their performance. Conclusively, the assessment promoted rich student-student interactions.



Message	Subject	Author	Date
0/02	do we decide to 1-2 patie...	Wai Lin Lau (52928970)	October 15, 2004 10:53
0/03	do we decide to 1-2 patie...	WONG Wai Lin, Marian (52949_20041_03)	October 16, 2004 21:32
0/03	What I have observed in K...		
1/18	wound healing	Chieh Wu LEE (52867130)	October 25, 2004 22:49
0/01	wound healing	WONG Wai Lin, Marian (52949_20041_03)	October 26, 2004 21:47
0/01	wound healing	Wai Lin Lau (52928970)	October 26, 2004 06:26
0/01	wound healing	Wai Lin Lau (52928970)	October 26, 2004 02:58
0/01	wound healing	WONG Wai Lin, Marian (52949_20041_03)	November 9, 2004 11:21
1/11	draft of 26/16		
0/01	information of GI bleedin...	See Wai LEUNG (53046680)	November 2, 2004 01:15
0/01	Can you form PPH group ...		
0/01	Can you form PPH group ...	Wing Sun LAM (53249193)	November 2, 2004 10:07
2/4	peer review comment on ca...	Wing Sun LAM (53249193)	November 2, 2004 19:10

Figure 6. Peer review of reflective journal entries

Note that both of these interaction-with-peers exemplars require input from the instructors in the form of: 1) setting up the activity; 2) maintaining a "virtual presence" during the activity; and 3) providing feedback via calculations that lead to grades and/or written commentary after the completion of the activity.

3.2.3 Instructors

As noted earlier, the interaction with peers category was least often found in the present study. The authors hypothesize the relatively small number of assessment activities in this category may be due in part to two reasons. First, the cases reviewed were all in "hybrid" or "blended" courses in which the teacher could also interact with students in regularly scheduled face-to-face sessions. In fact, some teachers directly expressed the opinion that as they saw students in class sessions, they were searching for different forms of interaction that students could experience outside of the classroom. Second, this is a comparatively newer category and the methods and prevalence of use in online modes are just emerging. The following two exemplars indicate possible uses in this newer area.

By providing the opportunity for teacher-student

interaction on assessment, a staged process for assignments allows for **online assignment submission with display of teacher comments**. A teacher of a nursing subject asked her students (in groups) to post up their presentations, which could be in the form of PowerPoint presentation slides, video shows, booklets or web pages. All the productions were showcased to the whole class on a website and compiled as a "cybernetic show". The teacher believed that the task would enhance the students' interest and understanding of the issue through creative work. The "cybernetic show" comprised three sections - understanding, exercising and caring in community nursing. Students' projects were collected and displayed in the corresponding sections of the website (Figure 7). Each student group was assigned to any one of the three sections. In this case, the teacher provided her comments and discussed the pros and cons of each student project online. The transparent communication between teacher and project groups enabled students to have a better understanding of the expectations of the teacher. In addition, the just-in-time comments allowed students to revisit and further improve their work.

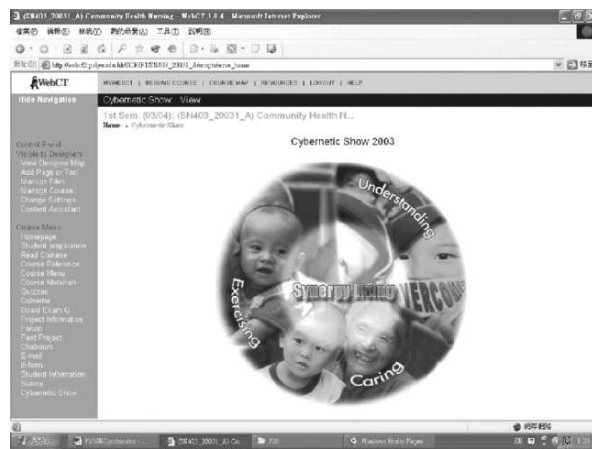


Figure 7. Displaying a gallery of the students' projects (cybernetic shows)

The possibility of **teachers commenting on** the performance and content of **students' online discussion** (including activities such as forum discussions and debates) makes teacher-student interaction rich. While real-time debate can help students to develop sharp critical thinking and requires good preparation, online

debate allows students more time to reflect and collect further evidence for their arguments in a Web-based environment. The assessment of a higher diploma course in home care for nurses required the part-time students to participate in an online debate as part of the assessment. Student groups took sides on controversial issues that the teacher had prepared detailed information about for debates, with both group and individual contributions (seven altogether). Students posted their views either for or against the idea by set deadlines and according to the specifications in the debate guidelines. The debate assessment had a component of student-student interactions, but its main feature was the strong student-teacher interaction, because the teacher monitored the whole process very closely. In addition to the students' group contributions, the teacher made comments on points that students made in the forum, as well as conclusive judgmental remarks on group performance towards the end of the debate exercise.

3.2.4 Lessons drawn from cases

To summarize, these six exemplary cases demonstrate increased student engagement through interactions in assessment activities. Whether interacting with content, peers or instructors, students have multiple opportunities to (1) reinforce concepts learned, (2) develop deep understanding, and (3) acquire professional skills in assessment. While traditional assessment provides limited interaction with teachers, embedding online assessment in traditional practice can offer better assessment outcomes.

However, it should be noted here that much time and effort is required. The enhancement of assessments that enables students to interact with content and instructors should be developed further, but it is necessary to balance the time needed for preparation and the workload involved in implementation of these types of assessment with the potential learning gains.

A network support system can be a solution: good practice on online assessment can be shared between teachers. Technical advice must be provided. Designing and developing the interactive materials for assessment also needs to be supported, as they were by the e-learning project that supported development of the 45

courses reviewed for this paper.

To streamline the feedback process for assessment, rubrics can be used to communicate objective assessment criteria more efficiently and effectively (Stevens and Levi, 2005). The use of the electronic mode of feedback through rubrics is increasing rapidly in the education sector.

4. Conclusions

Assessment methods are commonly selected for the primary purpose of assessing student performance. However, assessment can be used for a wide range of purposes including selection, qualifying for standards, motivating student learning and informing teaching effectiveness (Freeman and Lewis, 1998). Engaging learners in learning through assessment may not be highly valued. However, this study has stressed the potential importance of finding ways to achieve better engagement of student learning through enriched online interactions. Therefore, it is strongly suggested that enriched interactions can be fostered in the future design and implementation of online assessments.

In some cases, enriched interactions can be fairly easily achieved when online activities require students to interact with each other. However, it is more difficult to achieve, and hence more scarce, as our 45 cases revealed, when students have to interact with the content or with teachers on the Web. Good ways to do this are hinted at in the exemplary cases described. The quality of learning through assessment is evidenced by (1) improved conceptual understanding through prompt and enriched feedback; (2) enhanced development of professional skills through computer simulation; (3) broadened perspectives through online discussions; (4) the development of analytical skills through online debate; and (5) improved assignment through just-in-time feedback from teachers.

In designing activities that can embrace the purposes of assessment and value the pursuit of excellence,

teachers face many challenges. It should be noted here that a great deal of time and effort was spent by the teachers in the exemplary cases to make these activities possible. The enhancement of assessment that enables students to interact with content and instructors should be developed with an eye on how to minimize teacher workload at the same time. Furthermore, research in devising electronic assessment tools and prototyping question banks with automated feedback for *all* response options can be a useful way to explore the possibilities of streamlining the design and developing enriched interaction with content and instructors.

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Utilising an ICT Tool for Moderating, Marking and Managing Assessment in Large Tertiary Classes

Pippa Nelligan

Faculty of Community Services, Education and Social Sciences / School of Education
Edith Cowan University, Joondalup, Western Australia

Teaching and learning in Australian undergraduate university courses often involves working with large classes and many sessional tutors. Incorporating valid, reliable, and transparent assessment processes, in this context, is challenging. A recently developed ICT tool has been used to assist tutors in the moderation, marking and management of students' assignment work. This paper describes how a teaching team worked alongside an ICT researcher as he developed technology to support the tutors and address the assessment issues encountered. The development and implementation of the assessment processes facilitated collaborative, practical and educative outcomes for students, tutors and the unit coordinator.

1. Introduction

Unlike international higher education systems, Australian Universities are self-accrediting institutions with autonomy over course content, course delivery, assessment, grading and the graduation of students. It is therefore essential for universities to have robust internal quality assurance for assessment and grading. Academic staff and their academic judgment define and protect standards through the ways in which they assess and grade the students they teach (James et al., 2002).

Student assessment is crucial to improving teaching and learning in Australian higher education. Chalmers and Fuller (1995) claim the challenge for university teachers is to assess in a way that affects students positively. The current trend towards student-centred curriculum leads to more subjective assessments which involve professional judgment. The promotion of higher order intellectual skills also leads to subjectivity. This subjectivity must be informed by experienced professional judgment and communicated to students with transparency (James et al., 2002).

In addition to this challenge, growing class sizes have compelled staff to focus on time-effective assessment techniques (James & McInnis, 2001). With increasing student numbers, additional staff appointments have extended teaching teams to include sessional tutors. Sessionals are defined as casual appointees, typically employed at hourly rates for a short term - in most cases semester by semester (Edith Cowan University, 2005a). Sessional tutors are often from diverse backgrounds and with varying teaching experience. With the growing importance of professional judgment, ensuring common understandings of the assessment tasks within the teaching team can be quite daunting for unit coordinators. Quality assurance for assessment and grading for each unit is the responsibility of the unit coordinator.

University teacher education programs offer opportunities to model effective teaching and learning processes through the students' own assessment requirements within each unit. By modelling assessment processes that are valid, educative, explicit, fair and comprehensive, university teachers are preparing education students for what is required of them as

future professionals in schools (Curriculum Council, 2001).

This paper describes the design, development and implementation of an e-assessment tool to support effective moderation, marking and management of assessment in large classes. Online technologies were used in the project to develop a management tool to enhance interactivity of resources and processes. In this paper the particular management tool utilised will be referred to as "assessment@yourfingertips".

The online Electronic Performance Support System (EPSS) was designed to support and aid assessors in the moderation process when marking assignments that require professional judgment. Online assessment design has been dominated by tasks that are more suited to evaluating limited quantitative learning outcomes and objective knowledge. Assessment activities traditionally linked with knowledge construction processes, using critical analysis and higher order thinking, require professional judgment (Northcote, 2003). Professional judgment is facilitated in the assessment process discussed in this paper through "assessment@yourfingertips".

The project involved students in the actual assessment process in order that a shared understanding of the outcomes could be established. The students constructed their own knowledge. Hence, by involving the students in the assessment process, through the joint development of assessment indicators and peer assessment, the social constructivist position espoused throughout the teacher education program was modelled. Collaborative, practical and educative outcomes were achieved through student involvement and teaching team moderation and discussion.

In this paper, the effectiveness of the electronic tool (assessment@yourfingertips) used in the assessment and grading processes of one first year undergraduate education unit is explored, offering student, as well as tutor and unit coordinator perspectives. The implementation of assessment@yourfingertips is an ongoing process and refinements, modifications and new applications are continually being developed as utilisation of the tool spreads into other units across the program.

2. The context

2.1 Western Australia

Graduates of education courses in Western Australia will work in schools, in an outcomes based teaching environment. The Curriculum Framework was designed to provide a structure around which schools can build educational programs that ensure students achieve agreed outcomes. Within this framework, one of the primary purposes of assessment is to enhance learning (Curriculum Council, 2001).

2.1.1 The program

Edith Cowan University (ECU) offers the Bachelor of Education (Kindergarten through Primary) program which qualifies students to teach kindergarten, pre-primary, junior, middle and upper primary levels (Edith Cowan University, 2005b). One of the features of this innovative new program is the collaborative practice that underpins its delivery and design. The development of a university partnership with the West Coast Education District facilitates this collaboration. Student teachers, school staff and university staff all work together as learning partners in the authentic context of schools. Several staff members from partnership schools have been employed as sessional tutors to teach in the university program. They are committed to the program's principles and philosophy and are actively involved with both the 'on campus' and 'in school' components (Edith Cowan University, 2005c). Sessional tutors bring currency of classroom experience to the teaching team.

Collaborative planning, reflection and professional development amongst the team of academic staff involved in the program, sessional staff from the partnership schools and the education students, are essential aspects of the program (Krieg et al., 2004). Collaboration on the design and implementation of an assessment process to facilitate teaching and learning in two consecutive first year units highlights these collaborative processes. One of the units is the focus of this paper.

2.1.2 The unit

ECU guidelines set out for academic staff (Edith Cowan University, 2005a) assert the two main purposes of assessment tasks within each unit are to:

"promote student learning and improve student performance by providing timely and appropriate feedback to the student, encouraging reflection and self-assessment (i.e. formative assessment); and evaluate the extent of the student's achievements relative to the learning outcomes of the unit (i.e. summative assessment)."

In 2003 the unit 'Learning and Development 2' (EDL1201) was delivered through a combination of lectures, tutorial workshops, and interactive Information and Communication Technology (ICT). ICT relates to "those technologies that are used for accessing, gathering, manipulating and presenting or communicating information. Technologies could include hardware (e.g. computers and other devices), software applications, and connectivity" (Toomey, 2001). As noted by Anderson and Baskin (Anderson & Baskin, 2002), the addition of 'communication' to the previous term information technology (IT) emphasises the growing importance of the communication aspects of new technologies, which was very apparent in this unit.

The unit incorporated assessment processes that modelled the type of assessment graduates would be expected to use as teachers. In this way, the assessment processes increased the students' professional knowledge of assessment whilst fulfilling the assessment requirements of the unit.

Systems were developed to ensure that all aspects of the assessment process, including the match between the unit outcomes, tasks and marking criteria, as well as the consistency of the marking and feedback, were quality assured.

2.1.3 The teaching team

Four tutors, from very different teaching backgrounds and with varying experience in university teaching, worked alongside the unit coordinator over nine tutorial groups with a total enrolment of 240 students. Lectures

were conducted by the unit coordinator who also worked with two tutorial groups. Tutors were responsible for facilitating the other two-hour tutorials and marking the assessments for their groups. In this context, extensive collaboration was required to maintain authentic and reliable assessment.

One of the teaching approaches advocated in this unit was constructivism because as DeVries and Zan (1994) claim (Jensen & Kiley, 2005), it engages learners' interests, inspires active experimentation, and fosters cooperation. The team modelled how active, engaging, authentic, and collaborative learning opportunities result in the construction of knowledge and understanding. Teaching in a constructivist framework requires an alignment of teaching methods, assessment and classroom climate to support students acquiring the skills and understandings necessary for effective teaching and learning (Biggs, 2001).

With such diverse backgrounds, knowledge and understanding within the team, there was a need to develop a common understanding regarding the assessment tasks themselves, as well as fair standards of professional judgments of student mastery of the tasks. This can be time-consuming and challenging. EDL1201 used the process of developing rubrics for the assessment tasks, a strategy that assisted the team to develop common understandings.

2.1.4 The assessment process

To illustrate how assessment@yourfingertips was used to assist tutors and enhance students' learning, this paper details the assessment process for the EDL1201 written paper assignment. The process involved the eight stages described below.

Stage 1

The unit coordinator developed a very basic draft rubric using the marking guide published in the students' Unit Handbook. A Guide for Academic Staff (Edith Cowan University, 2005a) stresses the importance of preparing marking guides. It describes a marking guide as a document outlining how marks for an assessment are allocated enabling different markers to assess students' work fairly and consistently. In contrast, a rubric,

described by Goodrich Andrade, is a scoring tool that lists the criteria for a piece of work. It also articulates gradations of quality for each criterion, from excellent to poor.

The rubric was chosen because it is a formative type of assessment which becomes an ongoing part of the whole teaching and learning process (Upbin, 1999). It is a framework providing a checklist for self, peer and teacher feedback and assessment, clearly describing the criteria for outcomes (Wenzlaff et al., 1999). Rubrics are an effective assessment tool in evaluating student performance in areas which are complex and vague. When students know assessment criteria, prior to commencing assignments, there is a much greater likelihood that the learning goals will be achieved.

Stage 2

Rubric moderation followed; refining the criteria, indicators and descriptors. At this stage, the unit coordinator involved the students, as well as the tutors, in revising and improving the rubric. Other lecturers, tutors or staff could be involved in this process for quality assurance purposes. According to Tierney and Simon (2004), performance criteria descriptors are a critical component of rubric design that merit thorough consideration. In tutorials, students referred to their Unit Handbooks and looked closely at the assignment requirements. They considered the criteria listed and, in groups, discussed appropriate indicators for what each criterion would look like, under the various grade descriptors. Students worked together to construct their knowledge of what was required and how evidence of the criteria could best be demonstrated.

The small groups reported back to the whole tutorial group and together they gained shared understandings through the discussion and design of the rubric. In this way, they were developing their own rubric, a skill they will need to use many times in their future teaching careers. This involvement empowered the students and as a result, their learning became more focused and self-directed (Upbin, 1999). Chalmers and Fuller (1995) supported this in their claim that assessment guides students' decisions about what is important to learn.

By involving students in the creation of the rubric, the

students took more responsibility for their own learning, were empowered by being involved in the teaching/learning process, and had a clearer idea of what was expected in terms of specific performance. This student involvement supports the claim made in the Curriculum Framework that assessment is likely to enhance learning when the criteria are valid and explicit and when the assessment activities are themselves educative (Curriculum Council, 2001).

Jensen & Kiley (2005) believe that to maximise the potential development of students, teachers must employ constructivist practices. They cite Vygotsky (1978), who emphasised the social aspects of learning and believed that social interaction facilitated intellectual development and the construction of new ideas. The social interaction of the students discussing appropriate indicators for the rubric criteria, first in their groups and later as a class, facilitated a deeper understanding of the assignment and was clearly a constructivist practice.

Stage 3

The students' suggestions were worked with by the tutors and unit coordinator until an agreed rubric was developed. Someone with ICT expertise was required to incorporate the rubric into the electronic tool. In the future it is anticipated that the unit coordinator, tutors, or any novice will be able to input the rubric details, after staff training.

The rubric was then published online on Blackboard for the students. Blackboard™ is the software used at ECU to enhance communication, organization and presentation of units in a familiar, customisable and secure web page format (Edith Cowan University, 2003).

Stage 4

Pre-marking moderation was carried out with the tutors using `assessment@yourfingertips` to mark a small sample of the students' assignments.

The assessments were then moderated, through discussion of the marks that each tutor allocated. In this way a shared interpretation of the distribution of marks and criteria requirements was gained. According

to the *Curriculum Framework*, developing a shared understanding of the outcomes enhances the validity and consistency of judgments about students' learning (Curriculum Council, 2001). This moderation process also tested the rubric, ensuring it worked effectively.

Through the supportive and stimulating environment created by the unit coordinator, the team moderation process was a collegial and educative experience in which all parties felt comfortable expressing their concerns and views. It was a valuable team building exercise.

Stage 5

At this point, the marking stage, students were involved in peer assessment. For the written paper assignment, during the tutorial session, anonymous papers were put on the desks for an open free reading session. The students read at their leisure as many of their peers' papers as they chose within the time frame of 15 minutes. This opportunity provided the students with an overview of the range and diversity they were likely to encounter as they marked other students' work. From this exposure, more informed decisions could be made. In groups of three, students were allocated three papers to read and assess individually. They recorded their marks and justifications on a hard copy of the rubric and then passed the written paper to the next group member. When the three students had each assessed the three papers they discussed and justified their marks, using the criteria indicators and descriptors, until they arrived at a consensus. Each group entered the identifying code and results of their three moderated papers onto the `assessment@yourfingertips` rubric on the computers in the tutorial room. As they clicked on the circle under the appropriate rubric box, the circle became a button on the computer and automatically registered the corresponding mark. The marks were added automatically and a total and grade appeared at the top of the rubric next to the identifying code.

Together the students composed a comment comprised of positive as well as constructive feedback for each paper's author. The group generated comment was typed into a specified section on each rubric. Developing positive and constructive feedback is a skill that the students will be required to use every day of their

teaching careers. Constructing appropriate feedback in this manner provided another opportunity for the students to learn within social situations and practise vital professional skills.

Tutors collected their tutorial groups' papers and marked them by entering their assessment of each paper directly onto the same electronic rubric. The students' assessment of each paper was already clearly indicated for tutor comparison and moderation. The code was transformed to the student's name via the electronic spreadsheet within the tool. During this marking stage, the tutors could also access the marks and feedback of other tutors, through the technology, and use this information as a guide to consistency for their own marking.

Stage 6

Post-marking moderation occurred next, with the unit coordinator reviewing all the tutors' marks and comments. Differences between tutors could be identified quickly and moderation applied easily and uniformly. Finalised results were automatically collated through `assessment@yourfingertips` and the students' assessments were returned to them in hard copy. The tool caters for assessments to be returned electronically as well. This facility may be utilised in future units.

Stage 7

The students received a professionally presented assessment form which indicated the marks and comments of their tutor and their peers' assessment (shaded) (see Figure 1). Although the tutor mark was considered the official mark, students benefited from receiving their peers' perspective, which added another dimension to their feedback.

EDL1201 - Assignment 1 mark

Essay Number Late Submission

Tutor Final Mark / 20 N

Key: - Tutor Peer Group

The learning event is described clearly
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

The social / emotional aspects of the situation are explicit
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

A different perspective is articulated
The perspective is plausible in conjunction with that described for the child A
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

Understanding regarding social / emotional aspects of learning is demonstrated
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

Effective links with theoretical perspectives are made
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

Evidence of reading beyond the set text is demonstrated
 Not complete Pass Credit Distinction Higher Distinction
 Not complete Pass Credit Distinction Higher Distinction

Written Communication -1 0 .5 1
 -1 0 .5 1

Word Length -1 0
 -1 0

In-text Referencing -2 -1 0
 -2 -1 0

Reference list -2 -1 0
 -2 -1 0

Tutor Comment **Student Comment**

Figure 1. Peer Assessment Feedback

Stage 8

The electronic tool allowed for the collection, storage and management of data. The students' assessment details, including grades, marks, sub-marks and comments for all their assignments, within the unit, were stored, culminating in an overall unit result. This information was automatically collated through a variety of electronic spreadsheet views, easily accessed by the tutor or unit coordinator. Data about individuals, groups and tutors was analysed and evaluated, generating useful evidence for unit and course reviews. Student strengths and weaknesses were easily identified from the comments and sub-marks. Letters of referral to the Learning Adviser were generated for individual students, with minimal effort, as a result of this information.

3. Research methodology

Information was gathered from the collection of qualitative data and analysis has been on-going (Merriam, 1988). As part of the on-going managing and progressive analysis of the qualitative data, refinements were made to the unit assessment processes.

A student focus group was deemed an appropriate method of data collection for the purposes of this small assessment-related project. In contrast to questionnaires, which can be limiting, focus groups were chosen because they allowed for probing, prompting and the clarification of questions. Prior to the formation of the focus group, all the EDL1201 students were given a project information sheet. The willing participants signed the necessary consent forms for the project. Respondents to the focus group were a small representation of the total number of students in the unit. The focus group was held after the students had completed the unit's written paper assessment.

The students' contributions in the focus group demonstrated their view of rubrics, the degree to which they found developing rubric indicators useful, their opinions of the peer assessment process, the problems they faced during the moderation, the benefits of being provided with exemplars of assignment sections and general suggestions for improvements to the assessment process.

Tutors were individually interviewed and taped to record their reactions to using the tool as part of the assessment process. The unit coordinator also participated in the interviews, offering valuable insights from her perspective. The interviews covered the development of the rubric, marking and moderation processes, as well as suggestions for improvements.

4. Findings

4.1 Student perspective

Assessment dominates students' thinking (Chalmers & Fuller, 1995). This view was reflected in the regular student feedback received by tutors. Students appreciated being involved in the assessment process. By having input into the development of the rubric, the students gained a better insight into the assignment expectations. Through the social context of the group discussions they were exposed to a wide variety of perspectives and viewpoints that they may not have considered, left to their own devices. By sharing their ideas a deeper understanding of the assignment was developed.

In the focus group the students claimed developing the rubric "made you really look at it". Some said that they might not have used it if it had just been in the Unit Handbook. The students preferred being given something to work with (the basic draft rubric) rather than starting from scratch. They liked the idea of modifying, refining and improving a rubric. One student claimed that the original rubric presented to them "wasn't in plain English." It was found that through the tutorial task of developing indicators and descriptors for the rubric, students could devise language which is more meaningful to them. Another student stated that the process "draws your attention to the criteria which you would not otherwise look at so closely." Such negotiations clarified the criteria so indicators could be specific with shared understanding.

The students found it useful having the rubric published on Blackboard before submitting their assignments. This was indicated through comments like:

"It let you know what you need to meet the criteria. I used it as a checklist before I submitted my assignment. It helps improve your assignment."

The students felt strongly that the marks should also be published with the rubric so that students could see the weighting of the sections of the assignment.

The reading time was valued by the students who said they rarely had an opportunity to read their peers' work.

The students suggested extending the time to 20 minutes to allow for more papers to be read. The size of the groups (three) was considered to be good for the peer assessment task. When using the rubric to assess their peers' written work, the students noted that it was "easier to say what they haven't got than what they have." Assessing the papers individually and then moderating through justification and negotiation was found to be educative and rewarding. "I got a lot out of conversing with others about the work." The students agreed that entering the marks and group comments on the computers in the tutorial room was easy and convenient.

Students commented that group dynamics could cause problems, especially if there was a very dominant person in the group. Another problem noted during the group moderation process, was that although the mark was discussed, often the median was selected as the consensus mark.

By being involved in the whole process, the students found the assessment was clearer so the feedback and results were more meaningful. The professionally presented feedback sheets indicated marks from their peers' perspective as well as their tutor's judgment of their work.

Another point raised in the focus group was that the students would like to receive feedback about the accuracy of their peer marking. They wanted to review the rubric containing both peer and tutor feedback, via the coded numbers of the assignments they marked, so they could gauge the accuracy of their judgments by comparing them to the tutor's mark.

Student feedback from the focus group indicated that they "did not particularly like peer assessment". They felt that they were not really qualified to make professional judgments about their peer's written work. This was reflected in the comment:

"I didn't seriously consider that my peers had the experience to mark my work. I knew they hadn't done it before so I didn't think they had the ability to do it properly."

Students said they would have felt more confident about marking their peers' work if they had "practised using

the rubric to mark an example" either in a tutorial or at home on Blackboard. They claimed publishing "even just a section of an assignment", so they could practise applying the rubric, would be "helpful and increase our confidence".

Another issue that surfaced in the focus group was that the students were very conscious of the fact that, even though the papers were coded, they were discussing the work of someone from their tutorial group who was sitting in the room with them. They said, "You were very conscious of the people around you" and suggested it would be much better to mark another tutorial group's work to eliminate the problem.

When asked their views on tutors using rubrics for assessment, the response was:

"Rubrics are a fairer and more consistent method of assessment because they allow for feedback which specifies what is lacking. It eliminates the problem of tutors who only want to make positive comments."

4.2 Tutor perspective

Due to the degree of involvement tutors had in the development of the rubric and the discussions that ensued, sessional tutors believed they gained confidence as their understanding of the marking expectations became clearer. As a result of the intense initial moderation, as well as being able to access other tutors' marking during the process, tutors had "an indication of when they were marking consistently in line with the other tutors". This accessibility of other tutors' marking, also built tutor confidence.

Tutors noted that the whole assessment process was "more transparent for both tutors and the students. The fact that students are going through the exact same process as tutors gives them a better insight into marking". Tutors agreed that the whole process empowered students. The tutors were satisfied that the students received valid, explicit, fair, comprehensive and educative feedback through the computer's professionally presented format (Curriculum Council, 2001).

The development of the rubric:

"helps your understanding of the marking process so much better; what you're looking for; which is essential to fairness of marking."

Tutors agreed that more time was spent developing this type of rubric but the actual marking process was a lot quicker and easier for them, and fairer for the students. The quality assurance was therefore put in place at the beginning of the assessment process, through the development of a good rubric, so less moderation after the marking was needed.

One tutor claimed the instrument "forced" tutors to be very specific about what they thought so the assessment was not so "controlled by the unit coordinator". She explained how important it is "to be specific about the criteria and the weighting that it has within the assignment because it makes the moderation process easier. Using the rubric through the electronic tool seems to force you to do that."

The collaboration and the attention to detail when developing the rubric ensured common understandings between all the markers. The rubric provided neutrality and depersonalised the process allowing people to share equally, regardless of their experience. Through this process, the team developed a common language and were able to share ideas comfortably. "People seemed to have a much better voice in this process." An interesting point raised was:

"Sometimes the very new members of your team and the very inexperienced members can give you the richest input because they are not part of the system yet and they can see things that you take for granted so they can problematise things you have ignored and that's really important in the process of improving learning."

What was encouraging was that through this on-going process of designing and refining, the assignment tasks became "corporately owned rather than the possession of the unit coordinator."

On using the rubrics, tutors commented that "It was more consistent. It took away the subjectivity." A very experienced tutor said that a lot of marking is influenced

by perceptions that do not necessarily match reality. She claimed "This tool can make you a little bit more aware of that, a bit more objective."

In contrast to the feedback from the students, one tutor asserted that not showing the marks on the published rubric was a good idea because it ensured the students focused on the criteria and not the mark.

"They were thinking yes, it has done that, or no, it has not done that. They were looking at the comment more than worrying, what will I give that, a D or HD? Less quibbling about their marks resulted."

Tutors claimed using the electronic tool was easy and efficient because it involved just clicking buttons; no collating of marks was needed; records were easy to access (no shuffling of papers); at any stage you could go back and look at overall or individual marks; it was very easy to change marks; it reduced busy work and was quick to be up and running so you could achieve a lot in a half hour here and there.

According to one tutor, "A lot of the things that had to be done manually previously are now done automatically on the computer." Another tutor said, "I felt proficient using it. It made me feel organised." All tutors appreciated not having to add up marks or write student names and details on each feedback sheet.

assessment@yourfingertips saved tutors a substantial amount of time. It managed the student data so tutors were released from the non-productive busy work, such as entering student names, identification (ID) numbers tutorial group times, unit title/code details and tutor names. There was no room for mathematical errors when adding up the sub-marks as the tool calculated these. No calculations were necessary when collating the marks across assignments to derive the grade for the unit. All of this information was calculated and collated automatically through the tool and was readily available in a variety of spreadsheet views.

Tutors could view their whole tutorial group and compare tutorial groups if desired. Some of the ways student results could be viewed included alphabetically, numerically, by their ID numbers and by comments only. This flexibility was very useful for tutors to gain a clear

understanding of the students' progress and general areas of concern across the assessments.

Another time-saving device offered by assessment@yourfingertips was the facility to store comments so they could be re-used, where applicable. Tutors appreciated the time this saved as they no longer needed to refer back to their previously marked work in search of the specifically worded comment which was appropriate to use again. The comments were easily copied and pasted into the rubric from their comment storage box. Whenever a tutor composed a comment that they thought could apply to more than one student's work, it was easily placed in the storage box for future reference. Because comments could be accessed by the other tutors, one tutor commented:

"Your professional judgments are more explicit because as you're writing them up you're sharing them with others. You are putting them out there to be tested by other people and I think that's a really healthy process."

By using assessment@yourfingertips, and participating in the associated moderation processes, tutors gained a thorough understanding of the particular assessment requirements so they were better equipped to scaffold the students' learning towards the unit outcomes. Monitoring student progress was more manageable, allowing time for working with students with individual needs.

Reviewing an individual's comments from multiple assignments in the unit allowed tutors an opportunity to check that their feedback was varied. By using this viewing facility, tutors were also able to readily identify recurring problems that a student may have been experiencing. Intervention could be easily arranged.

The flexibility of using laptop computers was noted although tutors without laptops found it quite an inconvenience having to "book out the uni laptops". The simplicity of the tool was well received by the tutors. Although assessment@yourfingertips had multiple views and applications, the team was introduced slowly to its features. As time progressed, different views and more complex aspects were introduced. Tutors appreciated the gradual introduction to the features so

the ICT was not too overwhelming for them.

When discussing the experience of using assessment@yourfingertips, an experienced university tutor reflected:

"I don't think I have ever marked in a fairer way... I think this is the fairest process I have ever been through in terms of marking with a group of people."

Another experienced tutor said, "I felt more secure about how I had marked them than other assignments."

A more long-term view expressed was "the next time the assignment is written up for students, it is more explicit for them before they do the assignment, so that they are actually focusing on the right thing. It actually improves the quality of the assignment setting, as well as the marking."

The first-time tutors appreciated the ICT and team support saying:

"I thought that everybody knew more than me, then I realised that it was new to everybody so I relaxed. I felt I had the support and could ask silly questions if I had to. Sometimes I found that other people had the same questions so I didn't feel so bad. I felt confident to ask."

An inexperienced tutor stated that "You've got your team support with the moderating, which gives you confidence." Both new tutors believed their marking to be accurate and consistent as a result of the process.

4.3 Unit coordinator perspective

The unit coordinator saw the benefits of using assessment@yourfingertips as about "developing the team's understanding of what they were looking for". She thought the moderation process was much easier. Previously she had found assessment to be a very laborious process, especially the collation of marks from a range of tutors.

"Being able to look at the spread of marks, having that information all in one place, was hugely different for me."

Other positives the coordinator noted were that a good rubric actually reduces the number of comments that you need to write; no students questioned their marks; and students could be tracked over units. By analysing the sub-marks, you could track, for example students "not using any literature". That could not have been done, easily, before. She also claimed that:

"The peer marking gives the students experience in assessing as well as using the technology, demonstrating how technology can help to do this more efficiently, which will be helpful for their future teaching."

Problems that surfaced for the coordinator included the fact that she still felt very dependent on the ICT researcher. Training was an issue for everyone because tutors also need to be trained to use the program. Support was needed to load the program onto the tutors' laptops and retrieve the data from them for the unit coordinator's computer. The coordinator had to be trained to embed the specific rubric into the tool. These tasks all take practice. Another challenge she noted was keeping track of which was the "latest version" of the assignment rubric, with so much refining being carried out.

5. Implications for teaching in large classes

Reflecting on the whole assessment project, using assessment@yourfingertips proved it could be an extremely helpful device in classrooms of any size. The particular benefit it offers tutors of large classes is the amount of time it saves on time consuming, non-productive managerial tasks. Much of a tutor's role involves marking assessments and recording, managing and monitoring the students' results. Students expect, and are entitled to, quality feedback but this also consumes considerable tutor time. The importance of the time-saving aspect can best be summed up by one of the tutor's responses to using the tool:

"I had extra time to focus on the really important

things about marking; determining quality and thinking about what learning my students were demonstrating, so that then informed my teaching. What gaps are here? What do I need to really work on in my class? What understanding haven't these students developed, which is what assessment should really be about, not adding marks and stuff."

The needs of individual students can be clearly identified and monitored easily through the tool. Even in a small class monitoring can be an onerous undertaking. This process can be utilised throughout the program so a clear profile of students is developed over the four years.

Larger classes pose significant teaching challenges, particularly in the assessment of student learning. Five distinct, though interrelated, challenges have been identified when assessing large student cohorts. Through the team's assessment project, the assessment@yourfingertips process proved successful in addressing all five of these challenges. The challenges identified included avoiding assessment that encourages shallow learning; providing high quality, individual feedback; fairly assessing a diverse mix of students; managing the volume of marking and coordinating the staff involved in marking; and avoiding plagiarism (Australian Universities Teaching Committee, 2002).

Online assessment has become a common practice for tutors of large classes. Automatically marked multiple-choice and/or short answer questions, are utilised to provide feedback to students. These methods do not necessarily avoid the problems of low-level learning or plagiarism whereas the process described in this paper caters for higher-order thinking and deep learning through the use of the rubric. Like Wolf, Bixby, Glen and Gardner (Wiggins, 1998), we decided that what students most need, is information designed to enable them to accurately self-assess and self-correct so the assessment becomes "an episode of learning". The rubric provided this before assignment submission as well as in the form of feedback after marking. This process provided valuable professional development because the students will be required to teach children to self-regulate when working with them in schools.

Plagiarism was avoided by the nature of the actual assignment set. Turning tasks into self-assessed work

or peer-assessed work spared tutors from a lot of routine marking. Our work supported the claim by Race and Brown (2001) that it is much quicker to moderate students' peer assessments than to assess them from scratch ourselves. Tutors found this when assessing the written papers.

Criticisms regarding the issue of how to maintain consistency across a number of markers when using non-objectivist testing have arisen recently (Northcote, 2003). The coordination of staff throughout this project was handled in a manner that ensured common understandings and marking consistency. As a result, the volume of marking was managed smoothly.

Teaching in large classes often involves group work. It appeals as an efficient way to teach as workloads increase and available time diminishes. The assessment process used in this project supports Burdett's (2003) suggestion, that students should be encouraged to take greater responsibility for their learning and group work is one way of providing such opportunities. Group work models constructivist teaching. Through collaboration with others in their group, students constructed their own knowledge.

The scaffolding of group work within the EDL1201 unit supports the views expressed by Homan and Poel (1999) (Burdett, 2003) that students must be taught how to be effective group members. Mutch (1998) (Burdett, 2003) agrees that the mastery of group work skills requires explicit treatment and teaching, in much the same way that other areas of skill and knowledge are addressed. Throughout the unit, aspects of group skills were explored highlighting the complexity of working in groups so students gained an understanding of what it means when children in schools are asked to work in groups. This developed yet another skill the students will require as future classroom teachers.

tutors, many of their suggestions have been taken on board and implemented into subsequent assessments. Marks indicating the weighting of the general sections of the assignment are now published with the rubric, as requested by the students, although marks for each individual grade are not exposed. Students are given practice, during tutorials, using the rubric to mark a section of an assignment. They practise in groups and then discuss as a whole class, which eliminates the problem of students just choosing the median mark of the three markers during the peer assessment negotiations. This semester, exemplars will be posted on Blackboard for students to practise applying the rubric in their own time. This will increase the students' confidence in their ability to assess peers' work accurately, as well as their own.

Reading time for peer assessment has been increased to 20 minutes. Each tutorial group's papers were coded with a colour so students marked a mixture of papers from any tutorial but their own, thus eliminating any concerns about their peers hearing comments that they could interpret personally. This proved time consuming so that this semester tutors will simply swap tutorial group papers. For students interested in checking the accuracy of their peer assessment judgments, a spreadsheet of the coded results will be made accessible to them online. Students wishing to check this will need to remember the codes of the papers they marked.

Problems involving laptop access have been eliminated by the tutors arranging their own. Students who have been referred to the Learning Adviser in their feedback are now being tracked by tutors to monitor if they are taking responsibility for their learning and attending the recommended workshops. This will be on-going throughout the program.

The tutors are feeling more confident with ICT and are keen to trial more complex functions. It is recognised that tutors require extensive professional development and training in the full implementation of the tool to be able to use it, without any input from the ICT researcher. Although the unit coordinator is becoming more independent, she still relies on his input.

6. Response to feedback

In response to the feedback from both students and

One tutor's suggestion, yet to be trialled, is after marking an assignment, just returning the rubric feedback with

written comments and no marks. The marks could be issued the following week. This would alleviate the students' tendency to focus on the marks rather than the criteria. We could take this approach a step further by using the suggestion offered by Freeman and Lewis (1998) that students could submit an analysis of their feedback, together with their plans for acting on it, before receiving their final marks.

A personal reflection is to provide an area on the peer marking rubric, so students could write their justifications next to their decisions as they marked each paper, which would facilitate more informed negotiations.

To improve learning and teaching, educational assessment must be formative in both function and purpose and must put the student at the centre of the assessment process (Elwood & Klenowski, 2002). The assessment process detailed above clearly exemplified this student focus.

The process described in this study fulfils all of the assessment guidelines recommended by Chalmers and Fuller (1995) for teaching and learning at university. Through the use of *assessment@yourfingertips* in the process, teaching and learning was enhanced. The recommended guidelines that were met included encouraging students to learn with understanding and to evaluate the quality of their own learning; making each formal assessment task a learning experience for students; setting challenging tasks that require students to work with the subject matter, and not just reproduce it; providing students with feedback on their learning; facilitating cooperation between students to promote student learning and motivation, and develop interpersonal skills and relationships; involving students in working out the marking key that will be used to assess their work; and allowing students to participate directly in the assessment process by using self and peer assessment activities, which make a significant contribution to the development of independence in learners.

Consistency of standards across tutors and students was assured when using *assessment@yourfingertips*. Data-base technology provided an electronic record system for results. This storage system contained

detailed assessment information and facilitated the fast and flexible transfer of data. The data could be manipulated to support moderation, student feedback, assessment management and review processes.

7. Conclusions

There is great potential in the further development of *assessment@yourfingertips*. It has already been incorporated into a number of other units for a wide range of assessment tasks. As a tutor who has used *assessment@yourfingertips* in two units over several semesters, it has been extremely frustrating reverting to traditional methods of marking. A future goal for the teaching team is to incorporate the assessment of generic personal skills, known at ECU as Graduate Attributes (Edith Cowan University, 2005a) into assignments so that students can build a profile of their developing skills across the entire program. One of the greatest advantages of *assessment@yourfingertips* is that it can be designed to suit any course of study, at any level. Its flexibility and subsequent potential is unlimited.

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Using Online Environments to Promote Assessment as a Learning Enhancement Process

Mary Rice
Institute of Teaching and Learning

Coral Campbell
Judith Mousley
Faculty of Education
Deakin University, Geelong, Australia

The 21st century presents new challenges relating to the need for assessment to be more innovative, more responsive to students' needs, and more relevant and authentic. The characteristics of good assessment are well known and resources abound to assist academic staff to change their practices. Yet, at a time when the imperative for reconsidering practices has never been greater, it appears to be very difficult to bring about and maintain substantive change in assessment. This paper presents case studies that illustrate the way some academic staff have responded to the challenges. In particular, how the online environment can enhance learning through formative assessment is illustrated with four case studies. The paper outlines specific challenges faced in each case and discusses issues that arose during development and delivery. It concludes by identifying some of the factors that helped to facilitate changes in assessment practices in these specific cases.

1. Introduction

Over the past few years, there has been increased attention paid to assessment in higher education institutions, due largely to changes in government expectations and in the diversity of the student cohorts.

Imperatives for systemic change in assessment practices have been articulated by a number of scholars including Gibbs (1992), Brown and Knight (1994), Morgan and O'Reilly (1999), Entwistle (2002), James, McKinnis and Devlin (2002) and Biggs (2003). Such authors have argued that university assessment has been too narrow and therefore has not adequately reflected the quality, breadth and depth of students' learning. In respect to this, Nightingale et al. (1996) emphasised the need to assess a broader 'cluster of abilities' that included critical thinking, judgement making, problem solving, development of plans, demonstration of techniques and procedures, finding and managing information, creative design and performance, and communication skills (p. 3).

A key problem that these authors identify in common is that while assessment requirements are central to the learning experience for students, what is not assessed is often not learnt well because students generally prioritise what they need to know for formal, graded assessments. They tend to disregard academic content seen as less relevant to those requirements, so much potential educational value of coursework is lost. Clearly, the predominance of essays and examinations in University assessment has potentially constrained learning, particularly when used for summative purposes only.

A second problem commonly identified is a lack of focus on the deeper understanding of underpinning principles and ideas and students' abilities and dispositions to employ these purposefully, critically and rationally across a range of situations. Norris and Ennis (Norris & Ennis, 1990), for instance, stressed the need for assessment tasks to involve a variety of types of critical thinking as well as opportunities to display commitment to their use in relevant contexts.

A third common element is the need for teaching and assessment to be seen as interactive throughout the

pedagogical experience. Ramsden (2003), for example, made the point that "Assessment's educational value depends on our understanding of its multiple purposes and how these are related ... and on how successfully we integrate the process of making judgements into the job of teaching. ... Much assessment still proceeds from an ingenuous conception focused on methods of collecting information and comparing the relative worth of different students" (p.205).

This paper attempts to shed some light on what happened when academic staff reconsidered their assessment practices and implemented more innovative approaches in online contexts. These approaches aimed at encouraging deeper understandings by bringing assessment and teaching processes into the same realm of quality learning, by using assessment to inform plans for on-going teaching, and by assessing learning communities, contexts and products at the same time as assessing individual student performance. As well as identifying issues that arose in each case, the paper highlights key factors that appear to be necessary for change in assessment to occur.

2. Literature review

2.1 Characteristics of good assessment practice

Many of the characteristics of good assessment practice are well known. Key questions of why, what and how to assess, and how to interpret and respond to assessment at this level were enunciated clearly by Rowntree (1977) as far back as 1977. More recent scholars, whose work relates to changed circumstances faced by higher education institutions, regard his ideas as seminal and have built upon them. For example, Nightingale et al. (1996) emphasised the need to design assessment tasks that 'guide and enrich learning'. To illustrate this, a number of exemplars in various discipline areas were produced. James, McKinnis and Devlin (2002) articulated 16 indicators of effective assessment, and presented a number of illustrative cases on their website. Ramsden (2003) listed and discussed 14 rules for better

assessment in higher education, and Biggs (2003) devoted two chapters to the principles and practices of university assessment. More recently, Nulty and Kift (2003) developed a framework and checklist for ensuring quality in assessment. In addition, the assessment principles enunciated by the American Association for Higher Education (AAHE) have been widely disseminated. Consistency across the literature and recommendations that have been made suggest that effective assessment:

1. Is unambiguous in intention
2. Is closely aligned with course content and expected learning outcomes
3. Is fair, valid, reliable and ethical in nature
4. Requires completion of authentic activities
5. Emphasises and promotes students' learning
6. Focuses on eliciting student understandings and demonstration of higher order skills
7. Provides constructive, diagnostic feedback
8. Utilises a variety of methods across subjects
9. Caters for different learning styles
10. Allows for some student choice
11. Is free of cultural bias
12. Is cognisant of staff and student workloads

Most institutions have now formulated assessment policies based on these sound pedagogical principles, and various resources have been developed and disseminated within and across institutions to facilitate the professional development of staff. For example, at our tertiary institution, clear policies and procedures have been laid out, exemplars have been developed, professional development sessions have been held and relevant teaching awards made available. Moreover, assessment is a major topic in the compulsory Graduate Certificate of Higher Education for academic staff new to teaching. It is also a compulsory module in the online Professional Development Program for new sessional staff. In addition, the Australian National Teaching Awards scheme now has Assessment as one award category.

2.2 New challenges in assessment

Changed circumstances have given rise to new issues requiring new responses to the enduring questions mentioned earlier. James, McKinnis & Devlin (2002)

outlined 5 assessment issues in higher education that need to be brought to the fore in today's climate. These related to online assessment, large classes, plagiarism, group work, and the needs of students unfamiliar with assessment practices in Australian higher education. More recently, in a conference keynote address, Parker (2004) reiterated these challenges and suggested the need to move from an 'instruction paradigm' where the emphasis is on 'provision of instruction' to a 'learning paradigm' which emphasises student learning. In another keynote address, Parry (2004) outlined ten challenges ahead that institutions need to address to be effective in a knowledge-based society. These related to flexibility, more timely, technology-mediated assessment, group work and authenticity. She went on to propose a model emphasising the need to embed more assessment in communities of practice that link discipline knowledge with the world of work, and to suggest that some of the challenges can only be met by harnessing the potential offered by new Internet technologies.

Focusing on the issue of online assessment, research literature clearly articulates the potential that the online environment offers for learning. (See, for example, Anderson & Elloumi, 2004; James, McKinnis & Devlin 2002; Morgan & O'Reilly 1999; Reeves 2000). These authors suggest that online assessment tasks can be more varied and interesting and can include quizzes, debates, role-plays, simulations, portfolios and tests of various kinds. Formative assessment approaches, which allow students to learn from rather than for assessment, are seen to be easier to deliver and manage. The issue of 'who' assesses can be reconsidered because the online environment offers potential for students' work to be assessed not only by the teacher but also by peers, themselves, the computer, or external reviewers when appropriate. These authors point out that a broader range of skills can be assessed efficiently when operating online because delivery mechanisms can be timely and can provide feedback more quickly through features such as selective release.

However, in spite of the need for change and the potential offered by new online technologies, the nature of academic culture has been an inhibitor to change. James (2004) suggested that possible reasons for this include the general conservatism of both staff and

students, the strong culture of testing, the risk of negative results in student evaluations of teaching, workload constraints, and conceptions of the role of assessment. He further suggested that academics can have successful careers without necessarily having to change their assessment practices. In light of this, our research aimed to document cases that illustrate change in assessment practice and identify factors that appear to be necessary in order for change to occur.

With the same aims of relevance and lifelong learning in mind, even subjects that are not offered wholly online at Deakin must have an online presence, and many lecturers have developed advanced online components that are integrated either with face-to-face teaching or the use of distance education materials such as Readers and CD-ROMs. However, aside from some online tests, examinations are still conducted in traditional format, either on campus or in regional, interstate or international centres close to students' homes.

In response to Deakin's strategic and operational initiatives, most academic staff have moved towards developing at least online-enhanced teaching, with significant online resources and communication. Deakin Studies Online (DSO), the University's electronic learning management system, is the system used by all staff and students in this scheme.

3. The research context

At Deakin University in Australia, there is increasing emphasis on innovative, responsive and relevant teaching, and of course this includes assessment practices. The University is a large, multi-campus institution that offers courses in both on and off-campus modes, with extensive use of distance education. There has been a significant move to online teaching and learning mediated through corporate technologies. This has been seen as an appropriate way of progressing the University's objectives, and some strategic initiatives have encouraged staff to consider alternative approaches to teaching. For example, recently formulated policy requires every undergraduate student enrolled from 2004 to successfully complete at least one subject wholly online. The main rationale for this is that information literacy, information technology literacy and personal management skills are regarded as important skills underpinning the development of lifelong learning, in all professions as well as further education contexts. Teaching and learning wholly online means there is no classroom teaching; all content (except text books), all communication, assignment submission and feedback is online; and regular synchronous or asynchronous online interactions between staff and students, and between students themselves, are expected. Many lecturers provide video and multimedia resources online, although CD-ROMs are currently acceptable for delivering large files. Some subjects have online group work, debates, clinical and research simulations and other computer-mediated activities as part of their teaching and learning processes.

In considering the effects of this movement on assessment practices, Mousley, Rice & Campbell (2005) note that assessment components in wholly online units of study tend to include more elaborate use of multimedia elements, assessment of discussion participation, and use of self-review tests and quizzes. Even in subjects that continue to offer face-to-face and/or distance options, traditional approaches to assessment incorporating written assignments (predominantly essays) and examinations are being reconsidered in the light of possibilities offered by online technologies. In particular, the potential for more formative approaches to assessment seem to have been recognised and some staff are seeking ways of making the most of such potential to enhance students' learning.

4. Research methodology

In this paper, we report on four case studies of staff who took on the challenge of changing their approach to assessment. These have been selected as representative of the range of innovations taking place across the institution. In two of the cases presented below, staff responded to a request to report on

innovative approaches to assessment. This was part of a larger project examining innovative assessment practices used in Australian universities. In the other two cases, staff were involved in Deakin's 2004 Online Teaching and Learning Fellowship Scheme and other related unit development projects that enabled them to focus on assessment.

It was not required that lecturers who were interviewed used online resources for assessing their students' knowledge and skills or even that they used online teaching strategies. However, given the context described above, it is not surprising that many of the Deakin staff who were interviewed had been exploring the notion of assessment of online learning, and the cases below have been drawn from this subset.

Given that our interest is in academic professional development, it was appropriate that we use case study methodology because it 'provides an ideal vehicle for communicating with the consumer. It provides him or her a vicarious experience of inquiry setting ... [and] a means for bringing his or her own tacit knowledge to bear' (Lincoln & Guba, 1985, pp. 214-215).

We stress that case study methodology is not intended to underpin generalisation. As Stake (1994) noted, the purpose of case study is not to represent the world, but to represent the case" (p. 245). Similarly, the notion of replicability has no place in this form of interpretive research: each case is unique in time, and the study of it likewise. However, the discussion of commonalities from the four cases presented includes a number of features that were similar in many of the cases overall.

Our data-gathering techniques included interviews with teaching staff, examination of student feedback where available and analysis of online documentation (unit resources, online discussion forum, etc.). Interviews were audio-taped and transcribed, and student feedback was taken both from the university initiated end-of-semester evaluations of teaching and relevant online discussion spaces.

Four cases are presented individually below, with a concluding discussion that draws out some common features and issues. The examples below were selected from our collection of cases because they all used online

assessment tasks, they included aspects of formative assessment, and they used student assessment formats that are different from individual essays and tests. The descriptions below focus on only some of the innovative online assessment tasks that the four selected lecturers reported to us, not on other recounted features of their teaching or on the whole range of assessment activities included in their subjects.

5. Results, analysis and discussion

5.1 Case 1 - Online role play

Online role-play was used as an assessment approach in a second year public communication unit (course) offered by the Faculty of Arts for on and off-campus students. Forty-two students were enrolled in 2004.

The lecturer in this case had become dissatisfied with the quality of students' learning about theoretical aspects of the unit and felt there was a need to use a more egalitarian approach that enabled students to immerse themselves in an authentic experience and construct their own understandings through social interaction. The lecturer reported that over a period of time, she had developed her expertise as a reflective practitioner and now demonstrates a strong commitment to improving student learning. She wanted to move them beyond 'skilling for jobs', and decided to try using role-play to this end. The aim of the role-play she developed was to 'deepen students' theoretical understandings' and was based on the notion that 'knowledge is socially constructed' and that comparing different perspectives 'helps build and shape understandings'. Students were required to take part in an online debate about an environmental planning dispute relating to the fictional 'Wallaby Forest', and were cast in the role of either a property developer or environmentalist. The teacher allocated these roles and used a video scenario as a motivational trigger for the debate. When students were given their roles, they were required to work collaboratively in online groups to reach a consensus about their arguments and produce a speech to be pre-

sented in a public forum. Speeches for both sides of the argument were posted online and student groups then worked together to critique the opposing side's position. Student participation was assessed with reference to evidence of research, level of engagement with a range of relevant issues, academic skills demonstrated, and presentation of their arguments. This task reflected most of the characteristics of 'authentic' learning activities outlined by Herrington, Oliver and Reeves (2003) (pp.62-63). Students were required to suspend their disbelief in order to immerse themselves in the particular roles required of them.

There were many positive features of this experience for both staff and students. The lecturer reported that 'it's as much an immersive experience for me as a teacher as it is for the students involved'. She noticed that students found the role-play 'exciting', it 'held some surprises for them', and they 'found the group work different from group work in other units'. Most importantly, she believed immersion in the simulated role-play had a noticeable effect on students' theoretical understanding, as evidenced by the quality of the online discussions and the assessment outcomes. She believed it was largely the longer-term, collaborative, and consensus-building nature of the task that led to the creation of a 'learning community that was both focused and scholastic' - a phenomenon that she had not experienced even in face-to-face classes.

An unexpected outcome was that international students found their voices in the online environment. They contributed more to the online discussion than they usually contributed in the face-to-face classroom, and expressed satisfaction with the way they had been able to interact with other students. Other student feedback was also generally complimentary, mentioning that the activity was 'very useful, a better way to learn than just referring to books or classroom situations', they had 'learned and gained a lot', the 'exercise brought up some very good issues and challenges', and that it has been 'a great way to get everyone involved'.

Although the teacher in this case was enthusiastic about and committed to the innovation, a number of issues arose during the semester. The role-play was difficult to administer because it was one of two assessment options. (An alternative based on theory and case studies

was available for students who had limited or no online access.) Students were initially confused by the multiple deadlines and complexity of what they were required to do, having been used to essay-based assessment. The number of students who did the role-play assignment was initially unknown because the allocation of students to online groups occurred automatically via the University's technical systems, and when students enrolled late or withdrew before completion, it was difficult to maintain the integrity of groups. The lecturer noted that it is easier to establish and modify groups when students are on campus. While the task had the potential to excite students, it also ran the risk of causing disaffection because the operation of the role-play depended on student access to the Internet, and unreliable access did cause a few students to withdraw or complete the alternative assignment. Those students tended to distrust not only the technology, but also the newness of the task.

The lecturer reported that academic success of the role-play was dependent on high level, consistent moderation of the online discussions. Although it was more time-consuming and stressful than expected, the lecturer was prepared to do this because she was committed to the innovation, but determined that for the next offering, much more academic support would be needed.

5.2 Case 2 - Online portfolio and group multimedia project

Deakin's off campus students studying by distance education experience some advantages over on campus students, such as the ability to live at home, to not attend lectures and hence work or care for children, etc. One disadvantage is isolation from other students, which can inhibit students' academic, professional and social growth. This is an aspect attended to in a Mathematics Education subject offered by the Faculty of Education, Deakin University.

The assessment for this case had two components - a group online portfolio and a multimedia project submitted by pairs of students. The portfolio pieces were stimulated by prompts released each week, using the automatic timed-release function of DSO. Prompts included readings (electronic links to journal articles), short excerpts of video, a short audiotaped discussion

between two teachers, a quotation, a photograph, and a number of 'expert opinions'. All of these related to six specific components of quality mathematics teaching. Groups of four students had electronic discussion areas where they could express their thoughts, discuss issues arising, and plan a group response that also drew on their own professional experience as primary or secondary teachers of mathematics. The group portfolio pieces were posted into an assignment drop box in the DSO site for this subject by the due date, and these were released (without students' names attached) during the following week. The second assignment involved pairs of students creating a multimedia resource (with exegesis) on one of the six components, using the students' contributions as well as a general commentary by the lecturer on the students' group work in each of the six areas. They were also expected to seek and use research reports about their own area of focus, using electronic databases and online journals.

The first group postings were of extremely high quality and were very extensive. The lecturer was also surprised at how well pairs of students drew on points made by the groups, and particularly at the way that classroom experiences and resources that had been openly shared in the portfolio pieces were used.

A further positive outcome was that the group work and pairing of students led to some close friendships, as evidenced by the frequency of online discussion, arrangements made online to travel to visit each other, informal chatter (including synchronous chats), and honest critique of each others' work. It was noted that very few students chose to move outside their group of four when choosing partners, even though this was a free choice, and the lecturer felt that this was indicative of the quality of friendship and trust that had been established. In fact, in one case two pairs of students swapped their assignments with each other to seek peer feedback before they were submitted.

Student evaluations showed that they appreciated the quality feedback received from people in their group as well as opportunities to share readings and classroom experiences, and that they enjoyed and learnt a great deal from their conversations about a variety of aspects of teaching mathematics. Several claimed that the range of interpretations evident in the portfolios made them

think more deeply about issues raised and possible ways of responding to the series of prompts, and that this variety resulted in numerous resources for planning their multimedia work.

Issues that were reported by the lecturer who taught this subject again included some loss of members of groups and late enrolments disturbing established groups. Some groups included members who relied on the hard work of others, and the lecturer said that next time she would ask groups to issue a joint, signed report on each person's contribution and associated suggestions about sharing the marks. This problem seemed to have been overcome in the second assignments by having students work as pairs, as there was only positive feedback in the student evaluation regarding peer participation.

A further issue was the time-limited portfolio drops. When students could get online it proved a very efficient system. However, the windows of opportunity were interrupted by software maintenance periods twice, as well as individual students having technical problems. Next time, the lecturer says, she will set it up more flexibly, with longer submission periods.

5.3 Case 3 - Project-based assessment

This case is a good example of the way assessment can be used both for formative learning purposes and to inform teaching throughout the semester. The case is based on a politics unit offered at 2nd and 3rd year levels by the Faculty of Arts for undergraduate students studying on or off-campus. In 2004, 67 students were enrolled in the unit. The first unit assignment was a minor essay presented in the traditional way. The major assignment required students to undertake a case study project in the area of global risk. They had considerable choice in regard to the focus of their case, so there was scope for them to research something of real interest.

The lecturer responsible for this unit was concerned that, in previous semesters, too many students submitted work that was hastily put together and reflected superficial learning. Even though they had had to submit a proposal half way through semester, he found that many lacked the skills to manage the work required for the project throughout the semester and

tended to leave too much until the last minute. This had a detrimental effect on the quality of their learning as well as their grades. To overcome this problem and to encourage deeper learning, he adopted a formative approach by breaking the work up into manageable tasks, requiring students to complete them online and undertaking to provide immediate feedback. Each task was designed to build the case and be incorporated into the final submission that was submitted in paper-based form in the traditional way.

In 2004, the formative components of the assignment delivered online were as follows:

1. Post project proposal in the DSO assignment submission box.
2. Post an outline of the elements of the project in a format similar to a table of contents.
3. Post analysis, as an 'interim executive summary'.

To help students develop their case study and to avoid information overload, resources associated with the tasks were selectively released online throughout semester. Broader use was made of videos, because in the lecturer's experience, they enhanced students' recall and understanding of the content.

Following the submission of each of the three online tasks, the lecturer worked intensively to provide constructive feedback within a week of the due date. Collaborative group work and group submission was strongly encouraged but not mandated for a number of reasons. The lecturer did not want to force students to work this way if they felt uncomfortable about it. His previous experience and the experience of colleagues indicated that students tended to underestimate the workload and commitment that was involved. He was also mindful of the fact that students were often working quite long hours in paid employment and hence found it difficult to sustain group work over a number of weeks in the semester. His approach was to point out that in previous years, students who had opted to do group work had consistently outperformed those who chose to submit individual projects.

This formative approach to assessment worked well on a number of levels. The break down of the tasks and provision of formative feedback enabled students to

better manage their projects and relieved some of the usual last minute stress. The lecturer believed this had a noticeable effect on students' learning as reflected in the quality of much of the project work and subsequent grades. He believed some were the best he had seen. Off-campus students in particular appreciated feedback on their 'work in progress' because this was something they had not experienced before. The lecturer noted they were better able to extend the analysis of their case study after early feedback. He also noted that students who chose group work generally produced superior projects compared with those who worked individually. For example, those who achieved a 'Credit' on their individual essay often achieved a 'Distinction' when they undertook collaborative group work. This is consistent with research findings on the benefits of collaboration (See for example, Collis, 1998; Harasim, 1993b; Hiltz et al., 1990).

The commitment to provide formative feedback online brought into sharper focus the students who were really engaged with the unit and those who were not, so the lecturer had a better sense of the diversity of his cohort, 'where students were at', and what further encouragement and assistance they might require. Student feedback indicated that they appreciated the commitment of the lecturer and the time he took to provide useful individual feedback throughout this initial period. Positive comments were also made about the timely release of resources and the integration between video and online discussions.

The main issue in this case was that the provision of formative feedback was demanding for the unit chair, and while most students responded well, or at least adequately to their feedback, a few did not. This, of course, occurs with any assessment, but in this case, there were a variety of projects. The lecturer found that the process of reading the various proposals and thinking about the 'best advice' to give to individual students about the projects they had chosen was very time-consuming. A further issue was that it was difficult to implement change in assessment more broadly because some colleagues preferred to focus more strongly on other academic priorities such as research. The use of sessional staff who had limited if any background in teaching and assessing online, was a problem at times, as was the timing of available

professional development in the use of Deakin Studies Online. Although this was seen to be critical for the success of the online assessment, it was not always available at the optimum time. These issues were offset to some extent by the fact that the end results were more rewarding than usual. The lecturer was delighted with the quality of the students' work and their relatively high levels of engagement throughout the semester commensurate with prior experiences.

5.4 Case 4 - Peer assessment

A conviction that teachers of the 21st century need to embrace alternative ways of developing the curriculum prompted an Arts Methodology lecturer within the Faculty of Education to devise an assessment task that is essentially peer assessed. Her strong belief in the benefits of the online environment for enhancing learning is an underpinning philosophy for the inclusion of this particular assessment strategy during 2005.

The task has two main aims. The first is for the students to engage at a high level with multimedia technology so that they become versatile, well-equipped teachers themselves, being able to use a range of tools teaching as well as for their own students' learning. The second aim is that through peer assessment in the online environment, students' own artistic appreciation, analysis skills, and higher order thinking be enhanced.

The pre-service teacher education students use the online learning environment to develop a Website Curriculum Package in response to the learning activities in which the students have been involved. These include readings, learning about design elements of website presentations (e.g. using Microsoft PowerPoint) and art techniques using a variety of media, just to mention a few. The package is a totally online web-based compilation of different curriculum tasks suitable for use in schools, and it must include visual images that illustrate and are representative of the course material covered. After development of the Website Curriculum Package, the students upload their websites and the class discusses each package online. In response to peer comments, the students have the opportunity to change aspects of their work or to refine it further. Therefore the students' work is evolving, becoming better, more focused and more responsive to audience needs. In this

case the audience is quite specialized, but this feature in itself is quite unique to the learning generated. The final assessment of the Website Curriculum Package includes both the students' progressive assessments (worth 60%) and lecturer's final assessment (worth 40%). This total score is converted to a total of 60% for the whole unit.

Through the use of the online environment, students are expected to develop a range of generic ICT skills as well as becoming familiar with relevant hardware, and software as well as a range of design, graphics and art principles. As they engage in the task, some need to refine their use of the computer as a tool for study, experimentation and presentation. Using a computer screen limits some flexibility and the assignment task also raises issues of time management. These general issues, however, are relevant to the students' professional development as teachers of the future.

As the Website Curriculum Package is viewed by all the other students and is peer assessed, there is an expectation that students will develop a critical stance in relation to the following aspects of arts literacy:

- Shared knowledge
- Technical knowledge
- Website design
- Visual literacy
- Visual communication

Each website becomes a resource for further learning. The understandings of the students are broadened through critical reflection of their peers' work. In addition to this there is an expectation that collaboration will occur between students with common fields of interest. These include groups of students with a special interest in art and design, information and communication technologies, or online learning opportunities. As students engage with other students' material and websites, the lecturer hopes their thinking will become more reflective, divergent and analytical. Apart from the obvious benefits to students in terms of their enhanced analysis and critical thinking skills, the lecturer also expects that the students will gain an appreciation of the diversity of other students' responses.

An interesting aspect of this assessment task is that it could not be readily undertaken in a normal face-to-face context. It relies on the online context. The online aspect is what facilitates the interaction between students and the Website package. It allows for multiple student entries and comments and allows for digital work to be deconstructed and reconstructed.

The lecturer commented that her previous experience of students working in the online environment indicated that it was often difficult to get students to share their responses. Making the online experience part of the peer assessment encourages them to participate more fully. This relates to the research that indicates: "For most students, assessment requirements literally define the curriculum" (James et al., 2002, p.7).

Since the unit work has only recently commenced, feedback from students has not yet been solicited. However, early anecdotal comments online indicate most believe the assessment will be 'interesting and relevant' to them and will 'provide a set of excellent resources' for use as teachers in the future.

a 'transmission' model from one with expertise to one without it.

All were enthusiastic about teaching well, but expressed some dissatisfaction with two features of their previous assessment practices - mostly based on essays, with some also using exams. First, they felt that assessment tasks required at the end of a section of work, or the end of semester, were not very helpful for either students or staff in terms of learning. Feedback on summative work is usually not immediately useful for students and common misconceptions can usually not be used in the structure of further learning activities.

The lecturers displayed broad understanding about the multiple roles of assessment - for assessing, for example, students' knowledge and skills related to course content; social skills, information exchange abilities and professional capabilities; strengths and levels of understanding of content as well as areas needing further attention; analytical and interpretive abilities; levels of competence and confidence with various kinds of professional tools and resources (including technology use); and the amount of effort and time spent in engaging with the tasks. While marks were not allocated to such aspects of student performance, lecturers could get a good sense of where their assistance, prompts or guidance were needed during the semester.

6. Commonalities across the cases

There were several commonalities across the case studies reported above. The first is that the lecturers demonstrated a deep level of interest and ability in developing their knowledge and skills, both through reflection on what was not working well and their willingness to trial new assessment tasks, or modify existing ones.

The lecturers interviewed were professional and committed. They were articulate when talking about what they do and why, and had a sophisticated understanding of theories relating to knowledge acquisition. Indeed, most of them mentioned their belief in 'constructivist' epistemology, where learners construct and re-construct their own understandings through experience and social interaction. They had critiqued the notion that knowledge is acquired through

It was apparent that lecturers we interviewed were prepared to take risks. This was indicated first by their willingness to work in a relatively high-risk, and sometimes unstable, online environment. Second, they were more concerned about student learning than maintaining the traditional institutional culture, and showed a willingness to move both teaching and assessment practices (and the institution) forward. Such risks, however, were managed proactively. While able to talk about practical difficulties such as organising online group work, and coping with the time-consuming demands of formative online assessment, for example, they had already planned ways around difficulties experienced to date. They believe teaching and assessment approaches need to take account of the realities of students' lives. So, rather than focusing on students as 'the problem', they focused on the way they designed and delivered learning experiences to students.

One common point across every case of innovative assessment practice we studied was that both lecturers and students viewed assessment as a core element of the teaching and learning experience. This was evident in language use when both staff and students frequently referred to the assessment tasks as 'learning activities' and 'teaching tasks', rather than 'assignments'. Many of the lecturers talked about students being 'deeply engaged' or 'immersed' in these learning tasks over a period of time, and others noted that their tasks were used to develop students' 'professional understandings and skills' through professionally 'authentic', 'pedagogical' 'challenging' tasks. Thus, the assessment tasks were clearly experiential in nature in the sense that they were relevant and grounded in the real world of the students' intended professions.

Staff involved in the cases had a further aspect in common. They were all involved personally in developing extensive online components in their units. This involved collaboration with academic colleagues (within and across their faculties), education designers and multimedia and online developers. They did this because they believed the online environment enabled them to integrate assessment tasks more deeply into the learning experience. The process of working with other people sharpened their pedagogical viewpoints and helped them to shape and crystallise ideas about teaching in more focused ways. For them, the pedagogy was paramount, the technology just a tool. They had developed a strong understanding of the nature of the technology and were able to deal sensibly with its propensity to be unstable at times.

7. Conclusions

The cases presented in this paper highlighted a number of factors that can optimise attempts to change assessment practices. When teaching staff are reflective about how they assess, have some dissatisfaction about existing practices, and have a deep commitment to student learning and to improving outcomes for students, they are more likely to change how they assess.

In particular, they are more inclined to implement formative assessment tasks that are authentic in nature and encourage meaningful engagement and learning throughout the semester. The tasks chosen are often continuous in the sense that they build on a previous piece and culminate in a final substantive report or multimedia submission for grading purposes. It follows that institutions that establish formal mechanisms to encourage commitment to improving teaching and assessment, help develop practitioner expertise through professional development, and reward staff who are involved, are more likely to create the conditions that facilitate change.

The cases also indicate that broader, well-considered use of online environments and multimedia does have the potential to enrich assessment and learning. In particular, it enables the efficient delivery of more formative assessment approaches that can lead to more immersive engagement and deeper understandings. To foster the best possible use of such technologies, institutions need to attend to a number of aspects critical to successful use. First, policies that focus on extended use of digital and online technologies need to be developed. Second, technical and administrative systems that reinforce traditional assessment practices and academic culture need to be overhauled. Third, operational plans for enacting policy across the institution need to be drawn up and implemented. Finally, targeted, just-in-time professional development programs and technical support need to be delivered.

A further implication of the cases discussed is that if institutions create a climate where staff feel they can take risks in implementing innovation, changes in teaching practice including assessment are more likely to occur. Related to this is the need for students to be made aware that an innovative approach is being trialled and that, if any difficulties arise, their academic results will not be compromised.

While further research is needed to corroborate the commonalities that arose in the cases reported, the indications are that more could be done at an institutional level to foster the development of reflective practitioners by encouraging emphasis on innovations in assessment practice.

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Conceptualising Assessment for Online Delivery: Educational Developers' Perspectives

Peter Donnan
Centre for Enhancement of Learning, Teaching and Scholarship
University of Canberra, Australia

Christine Brown
Centre for Educational Development and Interactive Resources
University of Wollongong, Australia

Gwyn Brickell
Research Centre for Interactive Learning Environments
Faculty of Education
University of Wollongong, Australia

Within many universities the assessment practices of academics are influenced by Teaching and Learning Higher Education (TLHE) development processes commonly housed within central units and associated with academic staff developers, instructional designers and educational developers. The influence of educational developers is often more pronounced when information technology is being introduced in assessment practices and when online learning is being increasingly adopted to complement, supplement or replace components of traditional on-campus teaching. This paper outlines critical elements in the thinking which underpins the design and delivery of educational development in the area of e-assessment; furthermore, it indicates significant interrelationships between individual perspectives of educational developers and their institutional contexts.

1. Introduction

This paper is part of a larger ongoing doctoral project that is a qualitative study of educational developers in six Australian universities, focussing on their perspectives about assessment when it is conducted partially/ blended or fully online. Each of the roles of the six participants in one way or another is involved with the integration of ICT into learning and teaching in their respective institutions. In Australian higher education institutions educational developers work with a cross-section of teaching staff from a broad range of disciplines and therefore they encapsulate a rich repository of perspectives and experience on teaching, learning and assessment.

Assessment practices involving online delivery are rapidly evolving in universities and catalysts in this growth phase have been the adoption of commercial learning management systems such as WebCT, Blackboard and open source systems such as Moodle. Assessment is a critical point of intersection for learning and teaching but it is unclear however whether educational developers' advice in relation to e-assessment simply replicates established thinking about assessment or whether it incorporates new perspectives closely linked with the nature of the technology and the nature of learning online.

Adoption of educational technology to mediate learning, teaching, and assessment is a complex process. According to Reeves (2003) assessment is a weak component in both traditional and digital education and Mason's (1998, Section 11, C) view is that

Current assessment practices in higher education are long overdue for a rethink....[and] many online courses are leading the way in devising assignments and assessment procedures which reflect the call for higher education to teach IT literacy, team working ability and knowledge management skills.

In the transfer of assessment to online environments Dunn, Morgan, O'Reilly and Parry (2004) pose four questions that confront teachers and are certainly of concern to educational developers:

- What kinds of new learning and assessment opportunities arise in this environment?
- What pedagogies support meaningful online assessment?
- What are the losses and gains of this medium?
- Do old models and forms of assessment translate effectively into this environment? (p. 39)

Although James, McInnes and Devlin (2002, p. 4) note that extensive experimentation is occurring in Australian universities around effective and efficient on-line assessment Mason (2001) detects

...confusion over the term online assessment. At one end of the spectrum, there is web-based assessment, which usually describes various types of multiple choice questions delivered on the Web and marked electronically. These types of questions have become very sophisticated and the presentations can draw on the full graphical and multimedia potential of the Web.....At the other end of the spectrum are individual learning contracts, negotiated online with the tutor. These are generally regarded as hard work by students, but immensely rewarding. They are also very time consuming for tutors to manage and mark. In the middle are various forms of collaborative assignments which build on both the communicative and the resource-based potential of the Web. (p. 30)

Beetham et al. (2001) reported on a Joint Information Systems Committee (JISC) study in UK universities that audited twenty-three institutions and included a role analysis of thirty-five individuals associated with the embedding, development and support of learning technology in higher education. An important implication for educational developers highlighted in the report was that:

Educational developers have a critical role to play in supporting and facilitating the new specialists to acquire the core educational development and "change agent" skills needed to assist in the process. However educational developers must also ensure that they acquire skills in learning technology in order to be effective in supporting these new methods. (Beetham et al., 2001, p.3).

Sorcinelli, Austin, Eddy and Beach (2006) observe that many educational developers are also concerned about what they see as an over-reliance on technology, as the teaching and learning approach that everyone must adopt.

One of the clearest findings to emerge from an Australian study of online education conducted by Postle et al. (2003) was the lack of any pedagogical framework for online education. Given the increasing adoption of online elements in many courses, coupled with the critical role of assessment, this is a significant field of investigation.

While there are certainly studies on the intersection of assessment, online assessment and educational development (Dunn, Morgan, O'Reilly and Parry, 2004; Mason, 2001; McNaught, 2001, 2005; Shephard, 2004) there are few extensive qualitative studies that focus principally on the perspectives of educational developers and in that sense it is an under-researched area.

The general problem which this paper focuses on then is how do educational developers structure their thinking about assessment when online components are introduced? What in fact are the critical elements in the thinking that underpins the design and delivery of educational development in the area of e-assessment?

2. Research methodology

This qualitative study, to be written up as a series of multiple cases, will be based on data collection from three rounds of semi-structured interviews conducted with the participants at six month intervals. Educational developers' perspectives about assessment are best expressed in their individual voices because there are significant differences in the institutional contexts of Australian universities; furthermore, the experience and perceptions of each developer are unique.

The first interview series focused on participants'

backgrounds, approaches and professional orientations towards assessment that was beginning to incorporate online elements; the second interview series targeted responses to a range of e-assessments categories derived from the literature, as well as seeking responses to a framework developed from the first round; the final round of interviews will take up issues explored in this paper as well as returning to ongoing influences and critical events that are impacting on participants' thinking about assessment in online environments.

The broad categories and focus of questions for the series of three interviews are presented in the following table. The questions in rounds 2 and 3 were evolved in response to themes and responses emerging from the previous round so that there is a cyclical pattern to the study.

Interview round	Focus of interview
Round 1	Participants responses to their: Professional background Educational development context Orientation to online learning, teaching and assessment Thinking about assessment for online delivery
Round 2	Conceptions of learning, teaching and assessment Responses to forms of e-assessment (Table 2) Responses to model
Round 3	Perception of characteristics to work effectively in the role of an educational developer. Ongoing influences and events impacting on participant thinking about e-assessment

Table 1. Interview focus

This paper draws only upon the first two rounds of interviews but it explores emerging issues that are pertinent to the final round.

An interpretive analysis of the transcripts using NVivo informs the discussion and findings.

As part of the methodology a spectrum of types of e-assessment, presented in Table 2, was derived from the literature and participants were invited to comment on various issues arising from the table as well as to suggest

refinements. The rationale was to explore participants' thinking about assessment across a spectrum of types of e-assessment. Some reporting and analysis of participant comments on the categories in Table 2 are presented in the following section on Results, analysis and discussions. The fact that Table 2 is entitled Forms of E-assessment is not an assumption that with online delivery a new category of assessment is created. What is being explored is the thinking about assessment when there is an intersection of pedagogy and technology in online environments.

Assessment Type	Examples
Traditional assessment submitted online	Essays Reviews Reports Literature review Case Studies
Automated assessment	Multiple choice Short answer Matching Hot spots Calculation Text input (answer not always on screen)
Automated assessment - advanced options	Multiple choice Short answer Matching/label matching Calculations/randomly generated answers Drag & drop Automated item generation Construct concept maps
Invigilated online exams - (mid/final semester)	Range of formats Multiple choice/ short answer, automated Longer essay type etc
Group projects	PowerPoint presentations CD-ROMs Group online projects Laboratory reports Networked collaborative learning Role play/online debate Use of group pages

Online interaction	Forum/bulletin board discussion Email, chat, Blogs, wikis Networked learning
Authentic assessment	Simulations Critical incident analysis Case studies; Story narrative Access to external databases Oral assessment; semi structured interview Develop a database
Critical reflection and meta-cognition	Electronic portfolios Online journals, logs, diaries, Fieldwork, practicum reports Embedded reflective activities
Advanced problem-solving	Problem-based learning scenarios Learning contracts Database spreadsheets Graphic organisers Semantic analysis

Table 2. Forms of e-assessment: Stimulus material for interview round 2

As one explores the categories in this table it becomes obvious that there are relativities with some of the options in terms of the sophistication levels of technology skills and support that one has available to implement various forms of e-assessment. An individual academic would find it difficult for example to construct complex problem-based learning scenarios using a range of multi-media to enrich the presentation problem etc. It would be different of course if that academic was supported by a teaching grant or had ready access to technology support.

Table 2 relates broad categories of assessment to examples of assessment that may be conducted online. The advantages of web-based assessment have been widely recognized. Zhang, Khan, Gibbons and Ni (2002) typically highlight the fact that it can reach a large

population; it is time, place and platform independent, with simple update procedures; and it offers enhanced opportunities to collect and analyse feedback. They also add that web-based assessment tools support different media such as plain text, rich text format, still image, video and audio in representing assessment items. O'Reilly (2001) also notes the easy links to real data, the availability of expert help, possibility of rapid feedback, archival options of all interactions, more time for preparation of assignments with online submissions and the human-human interaction, as well as human-computer interaction in relation to online assessment. What is being recognised by these authors are the learning affordances that the technology offers.

The term affordances, originally used in environmental psychology, is now being adopted to extend the potential of the technology in e-learning, to pursue the educational uses it invites and facilitates (Conole & Dyke, 2004) or simply to use the potential of the design elements. Dabbagh and Bannan-Ritland (2005) recognise the undoubted potential of online learning for socially mediated and more globally focused learning and in these senses the concept of 'affordances' could constitute an important dimension in the thinking about e-assessment.

3. Results, analysis and discussions

The major theme emerging in this study was that elements of educational developers' thinking about assessment when it is conducted online can be identified but these need to be understood within the institutional contexts in which they are embedded.

3.1 Educational developers' thinking about assessment

Concepts such as *affordances*, *interactivity* and *asynchronous learning*, more associated with evolving discourse in technology-mediated teaching, are not commonly associated with established thinking about assessment. Of interest then, was the issue of whether

these concepts were able to qualitatively enrich existing assessment approaches and inform online assessment practice.

The following comment indicates a way of thinking about educational technology:

"the framework that I personally use is focused on how you get the best use out of educational technology and is based very much on constructivism".

(Respondent 3)

Dickey (2003, p. 107) in fact argued that within a constructivist paradigm, the central focus has shifted from an epistemology of transmission to one of construction and that the affordances of the technology highlight opportunities for construction.

While the phrase 'how you get the best use out of educational technology' in the comment above indicates an approach which clearly takes advantage of the learning affordances that the technology offers, it is however more complex than that because the same respondent adds:

"I don't ever start with the technology, or its tools, or any of its characteristics or any of those things.....putting together an interesting, stimulating, challenging learning experience for the student and the assessment drives that to some degree....if you are looking at a learning activity as a mode of teaching then assessing that learning activity is what in a sense defines what the students should do. So I don't really have a concept of online assessment as such, because online materials are simply the support for a learning activity rather than defining the learning activity in my view....I want students to actually create something...I advocate things like problem-based learning, interesting learning activities".

(Respondent 3)

What emerges in this respondent's comments, in addition to an obvious awareness of the capabilities of the technology, is the primacy of the learning activity and a clear emphasis on what the student does. The concept of affordances is significant but it is embedded

in a broader constructivist framework orientated to the creation of engaging learning activities.

3.2 Developers' thinking about assessment as it incorporates online elements

As assessment moves online, educational developers' fundamental understandings of assessment are either confirmed and the principles are recognised as applicable in any learning context; or alternatively, there is an awareness that some reconceptualisation may be necessary. The following series of short statements about assessment, from the six participants in the study, illustrate some core understandings:

"I am looking for a balance between formative and summative assessment"
(Respondent 1)

"My core answer here is: it's not about the technology"
(Respondent 2)

"Online materials are always simply the support for a learning activity rather than defining the activity"
(Respondent 3)

"I don't think effective assessment is any different in an online environment than in any other environment"
(Respondent 4)

"Assessment in a face-to-face course is not going to be as successful in an online [off-shore] environment and you have to talk about the reasons why"
(Respondent 5)

"The temptation with online is to automate the assessment process...because that's what the computer does well...I think formative assessment is critical, I've come around to that as being a really important tool to build into the online environment because it's so easily done in the online world"
(Respondent 6)

In these comments one can recognise important beliefs

about assessment: opportunities for formative assessment exist online; if it is not about the technology, then by implication the design of the learning activity is a priority; the principles of effective assessment may be applicable in any learning context but in off-campus and off-shore settings some translation of the assessment experience may be required.

A selection of participants' responses to five of the headings in Table 2 is reproduced in Table 3 below as a basis for extending the discussion.

Different institutional cultures and practices in e-assessment emerge in the extracts as the respondents comment on the categories in Table 3. If an institution is primarily a traditional university, with established lectures, tutorials and laboratory sessions, then the online environment will be conceptualised in a very different way than it would be for a specialist distance education provider as suggested in the comments of respondent 3. If the learning management system is not completely tested under robust quiz conditions, as indicated by respondent 2, then the advice to academics to prepare well beforehand, is designed to ensure that student assessment occurs in a secure online environment. In this sense educational developers become an advocate for learners and for the quality of the student experience.

Where there is a specialist support team of programmers, graphic designers and multi-media specialists evident in respondent 4's comments, then enhanced technology options can be implemented when the assessment activities are being designed or an invigilated online exam is being conducted.

The respondents' comments about online interaction indicate concerns in this area and perhaps a need for further research. The suggestion that this also impacts on the training of tutors illustrates that a broader systemic approach to assessment, guided by leadership, policy and support, is once again part of the solution. At a certain point the individual developers' perspectives need to be understood against the backdrop of their institutional environment to illuminate what is occurring in terms of assessment in online environments. Finally the external higher education environment in Australia, particularly government agendas implemented through

Assessment Type	Examples
Traditional assessment submitted online	<p><i>"It's really a non-issue whether it's submitted online or not because the students are on-campus.....it's like the whole business of assessment, if you're doing the assessment by essay, whether it's submitted online or whether it's not, is totally peripheral in the scheme of things. Unless you're a distance education student..."</i></p> <p style="text-align: right;"><i>(Respondent 3)</i></p>
Automated assessment	<p><i>"We spend a lot of time trying to dissuade people from it. Not because we are against the multiple choice; it's because the tool that we have got, the environment, is perhaps as not as robust as people might expect and they can get into trouble with all sorts of tricks to running a quiz unless they have done a lot of preparation."</i></p> <p style="text-align: right;"><i>(Respondent 2)</i></p>
Automated assessment - advanced options	<p><i>"We develop that all the time. Especially things like match the graphic with this or do a little flash movie for drag-and-drop or something or a bit of Java script coding.....We have specialised graphic designers and specialised coders and people who can create Flash and Java script...how much time do academics have and is it really fair to expect them to be able to design?"</i></p> <p style="text-align: right;"><i>(Respondent 4)</i></p>
Invigilated online exams - (mid/final semester)	<p><i>"There were big numbers of students...it was a face-to-face course so we booked three computer labs and the students all came in, sat down, did the exam and went home again...some of it was automatically assessed immediately and others were short answers that did have to be assessed"</i></p> <p style="text-align: right;"><i>(Respondent 4)</i></p>
Online interaction	<p><i>"The assessment of online discussions is currently an issue...., this vague category called online discussion....there is no clear criteria around participation for online discussion..."</i></p> <p><i>"If you're doing group discussions online, you could have the group allocations of marks: you've got twenty marks to allocate, there are four of you per group, you can allocate five marks each if you want, or you can allocate differently, that's pure assessment"</i></p> <p style="text-align: right;"><i>(Respondent 1)</i></p> <p><i>"If you are getting into online assessment like assessment of participation in online discussion, then you don't do that with 700 students by yourself; you do it with a team of tutors and therefore you bring in a whole dimension of what is assessment, what it is you're looking for, how do you actually train a group of people, and of course how do you manage the student expectations..."</i></p> <p style="text-align: right;"><i>(Respondent 3)</i></p>

Table 3. Respondents' comments to some forms of assessment in an e-learning environment

the Department of Education, Science and Training (DEST), needs to be considered.

The focus on online assessment invites detailed findings about the roles and practices of educational developers in learning and teaching units. This is also closely related to how new academics are supported in their teaching role and particularly their online teaching and assessment practices. Institutions can advance upon practices in these areas as they seek to align the ways they support academic staff with institutional expectations of their teaching roles.

4. Conclusions

Critical elements which underpin educational development in the area of e-assessment include individual components such as the developers' conception of learning, teaching and assessment, their professional background and disciplinary orientation, their awareness of the range of e-assessment options that can address diverse learning outcomes and the ways in which they identify and respond to critical assessment issues. In a sense though this is only half of the picture because institutional policy and leadership, how the developers' organisational context is conceptualised and the institutional quality/evaluation processes have significant impacts upon the thinking of developers.

In a broad sense the literature on assessment is imbued with such terms as *deep* and *surface learning*, *aligned assessment* and *formative* and *summative* assessment but there is some emerging educational development thinking, associated with constructivism, the design of active learning and educational technology, which suggests that new terminology such as *affordances*, *interactivity* and *asynchronous synchronous* is particularly relevant to the design of assessment in e-learning environments.

In practice though, respondents did not endorse the usefulness of such concepts. The following observations by respondent 4 illustrated the issues involved:

"I certainly talk about the capabilities of the technology. I would not use the term 'affordances'. It's to do with leading people into it without them necessarily being conscious of it. I might talk with them about where they locate quizzes online and things like that which have to do with them developing those affordances appropriately, but not necessarily the concept. I think the concept itself is confusing to lecturers rather than helpful".

These comments suggest that even if the educational concepts were valuable they needed to be translated into an applied context that made sense to the individual academic. Respondent 6 noted that "What I'm finding is that certain terminology has almost become mainstream; a couple of things have, like formative and summative assessment".

Educational developers work as change agents, often introducing research findings into teaching and learning environments in their work with academic staff, but in this study there was no explicit endorsement of the specific usefulness of such terms as 'affordances' and 'synchronicity'. There was a clear acceptance of terminology such as 'constructive alignment' and 'formative and summative assessment', especially in terms of educational developers' own concepts of assessment. There was also a strong awareness of the capabilities of the technology that could support assessment in online settings.

With the growth of e-learning, the possibilities for assessment are most obvious in terms of automated marking but it can be argued that automation has only introduced elements of efficiency in marking and administration rather than any change in the fundamentals. After all, multiple choice marking has long been conducted using pencils and paper.

It is also significant that institutional policy and leadership, the developers' organisational context and quality issues and concerns at higher levels within the institution are just as likely to influence developers' thinking about e-assessment. Figure 1 encapsulates the beginnings of a framework for exploring critical elements in the thinking of educational developers.

An important theme emerging in the study is that how

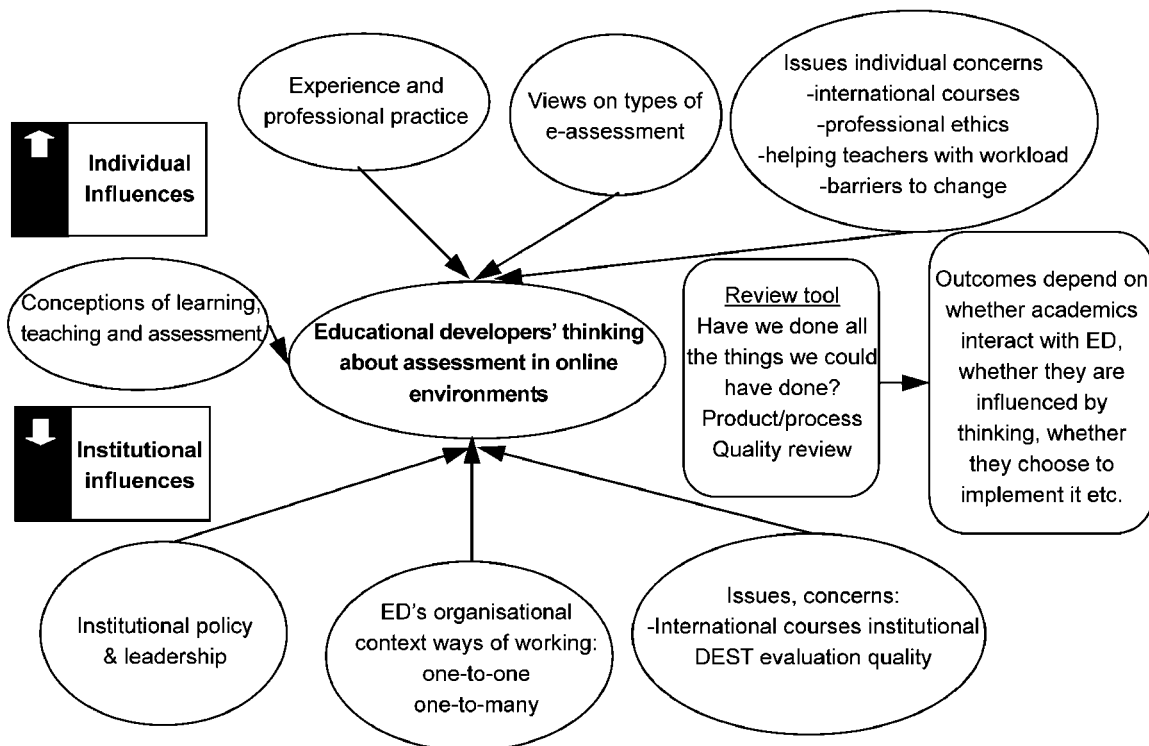


Figure 1. A framework to explore developers' thinking about assessment as it incorporates online elements

the roles of educational developers are conceptualised within their organisational contexts influences the advice about assessment they provide to academics. The ways in which developers liaise with academics - whether they work with individuals or course teams; the level of technology support they or their unit can introduce; whether they are project-focused or relationship oriented - are of particular significance. The dynamics of relationships between individual and institutional influences are complex however and require an appreciation of the context of each educational developer, as well as the traditions of educational development that underpin their practice.

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Exploring Implementation Issues and their Implications

Assessing the Assessors: Authentic Online Assessment of Students of School Counselling

Marilyn A Campbell
Denise Frost
Joanna Logan
Faculty of Education and Library
Queensland University of Technology, Australia

In a core unit in the Queensland University of Technology's Education Masters degree, teachers training to become school counsellors are required to learn to assess children with learning and/or behavioural problems. Students enrol in the semester-long unit in "block" mode, whereby face to face contact in the unit is limited to one block session of 5 days. After this period, they become distance learners, assessed by assignments due later in the semester. This format poses pedagogical challenges. To overcome these challenges it was necessary to design an authentic assessment task that would enhance the students' learning as well as provide opportunities for collaboration. This paper reports on the design of the action learning project which addressed these challenges. The results support the research that assessment is a powerful influence on student learning. The project also demonstrated that in order to be authentic, assessment need not mimic workplace tasks exactly.

1. Introduction

The principles of assessment in higher education mirror those in all levels of education in that assessment is informed by learning and teaching theories or paradigms. However, in higher education, assessment affects how learners learn even more than in other levels of education (Atkins et al., 1993; McMahon, 1999). Assessment paradigms are often discussed in terms of traditional assessment versus alternative assessment (Anderson, 1998). Traditional assessment views the purpose of evaluation as documenting student learning. This in turn is based on viewing students as passive recipients of knowledge who often adopt a surface approach to learning. The role of teaching is thus to deliver this knowledge (Speck, 2002). On the other hand, alternative assessment views students as inquirers into knowledge, who are active, deep learners, collaborating and using higher level thinking skills (Gulikers et al., 2004).

One of the most important of the assessment principles for enhancing learning is the concept of alignment. That is, the alignment of objectives, teaching practices, learning activities and assessment (Biggs, 2003). Teaching, learning and assessment must be tightly integrated, because as Ramsden (1992) emphasises, "from our students' point of view, the assessment always defines the actual curriculum" (p.187).

Another principle is that assessment needs to be authentic to enhance learning, especially when preparing students for professional roles. The assessment should integrate the learning from various parts of the unit in order that students can demonstrate the interplay of knowledge, process and skills required in their future professional life. There also needs to be a strong integration of formative and summative evaluation.

This paper explores the assessment for school counsellors, based on constructivist theories, which shifts the focus from a 'testing' culture to an 'assessment' culture where there is an integration of assessment, teaching and learning, involving students in authentic tasks.

1.1 Background

The core unit on psycho-educational assessment is part of the Queensland University of Technology's Education Masters degree and is designed to train future school counsellors to assess children with learning and/or behavioural problems. The aim is to teach the use of assessment methods in a structured and logical way, to elicit information which will inform intervention strategies. One of the major objectives is that students learn to form hypotheses about a child's problem and assess to provide evidence to support or reject these hypotheses.

Students enrol in the semester long unit in "block" mode, during which time face-to-face contact in the unit is limited to one block session of five days. After this period, they become distance learners, assessed by assignments, a literature review on any aspect of assessment, and a report on any child with a problem in a school. Both are due later in the semester. Thus, although the unit is considered to be internal, students experience both internal and external ways of learning.

1.2 Pedagogical challenges

The internal and external teaching and learning environment poses pedagogical challenges. In previous years, deep learning did not seem to be occurring - as evidenced by the poor quality of the assignments. The results of assignments and student feedback had indicated that although students were completing the required tasks, many of them had not constructed their own mental models of the counsellor's assessment process nor engaged with the professional literature. A contributing factor was the information overload that students experience when a semester's learning is delivered in five days. Furthermore, students reported feeling isolated while completing their assignments, having lost the collegiality of the community of learners which had formed during the intensive block period. In addition, there was no specific support provided as the students became distance learners.

It is interesting to note that one of the assignments set in the previous years was actually extremely authentic. Students were required to select a child in a school with a learning or behavioural problem, carry out

assessments and submit a detailed report of the assessments and intervention required based on their findings. Gulikers, et al. (2004) propose that authenticity in assessment operates on a continuum, with at one end, for example, multiple choice questions, with performance of an actual complex professional task in the work force at the other. If this proposition is accepted, then this previous assignment was extremely authentic. However, one of the aims of the course was to teach students to form hypotheses and assess, rather than use a 'test' battery approach to all problems which is the cultural norm in the workplace. In fact, this was the very practice the course was trying to counteract. Thus, as these students had no contact with the university during their assignment writing, many reverted to known, culturally embedded ways of assessing. Deep learning, a desired student learning outcome, did not appear to be occurring.

1.3 Assessment solutions

To extend the learning through assessment, two assignments were set. The first assignment retained the traditional literature review, requiring students to research the literature on a problematic topic in the assessment of children. The second assignment was based on a face-to-face case study in the intensive mode period. After an introduction to the main methods of assessment of interviews, observations and psychometric measures, students were involved in an all day case study designed to enable them to use these data gathering methods in a hypothesis-driven assessment. The students role-played the parts of a Year 7 student, his mother, his father and his teacher as well as staff of four different schools. The referral problem was that "Tom" had too many absences from school and the counsellor was asked to find out why this was so. Tom was the only one who knew that the real cause of his absences was separation anxiety disorder. The 'school teams' could use any of the assessment techniques to 'solve' the problem.

The basis of the second assignment was therefore changed from the student's choice of a child in a 'real life' case study in the school to a shared problem-based assignment with six scenarios involving a counsellor and a troubled child, "Emma", plus her teachers, parents and friends. The scenarios, filmed using amateur actors,

were revealed on a weekly basis online and were made available for a period of one week only. It was intended that the activity extend over a period of time and require a significant investment of student effort (Herrington et al., 2003). The weekly discussion forums were intended to provide opportunities for students to research, reflect and collaborate online, thus modelling their future professional roles. A single chat room session was provided at the end of the six weekly scenarios, in which the unit coordinator played the roles of Emma's friends, parents and teacher. Students were invited to ask questions as an information gathering exercise.

The second assignment was changed to a 'process' report consisting of a personal reflection journal or diary which could be a compilation of the weekly discussion point from the discussion list, in addition to a final report to the teacher. Each of the two major assignments was worth 50% of the overall grade and each had its own criteria sheet which was provided to the students with the outline of the assignments.

The logistical problem of the geographical dispersion of the students was addressed through the provision of the case study online. The online learning environment was delivered via the Online Learning and Teaching (OLT) site at QUT. Similar in function to Blackboard and WebCT, the OLT site was developed in-house by the University as a means of sustaining the flexible delivery of learning. The OLT site for each unit is able to be customized using a range of online technologies, including asynchronous and synchronous communication tools. These technologies provided opportunities to design online learning environments which could engage and facilitate communication between students and students and the lecturer and students, which were similar to the face-to-face environment. The ideal mechanism to deliver the content and to encourage students to engage in the process was an Integrated Media Enriched Teaching (IMET) page on OLT. Videoed scenarios were accompanied by a written transcript and a discussion facility. This meant that all of the components students needed to access the learning activities were made accessible from the same OLT page. Students were therefore not required to download or install software or plug-ins.

1.4 Alignment

To promote student learning the assessment was designed to be aligned, authentic and engaging. In addition, formative and summative assessments were used in ways which were intended to promote collaboration. In this unit, Biggs' (1996) "performances of understanding" were used to systematically align the teaching methods and the assessment. Given that the overall aim of the unit was for students to have a broad understanding of the various types of assessment techniques and strategies used in the educational context, Biggs' (1996) basic question about the performative notion of understanding was taken into account. He asked "What do students need to do in order to demonstrate particular levels of understanding?" (p. 353). As the major learning outcome was a desired paradigm shift from the view that assessing children was a test battery exercise to a hypotheses-driven process, the new assessment was designed to elicit evidence of the ability to generate and support hypotheses. The end product, the report, in turn, required students to provide evidence that their learning aligned with the objectives of the unit.

1.5 Authentic

Authentic assessment is now recognised as a method of assessment that assists in learning, promotes thinking and enhances student confidence (Falchikov, 1995, Falchikov, 2001). The online case study mirrors the complexity of authentic assessment of a child in a school setting. Unlike the case study in the intensive mode, where there was an 'explanation' of separation anxiety, there was no one 'correct' answer or reason for Emma's problem.

The design of the assessment and learning environment for this project attempted to address all ten of the characteristics described by Herrington et al. (2003, pp. 2-3) as essential for authentic learning activities. These are outlined in Table 1.

Herrington et al.'s condition	Unit example
1. Have real world relevance	Case study of a school child
2. Ill-defined, requiring students to define the tasks and subtasks needed to complete the activity	Students had to generate hypotheses about Emma's problems and work out ways of gathering evidence to test their validity
3. Complex tasks to be investigated by students over a sustained period of time	Case study scenario revealed across several weeks
4. Opportunity for students to examine the task from different perspectives, using a variety of resources	Case study scenario revealed across several weeks and students are able to post questions and responses to the discussion forum and initiate queries in the chat room
5. Opportunity to collaborate	Discussion forums and chat room
6. Opportunity to reflect	Student reflective journal and discussion forum postings
7. Can be integrated and applied across different subject areas and lead beyond specific domain outcomes	Applicable to other educational counselling units
8. Seamlessly integrated with assessment	Bonus marks allocated to discussion forum postings, and the assessment of a final report
9. Create polished products valuable in their own right	Final assessment item is a professional report for Emma's teacher
10. Allow for competing solutions and diversity of outcome	Unit coordinator continually reinforced the fact that there was no one "correct" answer to Emma's problem. False leads were included so that students would realise the complexity of assessing real life cases and gradually build their own construct of the assessment process

Table 1. Ten conditions for authentic assessment

1.6 Engaging

Regardless of the effort made to simulate an authentic experience, the fact remains that students are obviously participating in a simulation. Therefore, they must agree, even if tacitly, to suspend their disbelief so that they can be immersed in the scenario, in a similar way to movie audiences.

Herrington et al. (2003) note two typical patterns of engagement. The first is a willing acceptance of the learning situation, its characters and context. Students immerse themselves in the authentic activity to such a degree that they treat it as "real". This was the case with the "Emma" case study from the very beginning. In response to the first scenario, a student observed in the online discussion forum:

My initial impression of Sarah was that she was a loyal friend, at the meeting because of her friendship with Emma. The second time I viewed the scene I felt that Sarah was snivelling and whining! The conversation between the two girls seemed to be spiralling into a hissyfit.

This student had immediately engaged with the characters of the two girls on an intuitive, emotional basis. She, and many other students, went on to use similar observational methods to develop hypotheses about Emma's problems.

By Scenario 5, while still remaining aware of the constructed nature of the activity, students had sustained the engagement and were placing themselves in the position of a real school counsellor:

If I was the counsellor I might have started by talking to Mrs Jones about Emma's school work and grades before discussing about Emma wanting to leave school as soon as possible and get a job... I would also ask if Emma has a situation where she can study and do her school work under favourable learning conditions. Then move onto the discussion about leaving school... It would be interesting to set up a meeting with the father and hear his ideas about school.

The second pattern of engagement is a negative one

(Herrington et al., 2003), in that students resist authentic approaches. Some find that student-centred learning confers a degree of freedom which they find uncomfortable, although even reluctant students usually engage within a few weeks. This did not appear to be the case in this unit.

1.7 Formative and summative

The formative aspects of the assessment were the weekly discussion forums, scaffolded and put together for the reflective journal or process report. The summative aspect was the final report for the teacher. Thus there was an interplay between the process (the investigation of evidence for self-generated, multiple hypotheses) and the product (report to the teacher). The criteria for success in completing both tasks were made explicit in the criteria sheet provided to the students at the beginning of semester. Scaffolding was used to motivate and engage the learners, provide structure, and reduce task complexity and learner frustration. This was achieved by providing feedback, answering questions, and giving hints on the discussion list. Both the lecturer and the librarians provided this scaffolding by email and in the chat room (McLoughlin & Luca, 2002). Bonus marks, as well as assessment requirements, were used to encourage students to learn online and to collaborate. Both from experience and research it has been found that students tend not to put effort into work that is not assessable (Boes & Wante, 2001).

1.8 Collaboration

During the shared experience of the five day block period, students developed a strong sense of camaraderie. One of the questions for this pedagogical intervention was how could the online environment be used to encourage students to build on this sense of community and collaborate. Palloff and Pratt (Palloff & Pratt, 1999) discuss the basic steps in the development of an online community, pointing out that the group must have a clearly defined purpose. During the five day intensive block mode, the student group developed an identity and a purpose. They were taught about the different methods of collecting data - interviews, observation, records and psychometric assessment. The case study they undertook, by an all day role-play, could only be completed if they worked together, gathered

data about a school refusing child, contributed to a hypothesis-driven assessment and designed an intervention for the problem. This collaboration created a community of learners which is based on Kearsley and Schneiderman's (1998) engagement theory.

The authentic and collaborative nature of the learning environment had been modelled during the block period. Thus, it was decided that a second case study, delivered in online mode over a period of six weeks, would allow students to build on this foundation, not only reinforcing the learning, but extending it over a longer period.

Given that the online site for the unit would be the "distinctive gathering place" required by Palloff and Pratt (1999), a weekly discussion forum and a chat room were incorporated into the design of the online learning environment. A clear code of conduct was provided via messages from the unit coordinator and through the Unit Outline.

1.9 Evaluation

A 'pre-survey' was used in order to gauge students' information technology competencies and ability to engage with the professional literature. This was completed by semi-structured interviews which were conducted by the students in pairs during the intensive week of study at the beginning of the semester. There were nineteen interview questions grouped under the headings of Initial Inquiry, Searching Skills, Computer Skills, Referencing and Finding Help. The questions were both closed and open-ended, and were designed to elicit student perceptions and knowledge of undertaking research, the degree of confidence with using technology for research and education purposes and their initial perceptions of their individual technical and research readiness.

A post-survey was emailed to students towards the end of semester before they participated in the chat session. Students were asked to complete the form and submit it with their final assignment. This survey was designed to gauge students' perceptions in similar areas to the pre-survey. The themes covered in the results section, were a comparison of the two assessment items in terms of learning, of enjoyment, how much work it took and

their perceptions of the collaboration and the technology.

2. Results

To ascertain that the assessment contributed to the students' learning, results were collected from the following sources: pre-survey, post-survey, analysis of discussion forum threads and chat room transcript, and staff feedback. Thirty-one students began the intensive block; however four students subsequently withdrew from the unit. Twenty-four students completed the pre-survey and twenty-two students completed the post-survey.

2.1 The benefits

2.1.1 Learning

The majority of students reported that they learnt a lot from the online case study and that it prepared them well for assessing children in a professional capacity. A common theme that emerged in the students' free text was that the case study was a real life application of assessment of children. A typical comment was that the case study was "far more practical, gave ideas of what to expect in the real world of education" by modelling real life situations, providing hands-on practice, relevance, and providing a practical focus.

In comparing the literature review and the online case study assessments, the majority of students indicated that they learnt more from the online case study and again reported that they felt that the online case study prepared them better for assessing children in a professional capacity. The students who felt that they learnt more from the literature review cited reasons such as being able to choose their own topic, as well as gaining more in-depth knowledge about their topic. The students who stated that they learnt more from both assignments cited reasons such as the practicality of the case study and the in-depth focus of the literature review. Most students thought the online assessment

was easier as they felt that they worked harder for the literature review assignment.

In response to the question asking which assignment students felt they had enjoyed more, 10 reported the online case study, seven the literature review and five both. For those who chose the case study, it was for reasons such as "more applied, more reality like." Those who chose the literature review felt that it allowed them to expand and increase their understanding on their topic. Those students who cited both assignments said they enjoyed both the theoretical basis of the literature review as well as the practical experience provided through completing the online assessment.

The students' learning, as evidenced by the quality of the assignments, was pleasing from the lecturer's point of view. The paradigm shift from seeing assessment of children as performing a battery of tests was definitely replaced by a hypotheses-driven model, although with varying degrees of success for individual students. The previous year the lecturer had written in her general comments that students were still collating all the reports on a referred child from various specialists, such as learning support teachers and speech language pathologists, and then always assessing intelligence (no matter what the problem or indications there was not a cognitive problem) and any other test the school possessed. This year, the students were actually a little reluctant to use any psychometric tests, (probably the pendulum swinging too far) although at least were now suggesting appropriate tests for the hypothesis.

2.1.2 Learning through technology

Passmore (2000) has discussed some of the impediments faced by university faculty members in implementing web-based teaching delivery, finding that the computer skills and attitudes of the learner are also crucial to success of any online education. In the pre-survey conducted in the intensive block, students were asked how confident they felt about their computer skills in relation to searching for information for their assignments. Only three students indicated that they did not feel confident. In the post-survey, those three students stated that they now felt very confident or that they felt "more adept than when I started". In the pre-survey in the intensive block, students were asked

whether they had ever participated in an online discussion forum or chat. Fifteen of the students had never participated, nine had participated, although for two of these the experience had been some time ago.

In the post-survey, students were asked how confident they now felt about using the online discussion forum and chat room. Five students reported that they were now very confident using these types of technology, and yet four of these students had never participated in this type of technology before. One of these students commented that "although it was daunting at first, after a couple of goes my confidence increased greatly". Thirteen students reported that they now feel confident, although seven of these students had never used the technology before. Students' comments included "Being forced to use it, I have gotten over the fear of the unknown". Three students felt that they were still unsure about using the technology however, two of these students did not participate in the online discussion forum and all three students reported that they had been unable to participate in the chat room. One student did not complete this question.

2.1.3 Collaboration

Most students reported that the online learning experience promoted collaboration between students as they were able to see what the other students were thinking, which helped them to clarify their own thoughts. In addition, the majority of students thought that participating in the chat room for the case study was a useful learning experience, citing reasons such as "the opportunities to exchange ideas - others bring new insights/ideas/questions that hadn't been thought of".

Most of the students contributed to the discussion forum on at least four of the scenes, with the highest number of students (9) contributing for every scene. Two students did not participate in any of the discussion forums at all, despite the fact that weekly bonus marks were awarded for participation in the discussion forum. In fact, there was a high correlation of bonus marks (for participation) and the actual mark received for the assignment.

2.2 Difficulties

Some students reported that the first assignment, the literature review, provided them with more in depth learning than the online case study. Additionally, eight students did not feel that the discussion list promoted collaboration on the online case, due to competition between students for marks and therefore there was a subsequent unwillingness to share ideas. In using the technology, five students did not feel that it was a useful learning experience, as they found the chat room very busy and confusing. Eight students were unable to take part in the chat room, three due to technological difficulties at home, with the others citing commitments which precluded their participation.

From the lecturer's point of view, some students did not engage with the professional literature and research each week but waited to be spoon-fed, thinking that the 'answer' would be revealed to them in the next scenario. These few students then only described each scenario instead of applying their own hypotheses and suggesting ways of gathering evidence. These students thought that there was one correct answer and conceived the assignment as detective work and not demonstrating the process even though the process was scaffolded. In the discussion list although there seemed to be many postings, there was a lack of in depth discussion.

3. Discussion

The project was successful in facilitating deep learning and promoting collaboration among the students taking the unit. Student evaluations and the coordinator's personal reflections have contributed to the evaluation of the project and will inform the redesign process for the next iteration.

Part of the successful facilitation of deep learning and collaboration can be attributed to the removal of the "authentic task" out of the context of the "real life" of the school. This meant that students were encouraged to develop different hypotheses to account for Emma's

situation in the case study rather than the prevailing practice of using a battery of tests. If the assessment item had remained the same, asking students to undertake an actual case study, situated in a real school, the range of hypotheses and understandings would have been limited by the practices and environment of the school, as in previous years. The hypothetical case study therefore allowed students to think more creatively and critically, as well as providing all students with a common scenario. The use of a hypothetical case study, in a controlled environment, also provided students with further opportunities to consider diverse hypotheses and solutions to Emma's problems.

However, the poor quality of some of the final reports and an analysis of the discussion forum postings indicated that many students did not engage sufficiently with the professional or scholarly literature to support and inform their hypotheses. In spite of completing a literature review earlier in the semester the students seemed to disregard the literature for the second case study. Greater scaffolding for students will therefore need to be provided in order to encourage them to more deeply engage with the literature informing their practice as well as their academic work.

In the next iteration of the action research cycle of this project the unit's objectives will be rewritten and the literature review will be replaced by another assessment item which more closely aligns with the objectives of this unit. Instead of one process report or diary, due at the end of the semester, students will be required to submit their reflections weekly. This is aimed at motivating all students to engage with the online weekly case study and receive feedback on their progress from the lecturer. The marking criteria will also need to be altered to reflect the changes in the assessment.

An additional recommendation for change is the introduction of the chat room earlier in the semester to facilitate better communication between students and the generation of more hypotheses, which students can then develop throughout the semester. The use of the chat room earlier in the semester also provides increased scaffolding for student learning. Additional resources to provide further scaffolding include the introduction of documents such as teacher reports and school records regarding Emma.

Student confidence in their actual or future computer skills and experience, as gauged from the pre and post student surveys, indicates that these were not barriers to their engagement with the online learning environment. The importance of this level of confidence and experience is supported by Lee, Hong and Ling (2002), who found that positive attitudes to using a virtual learning environment were more important than student's computer skill levels. Furthermore, Venkatesh and Morris (2000) propose that user acceptance of technology is determined by the perceived usefulness and ease of use of the technology. The use of the IMET screen meant that students only had to use one online page for each of the six weekly scenarios and they indicated that they found the technology easy to use. The results of the post survey indicated that the majority of students enjoyed and learnt more from the second assessment item, the online case study. The assignment of bonus marks for student interaction in the discussion forum acted as a student motivator for the majority in using the technology.

Although the technology did not appear to be a barrier to engagement in the discussion forums, and the assignment of bonus marks was provided as an incentive, some students chose not to post to the forums and instead appeared to wait for others to post their hypotheses. This is probably due to the element of competition, which acted as a negative factor against the development of student collaboration. Those students who did not engage in the discussion forums on a regular basis did poorly on the second assessment item. However, this could be because of poor motivation as well as non-participation. In the next iteration, the students will practice the online collaboration during the intensive block and receive feedback. In addition, the measurement instrument, the pre and post student surveys, will need to be modified for next year, to ensure that the questions are grouped under the same themes and use the same rating scale.

4. Conclusions

The results of this project have demonstrated the power of assessment to influence students' learning, supporting many other researchers who view assessment as a way to learn, rather than just as a measure of obtaining a grade (Ramsden, 1992; Biggs, 1996; Dochy & McDowell, 1997).

An interesting point in this project was to consider that if university teaching is to be leading edge and constructively critical of the workplace culture, then it will not always be possible to use assessment tasks which exactly mimic workplace practice, since this will work against any change in professional practice. Therefore assessment by exact duplication of tasks in the actual workplace may not always be the most appropriate option. This is true even in areas of professional practice, where generally best practices are agreed upon and indicators of success are shared both by academics and practising counsellors. In the case of this project, the notion of "authentic" assessment was therefore simulated through the development of a hypothetical case study, and not through situating the assessment in an actual school environment.

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Assessing Creativity through Common Consensus

Gipsy Chang

School of Film and Television

The Hong Kong Academy for Performing Arts, Hong Kong SAR, China

Josephine Csete

Educational Development Centre

The Hong Kong Polytechnic University, Hong Kong SAR, China

One of the goals of higher education is to nurture students' creativity. It is a quality not only important for arts related subjects but for subjects across the board. However, even though "creativity" is widely viewed as an important and desirable skill, it is often vaguely defined and even more elusive to document or assess. There seems to be no single, universally accepted definition. Evaluating creativity is often seen as a subjective judgment. This paper describes a study that attempted to: 1) identify the appropriate criteria for assessing creativity in filmmaking, 2) develop an assessment rubric incorporating the criteria, and 3) apply the rubric to assess the creativity in 23 students' film projects.

1. Introduction

"This is a good exhibition, very creative work, isn't it?" I remark when attending an exhibition with a friend. "I think it's lousy and unimaginative," my friend comments.

Sounds familiar, doesn't it? Many people have similar experiences when discussing a piece of creative art work with others - people hold different views on creativity. For example, some regard Picasso as a very creative artist while others may have a completely different idea about him and his works. Different viewers will interpret a given work of art from various perspectives. Such interpretations will likely differ from each other (Efland 2002). As pointed out by Treffinger, "creativity has always been an elusive concept for which there is no single, universally accepted definition" (1999, p.35). It is so esoteric that some even argue this phenomenon cannot be studied and measured scientifically. Thus what will happen when it comes to assessing a student's creative outcomes? What exactly do teachers assess and how do they measure creativity?

Creative outcomes can take many forms including: a painting, a book, a piece of music, a solution to a hypothetical problem. Another possible creative outcome can be film. Film as one of the art forms, is a complexly structured domain. Learning filmmaking often draws upon knowledge from different domains of art such as visual arts, language arts, dramaturgy as well as other fields of knowledge, such as cultural issues and social issues.

Filmmaking is a complicated process, too. First a script has to be written. Then the director has to interpret and transform the script into segments of images and sounds (preproduction phase). The interpretation then needs to be realized and shot on film or video (production phase). Afterwards, the shots have to be structured in a particular way to deliver the idea and the emotion, and music and sound effects have to be added to enhance the emotion and define the tone (post-production phase). Only when a film has been edited in the post-production phase can this creative work appear in a truly coherent form.

In filmmaking, one's creativity is reflected through the

completed film or video work. In the college where I am teaching, film or video work is assessed mainly from three aspects: creativity, technical fluency and professional attitude. While the latter two aspects seem more obvious and objective, creativity is always vague and subjective. There are clearly identified criteria under the categories of technical fluency (such as use of camera, editing skill, etc.) and professional attitude (e.g. problem solving ability, meeting set deadlines, cooperation with team members, etc.). However, there are no specific criteria listed under creativity. The judgements for creativity are, at best, implicit. Often the assessment for creativity relies on the expertise as well as the personal taste of an individual assessor. No objective criteria are stated. For example, in assessing the creativity of a short film, one lecturer may focus on the content while another may place emphasis on the visual expression. Hence, there may be a big difference in the grades two different assessors may give for creativity in the same film project.

Students can easily feel confused about what is actually being assessed in a project in terms of creativity. This lack of stated criteria creates two problems. On one hand, the results of the assessment may not be consistent and may not truly reflect a student's creative quality. On the other hand, the results are unlikely to serve the purpose of informing students about how they can improve their creative ability. Is it possible to improve how creativity is assessed?

When studying for my Master's degree, I decided to unveil the seemingly mysterious phenomenon of creativity by paying attention to it and reflecting on it in the daily practice of my teaching in the environment where I was involved. It turned out to be an inspiring and encouraging experience and I would like to share my discoveries, in this paper with those who are also interested in creativity and the approaches to assess it.

The process of the study was divided into 3 stages:

1. To identify the appropriate criteria for assessing creativity in filmmaking.
2. To develop an assessment rubric incorporating the criteria.
3. To apply the rubric to assess the creativity in 23 students' film projects.

1.1 Purpose of study

In the context of the School of Film and Television in The Hong Kong Academy for Performing Arts (HKAPA), the study was intended to:

1. Make the definition of creativity explicit among the teaching faculty.
2. Build consensus among teachers on the criteria for assessing student's creative ability through film/video project work.
3. Develop an assessment rubric based on the agreed criteria and test it through an assessment activity.

1.2 Significance of study

Within my teaching context, the study provides a platform for experts concerned about expressing, interacting, evaluating and re-evaluating one's own as well as others' insights on creativity. The study method should also be applicable to other context.

With the consensus criteria laid out as a performance grid, the assessment instrument provides clear information to students regarding their targets and ultimate creative achievement on the outcome product. It is also useful for teaching faculty as it can help them to evaluate the alignment of the assessment and the curriculum. This assessment instrument can also be of assistance to them in their teaching of creativity.

Over the course of the study, I found that the research process, particularly the use of the Delphi method in developing assessment criteria, is worth further study. Delphi provides a useful way to tackle complicated and multi-facet subjects (such as filmmaking), and/or activities that involve multiple participants (in this case assessors).

As Treffinger and Puccio (1995) state, more than 100 different definitions of creativity or creative thinking have been documented. In fact, creativity is multifaceted and many elements interact to manifest this phenomenon. In order to understand the creativity better, many researchers have identified four basic facets of creativity: the qualities of the *person*, aspects of the *process*, characteristics of *products* and the nature of the *environment* (Isaksen, 1987; MacKinnon, 1978). Many researchers have focused on a single aspect of creativity. To name a few, Guilford (1986), Torrance (1974), focused on *personality* characteristics and developed different creative test instruments trying to measure the individuals' creativity. Relating to the creative *process* aspects, a lot of research efforts have focused on how creative thinking proceeds and how creative ideas emerge over time (Firestien & McCowan, 1988). Much attention has been given to the characteristics of *products* because it is believed that the creative qualities of a product are indicators of the maker's creative abilities, for example, Amabile, 1987; and MacKinnon, 1978. As for the facet of *environment* in relation to creativity, researchers like Rhodes (1961), Isaksen & Kaufmann, (1990) have developed different models.

2.2 Assessing creativity

Given the diverse nature of creativity, there is no single measure that can fully capture its essence. As commented by Puccio and Murdock (1999), "it is a non-productive way to approach creative assessment to assume that all-purpose creativity measures exist" (Puccio & Murdock 1999, p.10).

The assessment criteria can also be vague. As stated by Sefton-Green and others, "Inevitably, published criteria for assessment are largely comparative, although precisely what is being compared often remains unclear" (Buckingham, Fraser & Sefton-Green 2000). McGowan also discovered problems in assessment. She found disparity in the attempt to acquire consistency when dance teachers assessed the same solo dance pieces using common criteria. Common criteria for creative assessment that is not designed for the particular context can be vague. Wording such as "creative", "imaginative", or "novelty", with no particular reference and explanation, can be interpreted differently from

2. Literature review

2.1 Definition of creativity

person to person and even from time to time by the same person (McGowan 1982). One way to approach the assessment of this multi-dimensional attribute is to take a more ecological or interactionist approach (Amabile 1982). This means to employ multiple measurement methods to create a profile of information. Similar approaches have also been used by Guilford (1986), MacKinnon (1978) and many others in their studies.

Among the different measurements of the creativity of a *person*, the *process*, the *product* and the *environment*, MacKinnon (1978) referred to the creative product as the "bedrock" of creativity research. MacKinnon argued that the product was the one area through which researchers could discover much about the other facets of creativity. Examination of the product reflects qualities of the person who created the product, the process used to form the product, and aspects of the environment in which the product was developed. As Amabile (1982) stated, "a product-centered operational definition is clearly most useful for empirical research in creativity" (p.1001). The relationship between the four components is shown clearly in Treffinger's COCO Model (Figure 1). Many other researchers have also conducted research focused on the creative product. Besemer & Treffinger (1981) focused on the qualities that distinguish creative products from those that are less creative while Rogers (1983) was interested in the adoption of new ideas, practices, or objects by society.

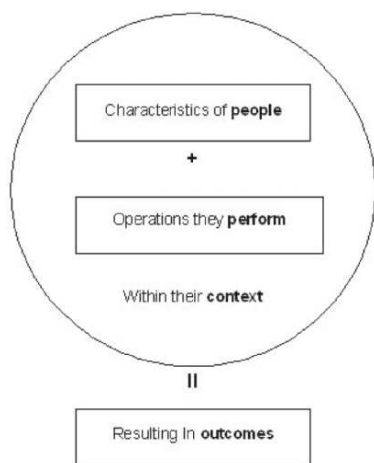


Figure 1. The COCO Model (Treffinger 1988)

Among the 4 essential components of creativity in the filmmaking context, approaching from the product aspect is considered most appropriate because the ultimate goal of making a film is for it to be projected in front of an audience. The final film (product) can reveal the ideology as well as the creative ability of the filmmaker (person). As Rhodes (1961) stated, "Products are the artefacts of thoughts." It is also the accumulation of the work process, from script to screen (process). Often, the finished film reflects its cultural and social context. For example, many Hollywood musicals were made during the Great Depression to cheer up the audience.

Analyzing creative products has long played an important role in the study of creativity and continues to be a significant concern of those involved in its assessment. Research studies on the level of creativeness of a product have been conducted by Treffinger and Poggio (1972), Skager, Schultz and Klein (1966), Besemer & Treffinger (1981) and many others. However, there are recurring problems such as definitions, aspects of originality, perceptions of those other than the creator and the practical administration of an assessing instrument. Besemer & Treffinger stated, "There is yet no conclusive 'set of criteria' for evaluating creative products." They suggested that "stating definitions and gaining consensus" can be helpful in achieving a set of criteria that is suitable for assessing creative products in a defined context (1981). Their statement sets the conceptual framework of my study.

2.3 Consensus on assessing creativity

In 1974, Ward & Cox tried an experimental study to implement pre-defined and previously agreed-upon criteria by a group of experts who later used the set criteria to judge the subjects' creative products. Amabile (1987) also used a consensual assessment approach to evaluate the creativeness of products produced by individuals involved in her studies of intrinsic motivation. This inter-judge method requires experts in a particular domain to use their implicit criteria to evaluate products related to that domain (for example, art and writing). As Amabile indicated, "A product or response is considered creative to the extent that appropriate observers independently agree it is creative" (1987, pp.230-231).

The above literature review on creativity suggests that for the present study the first priority would be to try to state definitions and gain consensus on creativity in the context of filmmaking.

2.4 Delphi method

One way of building a consensus of experts from a particular domain in a given context is by using the Delphi method.

The Delphi method is a survey technique originally developed in the early 1950's by Olaf Helmer and Norman Dalkey at Rand Corporation in connection with national defence research sponsored by the United States Air Force (1962). The objective of "Project Delphi" was to obtain consensus from a group of experts with different backgrounds on forecasting issues associated with the use of the atomic bomb. The strength of using this method to build consensus on complex issues among a group of experts was recognized widely, and gradually the method has also come to be used for planning, decision-making, structured conferences, and technology assessment in numerous academic disciplines and different fields of interest in the private and public sectors (Tafoya 1986).

The classical Delphi survey is a structured group process. It has been defined by Helmer (1983), one of its creators, as:

A method of communication among experts, aimed at obtaining a consensus of opinion on some particular subject of inquiry. The method employs a series of intensive questionnaires interspersed with summarized information and opinion feedback derived from the responses to the preceding questionnaire (p.76).

2.4.1 Application and consensus building

There are three major characteristics that separate Delphi from other survey methods. First, the panellists involved in the survey are experts in the issue concerned. Second, the responses of the panellists are treated anonymously. In studies of sensitive issues, even the identities of the panellists are kept anonymous from each other. Third, the study is conducted in repeated

survey rounds interspersed with controlled opinion feedback (Weaver, 1971; Dalkey & Helmer, 1962).

A panel of experts is selected as the respondent group, based on the areas of expertise required. They are then provided with a questionnaire on a certain subject and are required to give their opinion. Their responses are anonymous except to the moderator. The moderator collects the questionnaires, summarizes the results and then develops a new questionnaire for the respondent group. Before answering the second round of questionnaire, the panellists usually receive a summary of opinions, which they can use to re-evaluate their original answers based upon examination of the group responses. In each succeeding round of questionnaires, the range of responses by the panellists gets smaller and converges toward the "best" response through this consensus process (Taylor & Judd, 1994; Linstone & Turoff, 2002).

It is important to note that consensus, in and of itself, is not the ultimate goal of the Delphi technique. The value of the method is not merely its ability to induce consensus, but also its ability to highlight a diversity of underlying assumptions (Nolan, 1994). This would suggest that in the case of identifying criteria to assess creativity, a Delphi should not only result in an agreed upon set of criteria - but on a set that no single expert would have been able to arrive at individually.

3. The three stage process

The process of the study was divided into 3 stages:

1. To identify the appropriate criteria for assessing creativity in filmmaking.
2. To develop an assessment rubric incorporating the criteria.
3. To apply the rubric to assess the creativity in 23 students' film projects.

3.1 Stage 1 - Delphi method

A two-round Delphi plus a preliminary round was used

in this study. It was intended that if no consensus could be reached after the second round, then further surveys would be conducted.

3.1.1 Sample selection

The research study was conducted within the context of the School of Film and Television in the HKAPA. It looked at the assessment of creative work generated within the institution. As mentioned in the literature, panellists of a Delphi process have to be experts and should share interests and concerns related to the issue under investigation. The teaching staff, whether they are teaching full-time or part-time, are all expert in aspects of filmmaking, and as teachers of this subject, they should be interested in the assessment issue. All eight full-time and two regular part-time teachers were invited to join the panel. One full-time teacher declined to participate because of the workload involved. Hence, a panel consisting of nine experts was formed.

3.1.2 Preliminary round

Designing the survey

The use of a preliminary round survey was intended to elicit as many opinions as possible from the panellists on assessing creativity in order to develop the questionnaire for the primary Delphi rounds.

A sample video was sent to each participant together with an open-ended question, "What are your suggested criteria for assessing student's creative ability in their films?" The sample video was a piece of work from a previous Diploma student, so the quality of work should be similar to those produced for this study. The video was chosen because it contained all common elements used to create a short film, such as story idea, actors, visuals of life action, dialogue, music and sound effects. Although the panellists were familiar with assessing students' films, it was still considered useful to have the same reference for consideration. They were encouraged to list as many suitable criteria they could think of.

Analyzing data

Analysis of the preliminary round data was qualitative. Responses were aggregated and synthesized. The main focus was on what words the panellists used to describe

the criteria. According to the use of words, similar ideas were combined. Items discussing similar areas were grouped into categories. This analysis resulted in the establishment of baseline data for the subsequent Delphi process.

3.1.3 Primary round one

Designing the instrument

A total of 26 assessment items were proposed in the questionnaire of the first survey. These items were derived from two sources. One source was the aggregated and synthesized responses of the 9 panellists in the preliminary round. The other source was an established set of criteria, Creative Product Analysis Matrix (CPAM) (Besemer & Treffinger 1981). The CPAM comprises of 14 items divided into 3 sections: novelty, resolution, elaboration and synthesis. It is used frequently in assessing design and visual art products. The criteria of CPAM were adapted for the context of filmmaking and formed part of the assessment items in the questionnaire.

Table 1 summarizes the 26 criteria in 4 groups for assessing the creative outcomes of students' films. These criteria were used to develop the instrument for the subsequent rounds of the Delphi survey.

Content	Form	Expression & Style	Craftsmanship
Innovative Idea, theme	Unusual	Personal style	Effective
Innovative story dev.	Creative style	Moves audience	Efficient
Character & situation	Novelty in visual, sound	Draws viewers' attention	Bal. b/w Competence & original
Bal. b/w original & reality	Innovative in narration	Communicative	Sense of beauty
Multi-level Meanings	Creative film language	Refined and understated	Sense of interest
Fulfills needs	Provides new Perception		Highest crafted skills at times
Follows reasoning	Sense of wholeness		Acting

Table 1. Criteria of assessing creative outcomes

The design of the Delphi questionnaire for round one followed that of other Delphi surveys reported in the literature. It was designed as a closed questionnaire. A 5-point Likert rating scale was used to indicate the importance of each assessment item. Panellists were required to respond to all items by circling the corresponding score. A rating of 4 or 5 was considered to be important, 3 was seen as a 50/50 choice, and 2 or 1 indicated the item was considered unimportant in assessing the creativity of a student's film. Panellists were also asked to make comments at the end of the questionnaire on either the items or the instrument. These comments allowed them to show to what degree they understood the thoughts of others. They also served the purpose of modifying the questionnaire as necessary.

Analyzing data

Data collected from the first round were analyzed both qualitatively and quantitatively. The importance of each assessment item was looked at. The responses were divided into three categories, items receiving scores of '4 - 5' were considered important, items scoring 3 were seen as representing no opinion from the panellists, and items scoring '2 - 1' were considered unimportant. The percentage of panellists' responses on each item was determined. The result was reported back to the panel together with the second round questionnaire. Any item receiving 100% consensus from the panel did not need to be considered again in the second survey. Written comments were also compiled and delivered in the subsequent round.

3.1.4 Primary round two

Modifying instrument

The second questionnaire was modified based on consensus or recommendations from the panel on the items in round one. For example, most panellists commented that one particular item was very similar to another in the list. Hence, the 2 items were combined. In the first round, one item was considered to have already reached consensus as it has been rated 'important' by all 9 panellists. Therefore in the second questionnaire, it was highlighted to remind the panel that they did not need to consider this item again.

Analyzing and interpreting data

The data were interpreted after the second round of the survey. Any item scoring a response rate of 75% or more in the '4-5' category on the Likert scale was considered to have reached consensus by the panel. According to the literature on Delphi, 75% is an acceptable cut-off point (Jacob 1996). There were 11 items that reached consensus by this method. These items were then included when developing the assessment rubric in the following phase. The items which received a response rate of 75% or more in the '1 - 2' category indicating unimportance were discarded. Table 2 shows the survey results of rounds 1 and 2.

1st Round				2nd Round			
Item	Responses			Item	Responses		
	5-4	3	2-1		5-4	3	2-1
1	87.5	12.5	0	1	100	0	0
2	87.5	0	12.5	2	100	0	0
3	50	25	25	3	75	12.5	12.5
4	37.5	12.5	50	4	37.5	0	62.5
5	37.5	12.5	50	5	37.5	12.5	50
6	12.5	12.5	75	6	12.5	12.5	75
7	12.5	0	87.5	7	12.5	0	87.5
8	62.5	12.5	25	8	62.5	12.5	0
9	62.5	25	12.5	9	87.5	0	12.5
10	75	25	0	10	<i>combined into #12</i>		
11	75	25	0	11	75	25	0
12	87.5	12.5	0	12	100	0	0
13	25	12.5	62.5	13	25	12.5	62.5
14	12.5	37.5	50	14	12.5	12.5	75
15	87.5	0	12.5	15	87.5	0	12.5
16	37.5	37.5	25	16	37.5	37.5	25
17	62.5	25	12.5	17	87.5	0	12.5
18	12.5	25	62.5	18	37.5	0	62.5
19	0	0	100	19	0	0	100
20	62.5	25	12.5	20	100	0	0
21	25	25	50	21	12.5	0	87.5
22	25	25	50	22	25	0	75
23	37.5	50	12.5	23	37.5	50	12.5
24	50	50	0	24	50	50	0
25	100	0	0	25	100	0	0
26	62.5	37.5	0	26	75	0	25

Table 2. Responses of the Delphi surveys

As seen from the above table, after two rounds of survey, 11 items out of 25 reached consensus as important

criteria. A further 6 items were dropped because they were rated unimportant by a majority of the panellists.

3.2 Stage 2 - Assessment rubric

3.2.1 Development of the rubric

Educational research using Delphi as the research method usually stops at the point of reaching the consensus. Two examples are Nolan's 'A Delphi study of the future of education' (1994) and Jacobs' 'Essential assessment criteria for physical education teacher education programs: A Delphi study' (1996). Yet, some may argue that consensus arrived through Delphi may sustain only on paper but not necessary work when put into practice. To investigate if the consensus can be put into practice, stage 2 and 3 of this study went further and actually applied the results in practice. The 11 assessment criteria agreed upon in the Delphi were used to develop a rubric which was then used to grade 23 students' film projects for creativity.

A usual grading scale from "A" to "F" was adopted when designing the performance grid, in which the level "A" indicates the best result and the level "F" indicates failure in performance. To simplify the process, only levels "A", "C" and "F" were described in detail. Levels "B" and "D" were left blank. However, the Delphi expert agreed that assessors should be able to determine the different quality of each level from the adjacent descriptions.

Film work is an art form that combines many different elements. It can be a work using only visuals to tell a story, such as in the silent cinema of the past, or it can be a composite of sound, music, visuals, drama, animation, etc., such as the recent Hollywood blockbuster "Lord of the Rings". Each individual work can be a combination of different elements. Therefore, a separate column "Not significant to the project" was included in the performance grid in case any stated criterion was not applicable in assessing a particular piece of work. For a similar purpose, space for further comment was also included in the rubric.

The descriptions of different performance levels were selected from responses and phases used by panellists when they discussed criteria assessing creativity as well as terms commonly used within the context of the Film/

TV School.

The assessment grid together with the statistical results from the Delphi survey, were sent to all panellists for comments and recommendations.

The final version of the rubric contains 3 categories: innovation of content, innovation of form and craftsmanship. Each category has 4 to 5 items which adds up to 13 items. Space is left for additional comments under each category. Please contact the first author for the full version of the assessment rubric if interested.

3.2.2 Piloting the rubric

Modifications were made to the rubric according to comments from the Delphi panel. Then the grid was given to the assessors for a pilot test. Two previous students' short videos of about 3 to 5 minutes were selected randomly. The assessors viewed and graded the videos using the grid. Discussion was conducted after the test to collect comments to refine the grid for the actual assessment activity. For example, it was advised that the category of "Form" and "Expression & Style" can be combined to simplify the grid.

3.3 Stage 3 - Assessment activity

3.3.1 Selecting sample

Selecting assessing panel

Since assessing students' creativity from their films requires expert judgment, the invited assessors were also from the teaching faculty of the Film/TV School of HKAPA, who had served on the Delphi panel. Two teachers were invited. One was teaching in the Diploma program at the time of the study and the other was not. Together with the author of this study, the assessment panel consisted of three teachers. The intention behind the decision to have three assessors was to control bias and at the same time to keep the study within a manageable scale.

Selecting samples

The students undertaking the Film/TV Diploma in the 2004 - 2005 school year in the HKAPA were invited to participate in the study. The Film/TV Diploma program

is a foundation year in which students are required to learn every aspect of filmmaking and produce several short video projects. This is in contrast to the three-year Bachelor of Fine Arts Degree where students focus on their majors in the projects, such as camera students working as cinematographers while directing students act as directors of the projects. Film/TV Diploma students generate their own ideas and execute the process mainly by themselves, with help on minor roles from classmates. Hence, the product is more likely to accurately reflect the creative ability of the individual student. Therefore the Diploma year students were selected as the subjects of this study. All of the 23 Film/TV Diploma students participated in this study.

3.3.2 Creative video projects

A short story was selected for the participating students. This written text was loose in structure with plenty of room for imaginative interpretation. The reason for providing all students with the same script was to set a common starting point for everyone, with the hope of making it easier to compare the finished works and identify if one was more creative than another. The students were required to interpret and transform the given text in their own way and each produce a short video of 3 to 5 minutes' length.

There was no restriction in the form or genre of the video. However, certain production criteria were set due to limited resources. Each of the students could only be assigned one to two shooting days and approximately one week for post-production including editing and effect/music mixing. Shooting locations were restricted to within and around the HKAPA premises. All projects had to be finished before the date they were due for assessment.

3.3.3 Conducting assessment

The assessment activity was conducted in a single session. The three assessors were invited to sit together in a proper screening venue. They were given a pile of assessment grids. A technical assistant projected the videos. For ease of operation, all videos were recorded onto a DVD randomly and a number was assigned to each video for later communication and discussion. Students' names were kept anonymous to avoid bias.

Each assessor assessed the video projects against the performance grid individually. No discussion was allowed during the process.

The purpose of these arrangements was to provide assessors with a common environment in order to minimize the influence of external factors on the assessment, such as the time spent on the assessment and the viewing environment.

3.3.4 The assessment results

In total 23 videos were assessed by 3 assessors. After watching each video, the assessors evaluated and graded the performance of each item. After the assessment, the data was analysed through statistical tests to find out the reliability coefficient and inter reliability among assessors, students, and the assessment items.

Firstly, the reliability coefficient of all samples and items was calculated. The result is:

$$\text{Alpha} = .9864$$

This implies that the tendency of scores of each video project is similar, indicating videos receiving high scores in one item were also likely to receive high scores in other items. If a student video project is seen as creative, it is creative in most aspects, rather than good at one single area and poor in the others.

Secondly, the inter reliability of the 3 assessors was tested. The result is:

$$\text{Alpha} = .9261$$

This means video scoring high marks from one assessor usually also scored high marks from the other two assessors.

The third test was the inter reliability of different categories by individual assessor:

$$\text{Assessor 1: Alpha} = .9751$$

$$\text{Assessor 2: Alpha} = .9691$$

$$\text{Assessor 3: Alpha} = .9748$$

This implies scores given by each assessor in different

categories are very close. That is to say, if an assessor grades high on the content items, he/she is also likely to give high marks in other categories.

The implications and conclusions regarding these results are presented later in this paper.

4. Discussion

Each of the three stages of the study will be discussed in turn.

4.1 The Delphi survey

In the stage 1 Delphi survey, participating teaching faculty held different opinions towards the study in the beginning. "This is the first time I look into the creativity of students' films in such a structural way. Interesting!", said one of the teachers who welcomed the idea. However, some were skeptical, "We are professionals. We should be able to tell if a film is creative or not, no need to discuss" commented another colleague.

After the preliminary round, in which panellists were encouraged to spell out their opinions, it was discovered

that there were many differences among them in what to assess in student's work. For example, one teacher thought that one essential assessment criterion is communication,

"Film is a form of communication. Therefore, a film should be judged by how well it communicates its message to the audience. If creativity hampers communication it should be taken out."

He weighted communication over creativity. However, others did not share his opinion and discussion through emails was opened in an anonymous way with me acting as the moderator. The results of the two surveys revealed that some colleagues did change their mind and support this argument later while many of them continued to hold their original opinion (increase from 12.5% in the 1st round to 37.5% in the 2nd round).

As shown from Figure 2, higher levels of consensus were reached in the 2nd round survey. For example, only one item reached 100% consensus in the 1st round while in the 2nd round 5 items did. As for items that reached 75% or more, there were 7 in the 1st round but increased to 11 in the subsequent survey.

One significant difference and interesting change over the two surveys is the decrease in the choice of 'no opinion' for items. In the 1st round 4 items received zero responses of neutral as indicated by a "3". In the

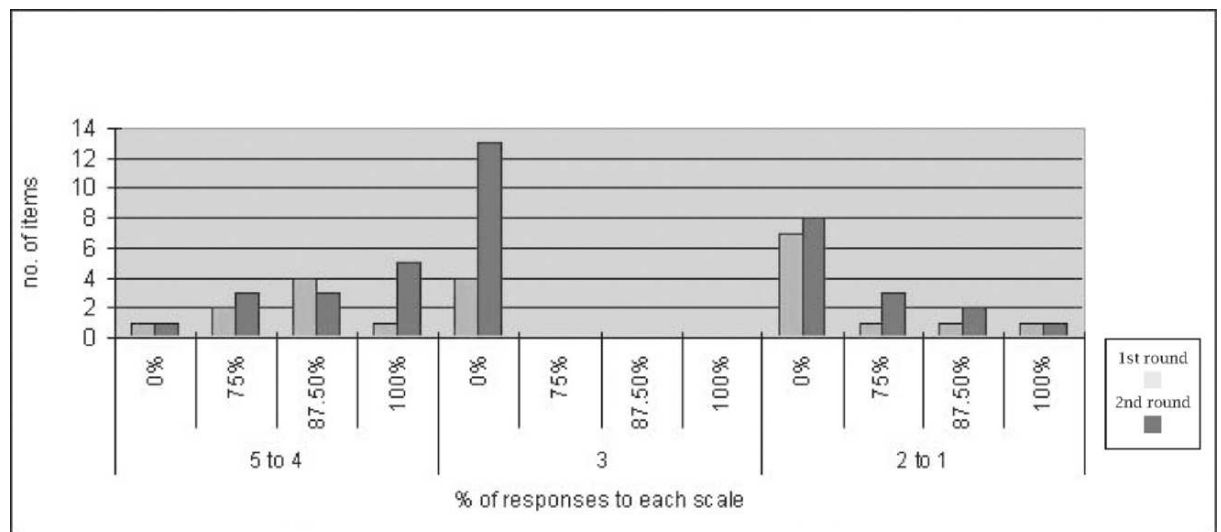


Figure 2. Consensus of Delphi surveys

second round the number of items receiving no neutral responses moved up to 13 of the possible 25. This indicates that after repeated surveys and sharing of others' ideas in discussion, most panellists made up their mind whether or not they considered certain items important in assessing student's creativity. The Delphi method may be considered for other complicated issues, not just to establish consensus but also to provide a mechanism for people concerned to clarify their thoughts.

4.2 The assessment rubric

In stage 2, it took a long while to develop the rubric. One major problem encountered was coming up with appropriate descriptions for different levels of creative performance. For the current rubric, most of the words used were drawn from the responses of the Delphi panel as well as terms usually used in the filmmaking context. However, when put into use, there were still differences in the understanding and interpretation of individual items and descriptions. For example, there were a few videos that students had laid in an existing song as the only sound source. Two assessors accepted it as a sound element while the third one referred it as 'insignificant' for 'innovative use of sound' and did not give any grade.

It looks as if when dealing with creativity, there is still subjective judgment in the process of assessment that cannot be avoided. A thorough and objective discussion with consensual criteria can only make things more explicit and transparent but cannot be expected to ensure absolute objectivity. Compared with a single letter grade on creativity, in the above mentioned case, at least the student concerned would know from the rubric that it is the sound he/ she used that the assessor does not agree with. The student can then decide what to do.

The column of "Not significant to the project" turned out to be an effective heading in this rubric, which dealt with creative products (in this case short video) that are composites of many different elements. Among the 23 video projects, 3 of them did not use any actors, 2 used puppets instead while 1 just used objects such as wine glasses, reflection of water etc. to tell a story. Therefore, the item "Acting" under "Craftsmanship" did not apply to those projects.

4.3 The assessment result

As shown in section 3.3.4, the study obtained high coefficients in the statistical tests for reliability and inter-reliability. One possible reason of course is the success of the research method in generating a rubric that is agreed on by teachers in the context. Instead of adopting a standard instrument, the study applied the Delphi method to generate a set of criteria that was agreed on by the majority of teachers as suitable for assessing students' creativity in filmmaking. Hence, when they applied these criteria in the actual assessment activity, high agreement among them was achieved. As Amabile put it, "...experts in a domain do share creativity criteria to a reasonable degree." (1983, p.38).

However, one has to be aware that even with the rubric created, if assessors assess a creative work with an overall impression instead of examining it item by item, it may also result in high inter-reliability among assessment items. This was actually reflected by one of the assessors in the discussion after the assessment activity. She found the session was too long and felt fatigued by the end and tended to grade students' films according to overall impression. This shows that even with a good assessment tool, if the way of applying it is inappropriate, negative effects may arise.

However, at the minimum, there is no indication that the process or tool has a negative impact on the ability to assess for creativity. It appears that participating in a long discussion process and using a rubric that breaks down creativity into an array of items in several categories does not confuse or prevent teachers from identifying and assessing the creativity of a given work. A further study to support or refute these possibilities is in the planning stage.

5. Conclusions

One colleague wrote,

"The set of criteria for the assessment will be varied

according to the level of students, i.e. criteria to assess Diploma films are different from criteria to assess BFA3 films."

The opinion was supported by many others. However, another colleague held a different view,

"Creativity is creativity no matter what level one is at, so criteria should be the same."

As for my own opinion, it is not the levels but the objectives of the course that generate such projects that are important. If objectives are similar but just levels of creative ability are different, then the criteria, such as 'Innovation of content' or 'Innovation of form' can stay the same. It is the descriptions that state the levels of performance that should be adjusted.

This study was concerned with the assessment of creativity from the student's outcome (here for a short video), but not assessment for a specific course. Therefore, it did not take individual courses into consideration. However, if the rubric is adapted to a certain course, then alignment between the objectives and the criteria should be examined. In fact, a further study is worth undertaking to test the reliability of the rubric on outcomes produced by students of different levels or in different contexts.

I suggest those who are interested in developing a rubric to consider including students' opinions in the process. Will students have very different opinions from the teachers on the degree of creativity shown in their own work? This is another issue worth further study.

Due to the small sample size and a one-off experimental test, the study may not show validity and reliability. However, it certainly has achieved the intended purposes:

1. Making the definition of creativity explicit among teaching faculty.
2. Building consensus among teachers on criteria for assessing student's creative ability through film/video project work.
3. Developing an assessment rubric based on the arrived upon consensus and testing it through an assessment activity.

The results within the set context are consistent and the rubric developed from the Delphi has proved a useable tool for assessing creativity. Definitely, it is encouraging and worthy of further investigation with larger sample sizes, and application in different contexts.

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Can Assessment of Student Attitudes Assist both the Teaching and Learning Process as well as Ultimate Performance in Professional Practice

Gjyn O'Toole
Occupational Therapy School of Health Sciences
Faculty of Health
The University of Newcastle, Australia

Recognition of the affect of negative attitudes on learning appears universal; however investigation of such attitudes and facilitation of the change of attitudes is rarely the focus of exploration. Attitudinal change occurs amongst third year occupational therapy students when studying Mental Health. The focus of this paper is to present the results of an assessment of this attitudinal change. The source of the change was investigated in order to maximise the learning. This paper examines both the initial causes of the negative attitudes and the contributing factors that result in positive attitudes thereby allowing the isolation of those factors that most facilitate the change. This isolation guides the teaching process and thus enhances attitudinal change and hence learning.

1. Introduction

Assessment is traditionally seen as the process of accumulating information and making judgments concerning student achievement in particular content areas (Board of Studies NSW, 1999) - such accumulation may result in a grade; in feedback for students, teachers and families; in reasons for adjusting teaching methodology or in plans for remediation. In most cases, despite the evidence that both negative and positive attitudes affect learning (Van Ameringen et al., 2003), the information usually accumulated through assessment is directly related to acquisition of knowledge or skills, rarely to attitudes.

If this is characteristic practice why even consider attitudes? We certainly do not generally teach attitudes, why assess them? Expert educators around the world do not do it, why should it suddenly be attempted?

The answer is in fact three-fold. Attitudes do affect depth and extent of learning - indeed they can also affect interest in learning, application to the process of learning and performance efficiency (Hadwin et al., 2005). However, more than this, instructors want students to develop and express particular attitudes toward the content being taught - either in the classroom or in their future profession (in this context, Occupational Therapy). Furthermore the students in the third year of the occupational therapy programme at Newcastle University (Australia) were exhibiting particularly negative attitudes that were potentially not conducive to learning. These attitudes seemed to be directly related to the mental health content of the third year of study in the programme.

1.1 Background

Colleagues teaching the programme gave assurances that the students 'would grow out of the negativity' and 'most of them would learn anyway' and 'some of them won't ever work in mental health areas of practice when they graduate anyway' indicating that the status quo was to ignore the negative attitudes and simply teach regardless.

The semester progressed with a reoccurring theme of negativity, however little was done to either examine or

monitor these negative attitudes. However by the end of the semester - (11 weeks of face to face teaching of 13 hours/week) there had been a substantial change in attitude for the majority of the students. Were the majority attitudes of the academics in the programme correct? Had the students simply grown up?

This pilot study was implemented to actually assess the causes of the attitude change. Establishing the contributing factors that brought about this transformation could potentially contribute to the learning and assessment process, as well as ultimately assist in improving the professional performance of the graduates of the programme.

2. Brief overview of third year OT

2.1 Programme at Newcastle University

The third year of the Occupational Therapy programme is devoted to an in-depth study of Mental Health. It consists of 11 intensive weeks of learning about themselves and many related Mental Health issues. There are 3 streams within the semester - most of which are directly related to the concepts, knowledge and skills required to practice as a professional in the mental health arena. The content is delivered in both lectures, experiential 'laboratories' and problem-based learning tutorials. The students experience group process, group membership and group dynamics first-hand through randomly allocated group membership. They are also expected to plan, prepare and facilitate their own group from a self-selected list of group scenarios, employing an Occupational Therapy perspective. They also continue learning through the problem-based learning technique which requires the students to consider case studies focussed on clients with various diagnoses, skills and environments typical of Mental Health settings.

The assessment tasks during the 11 weeks are progressive and ongoing. They require the students:

- to present three case studies in groups of 4-7

- members,
- lead a group in pairs and
- write an individual 3000 word reflection upon the dynamics of their particular 12 -15 person experiential group.

Case presentations and the group leadership (paired) tasks require every student to assess the presentation or leadership of their peers in conjunction with a staff member. In addition each student is expected to assess the contribution of all group members to the group development process and the learning process. The cumulative marks therefore are a combination of marks for both individual tasks (marked by an academic) and group tasks (marked by both fellow students and an academic). Where there are multiple markers the marks are averaged to create the final grade for each task.

The marking process is guided by carefully designed criteria which assess both knowledge and skills in clinical reasoning and the application of the Occupational therapy process within the given mental health related context. Thus marks reflect both levels of learning and acquisition of skills.

2.2 Student attitudes initially negative

This particular cohort of students (as with others before them) began the Mental Health component of their training expressing varying levels of negativity. This negativity was expressed both verbally and non-verbally. The verbal negativity was expressed in comments such as

"This is stupid!"

"This is too contrived to be useful!"

"I don't want to work in Mental Health anyway!"

"Why do we have to do a whole year on Mental Health?"

"What do you think we can achieve by doing this stuff this year?"

The non-verbal negativity was more difficult to relate specifically to a negativity toward Mental Health.

2.3 Possible sources of these attitudes

Research suggests that attitudes develop as a result of

various factors. Certainly the role of personality and other environmental factors in the development of personal attitudes is well established in the literature. (Brill, 1978; Kielhofner, 2002.) Therefore in this situation the nexus between individuals and their environment can be seen as contributing to the development of attitudes toward Mental Health. Specifically the experience of an individual student in combination with the attitudes expressed in their social networks and those expressed in the media contribute to the negativity of their attitudes to Mental Health. If this is the case one wonders whether a short semester of classes focussing on Mental Health can actually achieve any change in the attitudes of any students.

2.4 Managing negative attitudes

Within the context of Occupational Therapy a characteristic of a therapeutic relationship is collaboration (Bruce & Borg, 2002; Yarwood & Johnstone, 2002). Such collaboration may potentially provide experiences that facilitate the development of positive attitudes. Leary (1994) includes in the role of the therapist the concept of both interrupting and changing the cycles of client negativity so often demonstrated as a response to the events that challenge their occupational performance. Such roles are not limited simply to client therapist relationships. In order to create therapists comfortable in this role the ability to interrupt cycles of negativity must be demonstrated within the context of the university classroom. Hence the teacher in combination with the teaching and assessment methods must contribute to the required change in attitude.

Various authors in the field of occupational therapy (Finlay, 1997; Hume & Joice, 2002) outline practical ways Occupational Therapists can facilitate attitudinal transformation. These include: creating a positive environment, promoting emotional safety and encouraging the student to understand their own attitudes and ways of transforming them.

Mosey (1996) suggests that the creation of 'need-satisfying environments' can also contribute to changes in attitudes. However in order to understand how to create such an environment it was important to assess the attitude transformation within the context of the

third year Occupational therapy programme at Newcastle University!

3. Research methodology

A survey is an effective tool to gather a breadth of information (Krueger, 1994), hence a survey with 5 open-ended questions was used to assess both the extent of the negative attitudes across the third year cohort and the transformation of those attitudes. This research device proved a most effective tool in gathering descriptive data about these negative attitudes and the associated transformation.

The survey was presented in the following way

"In an attempt to understand student needs and therefore adjust the Third year Mental Health Program, we would appreciate your considered completion of the following questionnaire. DO NOT feel you have to identify yourself, as we would appreciate your honest responses."

The questionnaire was designed to assess student perceptions of causes of the initial attitudes; highlight any attitudinal changes and isolate reasons for those changes. The survey was administered at the end of the first semester of their mental health year! It was thereby a vehicle for student communication of their reflections upon the experience of the preceding 11 weeks. The students were not given previous knowledge of the survey, nor were there any particular comments made about the negativity of the attitudes at the commencement of the semester.

The five questions included in the survey were as follows.

1. *Attempt to describe your thoughts about Mental Health as you began this semester. Where possible, please outline your concerns and expectations.*
2. *Have your thoughts and feelings about Mental*

Health changed during the semester? Please describe the changes (if any), suggesting any experiences or processes that have contributed to these changes. If there have been no changes, please suggest possible ways that we may improve this course.

3. *Describe your thoughts as you prepare for your fieldwork placements,*
4. *Do these thoughts differ from those thoughts you have experienced before other, physical placements? If yes, explain how and consider whether this difference is appropriate.*
5. *How are your experiences in Mental Health going to assist you with future fieldwork experiences and in developing Occupational Therapy skills in general?*

A sample of 24 students from the entire class of 38 students completed the survey. This response rate approaches two-thirds of the cohort and is sufficiently high to be considered representative.

4. Results, analysis and discussions

Three emotions were reported at the beginning of the semester, with some students naming more than one negative emotion.

· Apprehension	16 students
· Interest	7 students
· Excitement	5 students
· No real concerns or negatives	4 students

4.1 Apprehension

(As the only negative emotion it requires closer examination).

The major cause of apprehension was personal experience (47%), naturally reflecting the importance of personal experience in establishing attitudes. The other emotion causing apprehension was fear (45%). The possible sources of fear will be discussed later.

Although the Occupational Therapy education program has no control over the personal experiences which students bring with them to class, it does seem able to contribute directly to current student experience thereby hopefully contributing to the resolution of any fear.

Hume and Joice (2002) aptly suggest that particular consideration and action for clients and staff (by implication students) in Mental Health should include:

- creating a safe and secure environment (that addresses previous attitude-establishing experiences and present fears, as well as allowing for mistakes and failures).
- encouraging clients (and by inference students) to attempt tasks that may seem difficult.
- knowing and understanding both causes of and actual attitudes.
- knowing feelings and
- knowing and understanding individual and societal expectations.

Perhaps here is another area of convergence between therapy and pedagogy. Whether there is commonality or not, it is reasonable to assume that apprehension, regardless of its cause could potentially impede effectiveness either in learning or in professional behaviour.

4.2 Sources of fear

Most students (80%) nominated the following as causing their fear.

- lack of knowledge as the basis of their apprehension. This lack of knowledge included content knowledge and knowledge of roles within mental health.
- concern for their personal safety,
- doubt of their own coping skills,
- ignorance of the client group.

Some students identified other lesser factors as the source of their fear (in order of magnitude).

- academic workload - considered heavy for third year
- lack of experience
- media misconceptions

Clearly some of the above are directly related to the

primary role of the therapist-educator.

By the end of the semester (11 weeks later) there was a transformation of the negative attitudes into more positive attitudes and expectations. Students indicated excitement about - linking theory to practice during their fieldwork (75%),

- increasing confidence in moving outside their comfort zones - that is in taking risks (71%),
- increasing interest in Mental Health (66%),
- and increasing confidence to meet challenges that the field might pose for them (38%).

However, some of the students were still

- hesitant (42%)
- and small numbers of students (less than 5%) still felt that they did not know enough, were worried about physical violence and did not know what to expect.

The transformation from two thirds of the students being afraid of Mental Health to three quarters of them wanting to experience Mental Health and almost as many feeling confident to move beyond their comfort zones is remarkable.

4.3 Perceived contributions to the transformation

Participants nominated five knowledge-related factors:

- increasing knowledge of the Occupational Therapy role (83%),
- increasing knowledge of client groups (66%),
- increasing knowledge of abnormal psychology (58%) & associated disorders (49%),
- problem based learning tutorials (58%) and
- Occupational Therapy theory and practice (25%).

All of the above can be categorised as foundational knowledge providing empowerment for the students to act and be confident in practical situations. Truly, in this case "Knowledge is Power", as Francis Bacon wrote in 1564.

Many students also drew attention to more 'process-oriented' factors:

- Experiencing group work (66%)
- staff support and attitudes (42%) and
- the experience of leading a group themselves (21%).

The 'process-oriented' factors identified by the students all relate directly to the group work aspects of their 11 week experience. Groups are powerful tools when influencing behaviour and attitudes (Finlay, 1997; Howe & Schwatzberg, 1995; Johnson, D.W. & Johnson, F.P., 2003; Cole, 1998). Cole (1998) indicates that groups can potentially facilitate many achievements for group members. These achievements include self-understanding, evaluation and adjustment of values and attitudes, as well as an examination of obstacles that may prevent individuals from reaching their potential. It is the examination of these obstacles that allows individuals to reach their potential, something central to the practice of both Occupational Therapists and teachers.

One can speculate that the inclusion of the students in the application of marks - the assessment process (grading fellow students) may have also contributed to the perceived transformation and outcomes.

4.4 Perceived outcomes of the transformation

Included:

- increasing knowledge and understanding (83%),
- increasing development of skills (50%),
- awareness of underlying emotional issues and their impact on occupational performance (50%),
- awareness of the whole person (29%),
- open-mindedness (21%),
- personal performance levels (21%) and
- coping strategies (17%).

Students were now heard to say things like:

"I feel more able to identify MH issues in clients in other settings", "I've realised the major needs of the clients remain the same, regardless of the area".

"We learnt skills needed across areas for OT and life: communication, group leadership, counselling, creativity".

5. Conclusions

What then has this assessment of attitudes achieved for the classroom?

It has shown that the academics of the OT programme were in fact in error - it was not that the students would grow up - but rather that they will through particular teaching methodologies be given exposure to particular knowledge and particular experiences key in consolidating that knowledge which leads to development of skills and confidence as well as the reduction of fear. Not the mere passing of time, but rather whether by design or accident the third year OT programme is transforming these attitudes.

In summary the examination of the causes of the transformation in these negative attitudes has indicated that teaching methodology, increased knowledge, development of skills (by experiential learning) and awareness of student attitudes markedly increase the potential for change of attitudes and thus of learning. Specific assessment of attitudes may not be required regularly, but specific awareness of negative attitudes and consideration of how to transform them can greatly enhance learning.

Acknowledgement

The third year Occupational Therapy Students of 2003 must be thanked for their time given to fill in the survey.

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Can Intrinsic Graduate Qualities be Developed Through Assessment? Mapping Assessment Practices in IT Degree Programs

Sue Gelade
Division of Education, Arts and Social Science

Frank Fursenko
Division of Information Technology, Engineering and Environment
University of South Australia, Australia

This paper discusses a recent study from the School of Computer Information Science at the University of South Australia. . The aim of the study was to enable the research team to understand assessment practices within three interrelated IT degree programs offered in Australia, Hong Kong and Malaysia. The objective these programs is to develop appropriate intrinsic graduate qualities and enable those who design future assignments and assessments to engage more effectively with the diverse cultural environments of the students, while enhancing the overall IT knowledge and abilities of the students. As will be discussed in this paper, the project enabled the team to develop a data-based mapping tool that can be usefully adopted in their own, as well as other disciplines. At the same time, the project presented each team member with a valuable learning and development opportunity where they gained a deeper understanding of assessment and the issues around its facilitation.

1. Introduction

Higher education in Australia is operating in a climate of increasing accountability. The building of key discipline skills which help to set a student on a career path along with those interrelated skills, called graduate attributes or qualities, therefore has become crucial to both the students and to their university. In universities, graduate qualities are a useful framework within which discipline knowledge and the more intrinsic personal qualities students need to gain or consolidate during their degree program can be developed. Indeed, such intrinsic qualities embedded in the teaching of most disciplines' teaching should go beyond the life of any chosen field, having 'the potential to outlast the knowledge and contexts in which they were originally acquired' (University of Sydney 2003).

At the University of South Australia, our graduate qualities have been clearly defined, and in the process of obtaining their degree, it is expected that a graduate:

- Operates effectively with and upon a body of knowledge of sufficient depth to begin professional practice;
- Is prepared for lifelong learning in pursuit of personal development and excellence in professional practice;
- Is an effective problem solver capable of applying logical, critical and creative thinking to a range of problems;
- Can work autonomously and collaboratively as a professional;
- Is committed to ethical action and social responsibility as a professional and citizen;
- Communicates effectively in professional practice and as a member of the community;
- Demonstrates international perspectives as a professional and as a citizen.

Among academics, there is general agreement that students will acquire their discipline knowledge through the teaching and learning that occurs throughout a degree program. Assessment is the obvious means by which teaching staff know whether students have gained their required levels of knowledge. However, it is often less of a certainty for university educators as to how students can be assessed for other, intrinsic graduate qualities they are also expected to have acquired. This

issue becomes even more problematic for staff who are designing tasks for culturally or geographically diverse groups of students who may rarely be encountered face to face.

For a number of staff within the School of Computer Sciences (CIS) at the University of South Australia, the lack of a coherent understanding about assessing graduate qualities was coupled with some concern about off-shore (from Australia) delivery of degree programs. There was an awareness that cultural differences and hidden assumptions on the part of course designers might impact on student attainment across the diversity of delivery.

This project was initiated in an effort to address the issue of mark disparity, and to find out more fully how students might be gaining their various graduate qualities. The project was planned to encompass assessment in relation to a particular program offered across 3 different localities: Australia, Hong Kong and Malaysia. Our team consisted of four computing academics, one professional development academic and a dean of teaching and learning. In its broadest terms, the project aimed to provide:

An information base that would assist course developers to understand how their students' learning could be addressed so as to produce the university's graduate qualities through the use of their assessment tasks;

A wider understanding of assessment design and how that can be formulated to be delivered similarly across differing geographic and cultural contexts but within culturally appropriate parameters addressing all students' learning needs;

A model from which other programs in an international context might be designed to support graduate qualities and their linkages to assessment and learning.

Given such broad aims, we initially decided to focus mainly on developing a mapping tool and then using it to produce an overview of the programs' assessment tasks in three ways:

- The outcomes required
- Their relationship to graduate qualities and

- What, if any, assumptions of knowledge were implicit in the setting of the tasks

We expected that the mapping exercise would reveal cross cultural factors that might account for observed differences in grade distributions. A project officer would be added to the team when the mapping was undertaken.

Sharing meanings

Our first instructive learning point came when the assembled project team discovered their own many, varied and disparate understandings of the aspects they were expecting to address. We could not jointly design a mapping tool until we came to some clear agreement over, for example, what each graduate quality signified, or whether assessment was only about outcome or process, or both, etc. As a consequence, we held a series of meetings which were in effect, discussion groups where we addressed graduate quality interpretations, assessment and learning objectives. We noted that varied interpretations could lead to graduate qualities being applied in relation to an outcome of an assessment task, rather than at the starting point and being developed as part of a learning process. The team also talked though their differing views on what was crucial to be included in course objectives, and how closely they should reflect, or be reflected in, the graduate qualities. There was also discussion around how assessment tasks could be viewed in relation to those course objectives, and how assessment tasks might provide information about any assumptions curriculum designers were making about a student's intrinsic qualities or abilities as well as prior knowledge.

2. Developing the mapping tool

The team undertook a number of mapping exercises to investigate the practicalities of mapping against varying sets of parameters. We started with one course, 'Object Oriented System Development' an early subject in the degree program taught across in all three localities. Each

member of the team analysed each assessment task in the course to assign a value in terms of adding to a student's acquisition of graduate qualities. We completed a table to allocate a ranking of high, medium, low or nil to each sub-category of the seven University graduate qualities. Our ranking was based on perceptions of whether each graduate quality category was explicitly or implicitly reflected in the assessment task. A comparison of all the tables produced indicated a good deal of agreement in terms of basic graduate qualities, but further analysis revealed highly significant variations relating to how qualities were gained and whether they related to outcomes or to the processes of the task.

The early mapping exercise was repeated in Malaysia by 3 senior staff members from the Sepang Institute of Technology who teach many of the University's IT courses. Each staff member was provided with a copy of all assessment pieces used in Object Oriented System Development, a detailed description of the graduate qualities and the mapping table. Once again the exercise showed broad agreement for most of the graduate qualities but significant variations due to interpretation of the task and its relationship to a graduate quality.

These preliminary graduate quality mappings were crucial in affirming our realisation that intrinsic graduate qualities can be interpreted in so many different ways when relating them to assignment tasks. As well as the Malaysian educators, each project member viewed the task from a different point of view. Some were relating to their own teaching, others to how they interpreted the requirements of the task, or the final outcomes required. Then another viewed this as the process that students would undertake to get to the outcome. The variable interpretations among project team members gave us an indication of how students might similarly have issues of interpretation when faced with assignment requirements, and how curriculum writers might design for differently interpreted outcomes, despite providing marking criteria. As a consequence, the team decided that an additional model of 'measurement' was needed to address the relationship between assessment tasks and course objectives.

A systematic analysis of graduate qualities or assessable outcomes suitable for developing a mapping tool

required another parameter - course objectives. At this stage we turned to one of the later interpretations of Bloom's Taxonomy (Writing Objectives, 2004).

2.1 Bloom's taxonomy

This taxonomy seems the best known and most widely used classification of cognitive learning objectives. Learning is organised as a series of levels or prerequisites, and suggests that higher learning levels cannot be addressed until those below have been covered. Learning becomes effectively serial in structure. The model includes six levels of thinking: knowledge, comprehension, application, analysis, synthesis and evaluation as shown in Figure 1.

Each sequential level not only assumes a deeper understanding of the content, but includes the previous levels as subsets of the new level. Each of the six levels or sub-domains is typified by a specific approach to curriculum content and used typical key words in assessment. For example:

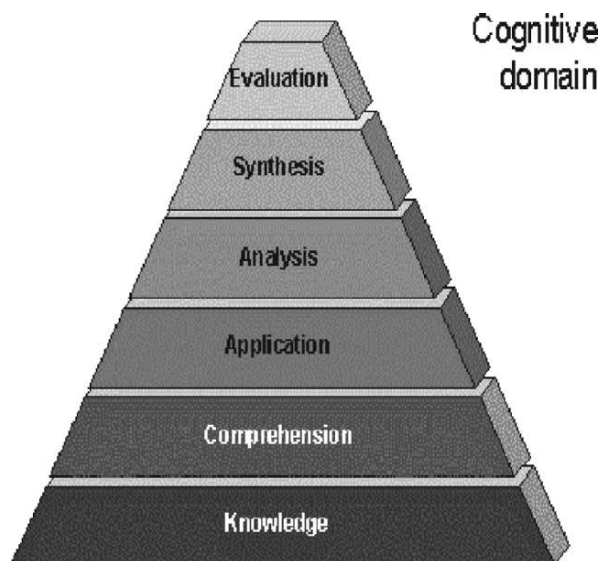


Figure 1. Bloom's taxonomy

Knowledge is the recalling of appropriate, previously learned information.

- Key words: who, what, when, define, recall, recognise, find, label, list

Comprehension is the understanding of the meaning of informational materials.

- Key words: compare, demonstrate, interpret, explain, illustrate, describe

Application is the use of previously learned information in new and concrete situations to solve problems that have single or best answers.

- Key words: apply, build, construct, classify, use, plan, model, select

Analysis is the breaking down of informational materials into their component parts, examining such information to develop divergent conclusions by identifying motives or causes, making inferences, and/or finding evidence to support generalizations.

- Key words: why, determine, examine, simplify, distinguish, infer, categorise

Synthesis is creatively or divergently applying prior knowledge and skills to produce a new or original whole.

- Key words: predict, design, develop, combine, formulate, test, choose

Evaluation is judging the value of material based on personal values/opinions, resulting in an end product, with a given purpose, without objectively right or wrong answers.

- Key words: conclude, judge, justify, prioritise, recommend, appraise, deduce

The six levels or sub-domains of Bloom's cognitive domain offered us an effective way of deciding whether the stated course objectives aligned with the set assessment tasks. Bloom's taxonomy lists key words that assist in identifying and classifying objectives in assessment work and then mapping these against course objectives. The six sub-domains can be aligned with graduate qualities and hence can facilitate the mapping of both course objectives and assessment tasks to graduate qualities.

In the literature, a number of practitioners have shown

how making the taxonomy into either a rating scale or an aid to grading, can relieve some of the complexities of setting criteria (Box, 2004; Oliver et al., 2004; Scott, 2003). We agreed that the key words and types of questions asked within each sub-domain of Bloom's cognitive domain relating to learning presented us with a tool that could be embedded within the mapping exercise. The sub-domains were set down within the mapping of set assessment tasks against course objectives, as well as within stated expectations as to graduate quality.

Other authors similarly note that that when writing objectives into course statements and tasks across a number of disciplines Bloom's taxonomy offers a way of describing and delineating learning outcomes (Coats, 2002; Writing Objectives, 2004). Their findings were highly consistent with ours, and once the team all agreed as to how this taxonomy was to be applied, a data base could be constructed from information taken out of course statements. These course statements are produced by course developers. They state course objectives and indicators towards expected graduate quality outcomes.

2.2 Clarifying the map

Given that our project is embedded within a computing discipline, the development of a flowchart was an obvious way to clarify our process (see Figure 2).

The process uses 3 starting points; (yellow) assessment tasks, course objectives and students (meaning their intrinsic abilities) and 3 end points; (green) graduate qualities, Bloom mapping and assumptions. The flowchart showed how the mapping process can relate these 3 inputs together (via the blue points to the red intermediate points) and also highlighted the way in which we could map cultural and knowledge assumptions underlying the assessment tasks. Mapping cultural and knowledge assumptions was clearly the most difficult aspect of the mapping exercise and was therefore left to a latter stage.

Note that this flowchart illustrates how a "course evaluation" software package might be developed. The software would naturally be much more sophisticated, and would ask appropriate questions to guide the user towards evaluation of a course.

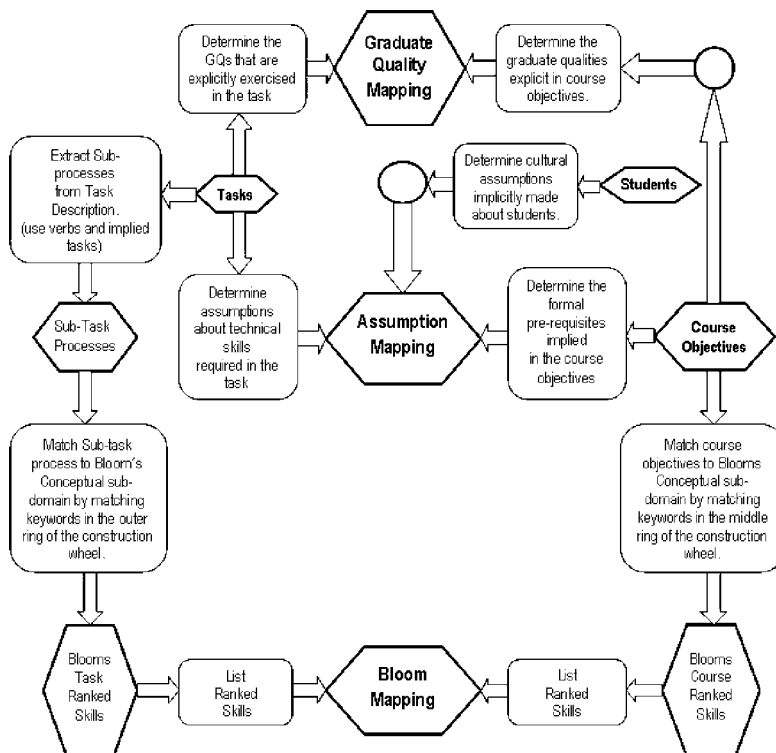


Figure 2. Mapping process relating assessment tasks, course objectives and students

2.3 Undertaking the mapping

The task of mapping and feeding information into the database, as well as setting up the information in an accessible and readable manner was undertaken by the project officer who reported back with the mapping object in each developmental stage. The actual mapping object was constructed by:

- Identifying objectives in course statements and assessment tasks for each of the 21 courses in this IT degree program and mapping this data to numerical identifiers
- Organising the numerical identifiers as variables in a format that could allocate terms from both the Bloom's taxonomy sub-domains and from the stated course objectives
- Entering all variables into a spreadsheet so that results could be graphed

Bloom's domains were given numbered identifiers, as were relationships to assessments. Identifiers were also given where graduate qualities were obvious in course objectives and assessment tasks.

The assessment tasks were examined by the project officer to ascertain what assumptions seemed to be applied to students in terms of expectations of their intrinsic ability to undertake a task. These assumptions were then put into the database as part of the mapping object (see Table 1).

Major Task	Process	Assumptions about student
Group assignment	Develop, document, use, specify, show	Can work collaboratively,
Individual Assignment	Write, learn, create, construct, use	Can work with minimal teacher input, comfortable with self-directed learning
Essay or Report	Write, reflect, summarise, explain	Fluent oral and written English

Table 1. Example of assumption mapping

3. Our findings

The database generated, and the accompanying graphs (see below) indicate a number of surprising, and perhaps uncomfortable, factors about the current assessment being applied in the three linked programs.

Within the 21 courses mapped (see Figures 3 and 4) for graduate qualities, there are many apparent discrepancies between what the course objectives state and what the assessment tasks ask the students to do.

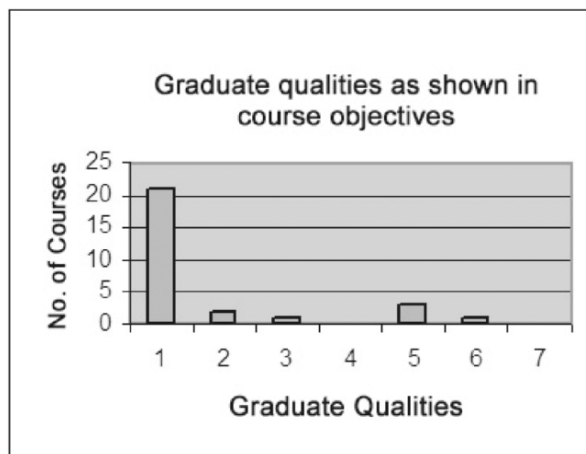


Figure 3. Graduate qualities shown in course objectives

Figure 3 indicates that in most of the courses, course objectives focus almost exclusively on Graduate Quality 1 'Body of Knowledge' which would indicate that course developers write course objectives to reflect the course content only. In fact only four of the 21 courses explicitly address more than one graduate quality. In the case of assessment tasks, nine of the 21 courses appear to explicitly address only Graduate Quality 1 (see Figure 4), although a number of courses address 5 out of 7 graduate qualities.

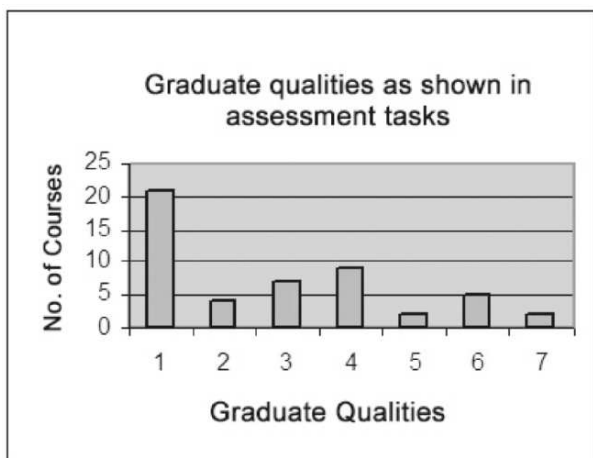


Figure 4. Graduate qualities shown in assessment tasks

An examination of the allocation of graduate qualities using indicative unit weightings (see Figure 5) made by course developers in their course statements indicates a higher correlation with the course assessment tasks rather than the course objectives.

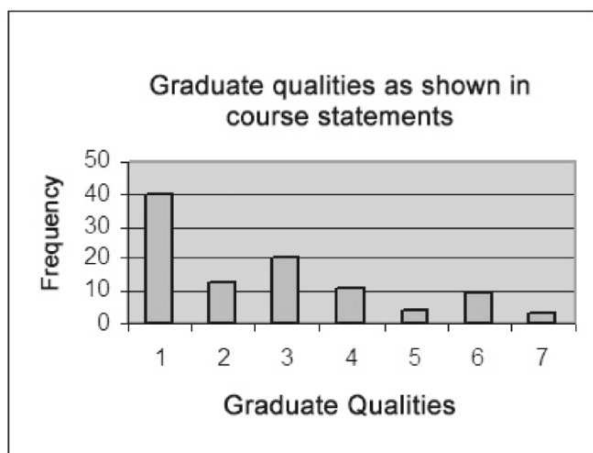


Figure 5. Graduate qualities shown in course statements

A comparison of Figure 4 and Figure 5 shows a high correlation between graduate qualities evident in assessment tasks and graduate qualities weightings allocated by course developers in their course statements. University policy requires all course descriptors to include a chart indicating which graduate qualities are expected to be gained by a student undertaking the course. Nevertheless this result was

surprising given that course developers generally allocate graduate quality weightings to a course during course development whereas assessment tasks are designed during delivery and often without reference to graduate quality weightings. It may be the case that course developers allocate graduate qualities in the expectation that these graduate qualities will develop as a result of doing typical assessment tasks.

Given such results we then undertook a further, and more critical, analysis of assessment tasks in four courses. In all cases we ascertained that the assessment tasks seemed based on an assumption that students already possessed a number of skills that could be viewed as graduate qualities. Some examples of these assumptions are that to adequately address a task, students:

- Possess adequate presentation skills
- Have the capacity to engage in student-centred learning and have the ability to find information
- Are able to work effectively in groups and manage conflict resolution
- Have a sound command of academic level written and spoken English
- Can critically analyse text
- Understand relatively complex commercial activities

More profoundly, in several other cases we determined that the assessment tasks seemed to actually test whether students already possessed a number of graduate qualities rather than developing them.

On graduate qualities and course objectives

We would argue that in an appropriately designed course graduate qualities should shape course objectives, which in turn should shape assessment tasks and, assessment tasks should develop graduate qualities - as shown in Figure 6.

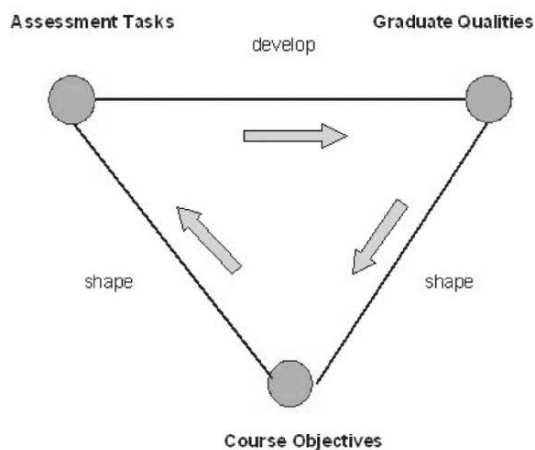


Figure 6. Relationship between course objectives, assessment tasks and graduate qualities

However, the mapping exercise revealed that in some courses there is little or no correlation between the three categories (assessment tasks, course objectives and graduate qualities) under consideration. It would appear that the majority of assessment tasks we mapped require students to understand and apply the content taught. If we use Bloom's cognitive domain as a guide, these assessment tasks assume that students have been guided or have learned to take their first level knowledge acquisition through the comprehension level to the application level. It is important to note here that this third level assumes that students have developed sound problem solving skills - one of the intrinsic graduate qualities. The mapping exercise indicated though, that students' previous assessments did not appear to offer them incremental development throughout their courses and did not tackle the various cognitive skills in an apparently linear formation.

A further analysis of graduate qualities in relation to the cognitive domain of Bloom's Taxonomy reveals that graduate qualities explicitly assume the first four levels of Bloom's Taxonomy (knowledge, comprehension, application and analysis) but not the top two levels. Depending on one's interpretation, the top two levels (synthesis and evaluation) are implicitly assumed in the graduate qualities. This finding was surprising given that the top two levels of Bloom's Taxonomy distinguish a traditional university education based competence from tertiary college training that emphasises the acquisition of a skill set of competencies.

If assessment tasks determine the development of students for the real world which they enter on graduation, then graduate qualities should reflect the modern economy.

As part of the analysis of data obtained from our research, we needed to determine whether the graduate qualities provide an effective framework for the development of students in a modern, global knowledge economy. A knowledge economy is defined by the following characteristics:

1. Knowledge is the key factor in production.
2. Improving human capital is critical for GDP growth.
3. "know-why" and "know-how" is more important than know why.
4. Knowledge gained by experience is as important as formal education and training.
5. Life long learning is vital for organizations and individuals.
6. ICT releases people's creative potential and knowledge.
7. Globalisation (Ministry NZ, 2005).

An analysis of the university's graduate qualities shows them as consistent with the demands of a knowledge economy and therefore they provide a suitable framework for shaping course objectives, which in turn should shape assessment tasks. Our findings provide some support to our conclusions that graduate qualities are a very useful framework for preparing students for a modern global knowledge economy.

Crucially, our work has shown (see Figure 5) that Graduate Qualities 4 'Ethical Action and Social Considerations' and 7 'International Perspectives' are those least likely to be built into course objectives or assessment tasks. Yet these closely related qualities indicate the extent to which graduates are prepared for addressing all stakeholder needs in a modern, global knowledge economy.

On cultural and knowledge assumptions about students

From our mapping we ascertained that course developers traditionally design courses, assessments and delivery modes based on local (Australian) business

and IT environment. Tasks appear to be based on factors present within the local teaching and learning environment so that our graduates can be more competitive in the local job market. Yet if these courses are delivered in different cultural and geographic contexts the vocabulary, readily accessible software, business and IT practices and legal structures may not be applicable (Gillani, 2003). As an example, one course requires students to design a software system for a car rental company. While car rental is common in Australia and it is a reasonable assumption that Australian university students have a driving license, in Hong Kong these assumptions are not valid and may not be for Malaysian students either. Similarly, a number of other courses require students to make investigations into areas that may not be understood or available in the context of their learning locality. Assumptions are made about the ready availability of detailed information about certain industrial or commercial enterprises or access to these enterprises.

Various assessment tasks require intensive collaborative work, as well as a highly developed self-directed study style. In courses that included group projects, assumptions were often made that the students could organise effective collaborative teams. In some cultures students are reluctant to be part of groups. In other cultures, consensus is all important and students will try to avoid conflict through argument or debate. Group dynamics will often be different and may negate the course developer's rationale for using group projects. Self-directed study that requires a critical analysis of course content or recommended texts presents a fundamental difficulty for students from an educational culture that emphasises rote-learning and acceptance of authority.

In terms of knowledge assumptions, we found some difficulty in clearly defining where an assessment task is part of the process of learning, and where the assessment task is testing what students have already learned.

It became apparent to the team that determining any assumptions would require quite in-depth analysis, so four courses were put under our collective microscope to determine what underlying cultural and knowledge assumptions might be made by course developers about

their students. At the same time, we realised that an analysis of assumptions made by course developers must be done by persons with specialist knowledge of that course.

A comparison of grade distributions results collected in 2002 and 2003 for all courses taught both locally and in Malaysia (using the same course content, resources and assessment tasks) showed a consistent pattern. The pass rates for the same courses were similar but the percentage of students in Malaysia who achieved a Credit, a Distinction or a High Distinction grade was lower.

Grade distribution	Local	Malaysia
High Distinction	9%	2%
Distinction	21%	4%
Credit	24%	36%
Pass Level 1	21%	24%
Pass Level 2	5%	13%
Fail Level 1	13%	13%
Fail Level 2	7%	6%
All grades	100%	100%

Table 2. Grade distribution for OOSD

After a thorough analysis of assessment tasks in four courses (including Object Oriented System Development or OOSD), we concluded that cultural and knowledge assumptions could explain these grade distributions. The other three courses we analysed showed similar distributions to the results shown in Table 2 for OOSD. Although we found no indication that assessment tasks are culturally insensitive or inappropriate, the number of cultural and knowledge assumptions made in the assessment tasks disadvantaged the Malaysian students. Students in Malaysia could acquire 'Body of Knowledge', 'Comprehension' and some aspects of 'Application' but they were at a disadvantage in the higher-order levels of Bloom's cognitive domain.

4. Some questions raised by the mapping

From our evaluation of the project, the mapping tool, and the results obtained, we realise that while we have answered a number of questions, we have raised many others not previously apparent. This factor is in itself valuable, as it indicates we were able to move our thinking from purely practical into a more theoretical framework. Our questions allow us to continue thinking about issues and seeking alternative answers. For example:

- How do curriculum writers develop assessment tasks that can clearly be seen to build graduate qualities?

In many cases a successful and high marking completion of a task will indicate that a student has not only attained the requisite discipline knowledge, but also has the required graduate qualities. Yet it may be that a student already had those qualities, and used them in order to arrive at the high mark. Thus they would have demonstrated their ability. However, for students starting without whatever particular quality is required, there may not be a transparent and enabling pathway to follow. Hence if an assessment task is designed with a marking scheme that accounts only for outcomes, rather than processes as well, it may work against the attainment of graduate qualities.

- How can staff developing courses that are taught in the final years of a program be able to assume that Graduate Qualities are already established and thus be able to offer assessments that pursue the development of graduate qualities at comparatively sophisticated levels?

From our mapping it would seem that this is not currently the case and a method of effectively measuring cumulative graduate qualities is proving evasive so far. The method of summing graduate qualities for courses already undertaken is tractable but unreliable. As guidelines for specifying graduate quality values are not available to course designers, significant discrepancies in graduate quality weightings are likely to exist.

- How do students read the graduate qualities being

assumed in assessments? Are students adequately equipped to undertake further development of graduate qualities?

We knew that these questions could only be reliably addressed by referring to students, but this was outside the scope of our project. However, the question is one that needs to be addressed.

- Given the uncertainties that our mapping task has raised, is it possible to specify trans-national implications for course developers?

Our research suggests that the best method of determining trans-national implications is through an analysis of assumptions made by course developers. As this analysis requires a good knowledge of the course content it an exercise best done by a nominated course moderator with specialist knowledge of that course.

- Can we develop an understanding of graduate quality pre-requisites among course developers?

Our research suggests that this is possible through the use of assessment marking schemes that give due emphasis to process as well as to outcomes produced by students. Course developers often assume that students already possess a number of graduate qualities and this seems further aggravated when cultural factors are taken into account.

- What tools (for defining program outcomes; course content; assessment; all in terms of graduate qualities) can this research provide staff with?

For example, templates for writing course objectives and course statements.

5. Concluding remarks

In terms of the stated project aims, the research exercise has resulted in a mapping tool that provides a detailed information base about current assessment practices

as well as a relatively objective view of those practices in relationship to course objectives and graduate qualities. We do acknowledge that the nature of the mapping may result in dissenting arguments around the apparently arbitrary allocation of process identifiers and assessment relationships to course objectives.

Our research suggests that developing a method of summing up a program's graduate qualities using the indicative unit weightings for courses can be achieved if we can develop an understanding of graduate quality pre-requisites among course developers. This will facilitate the development of graduate qualities in the same manner that course pre-requisites are used to ensure a systematic development of Body of Knowledge and Problem Solving skills. We believe that this can be achieved through the use of course objectives that are written to explicitly state how graduate qualities will be developed and, which graduate qualities will be reinforced and are therefore assumed. Course objectives must also show a direct relationship to the course developer's allocation of graduate qualities. Our findings suggest that team teaching practices that ensure graduate qualities are developed in a systematic fashion through thoughtful design of assessed tasks need to be used. We also propose the development for assessment marking schemes that give due emphasis to process as well as to outcomes produced by students. These marking schemes must support the learning environment by making the processes that are designed to develop graduate qualities transparent to both students and teaching staff.

A course developer has one reliable tool for developing the Graduate Qualities in students: the assessment tasks. If an assessment task is designed to develop both discipline specific knowledge and graduate qualities, clearly it will demand that students engage with discipline specific knowledge in such a way that the graduate qualities are further developed. Thus, by definition such an assessment must incorporate tasks that challenge a student's graduate qualities and will rightfully make assumptions relating to the student's existing graduate quality maturity. The task of determining the degree to which such assumptions are valid will remain intractable until such time as a suitable method for measuring cumulative graduate qualities is proposed. It would seem that the method of summing

up a student's graduate qualities for courses undertaken is a somewhat unreliable approach at this point in time, as there is currently no method of ensuring that graduate quality values per course are accurate.

Our research suggests that the best method of determining international implications for the use of our analytical tool is through a thorough analysis of the assumptions made by course developers. As this analysis requires knowledge of the course content it is an exercise best done by nominated course moderators with specialist knowledge. The task of determining the degree to which such assumptions are valid will remain debatable until a suitable method for measuring cumulative graduate qualities (such as the one we propose based on course objectives) is implemented. Sound team teaching practices can be very effective in dealing with inter-cultured factors especially if the team is culturally diverse. Designing assessment tasks with as much emphasis on process as on outcomes gives students a better understanding of how to develop their learning skills where inter-cultural factors are involved, as they generally are in trans-national delivery of programs. Assessment marking schemes need to support this approach.

The team were not able to ask students in diverse settings about the assignment tasks, and the mapping does not clearly indicate whether the inter-cultural factor of delivery has an impact on students' ability to tackle assessments. However, the mapping does highlight issues of assumed knowledge that may impact more negatively on students overseas than those either onshore or with an Australian schooling or background.

Although this research was undertaken using computer and information science courses, all university courses should be seen as providing a sound basis for the introduction of Graduate Qualities other than 'Body of Knowledge' and 'Problem Solving'. The knowledge economy requires the systematic development of many other qualities that students will need in the real world. The development of this mapping tool provides a valuable means of measuring Graduate Qualities and educational objectives across a wide range of science-based disciplines. The mapping tool also offers a methodology to standardize and implement learning and measurement in e-learning mode.

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CONCLUDING NOTE

I teach engineering subjects, and in so doing, I try to act as the learning partner of my students where one of my major roles is to empower them to be the independent learners. I also engage with the theory and methodology of my own discipline and try to be an active contributor to the range of communities relevant to my professional work.

I do not approach teaching on a trial and error basis. Instead, the same as I do in my profession, I make every effort to improve my teaching and, what is more important to me, to improve student learning. In some cases, this is by doing action research and also by attending workshops, forums, etc. concerning pedagogic knowledge. This becomes a continuous process of shaping a model – a model, which can guide how we teach and let us conceptualize how students learn.

We are pleased that as a result of the Assessment Conference in 2005, we are able to collect various assessment practice exemplars from various parts of the world. In the process of editing this book, I have had a good opportunity to reflect on my own practices with reference to the practices of others in other contexts. What is contributed here has become a concerted effort to understand how to enhance the quality of teaching and learning through designing, implementing, and making effective use of assessment practices. After examining the work contained in these book chapters, we hope that we can help each other to improve student learning.

Through discussions in professional development workshops for teaching and learning, we have shared our viewpoints on assessment issues. The same as many colleagues in my University, I am heavily involved in daily teaching and other departmental issues. I have however, always intended to be a reflective teacher. Just like many of you, I say to myself;

“Did the students learn? What did they learn?”

I then follow this up by asking,

“Did the students learn what I want them to learn?”, “Did they learn what they should have learnt?”

In this sense, we are looking for evidence that learning that has taken place. At the same time, we also ask,

“What have I done that help the students learn? What should I do to help the students learn better?”

We should all be in a quest for better teaching and learning practices. I sincerely hope that these thoughts help form the habits of other teachers.

Steve Frankland

To find out the online publication of assessment practices via the Assessment Resource Centre (ARC), please visit

www.polyu.edu.hk/assessment/arc

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Assessment is an integral part of institutional education where alignment between teaching, learning, curriculum and assessment is essential. In accordance with such views, a learning and teaching development project - Enhancing Teaching and Learning through Assessment, funded by the University Grants Committee of Hong Kong, commenced in September 2002.

This inter-institutional project was hosted by the Hong Kong Polytechnic University and its overall aim is to enhance the quality of teaching and learning through designing, implementing effective assessment practices, and the effective use of assessment results.

With the support of this project, we have reviewed current practices regarding the assessment of student learning outcomes, what and how approaches and methods are being used to inform and improve the quality of teaching and learning. Over the past few years, we have gained insights from the world of educational development. We have attended conferences, participated in running workshops and offered input to other colleagues. With the findings of this project and its sub-projects, we explicated how assessment has a profound effect on student learning.

For the most updated information, please visit our website at:
<http://www.polyu.edu.hk/assessment/arc>