Bright ideas and evolving evidence
Proceedings of the 2005 Charles Sturt University
Learning and Teaching Conference

Edited by
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A publication of the Charles Sturt University, 2005_
Editorial

The 2005 Charles Sturt University Learning and Teaching Conference *Bright Ideas and Evolving Evidence* was held in Bathurst from 28-29 September. The papers and posters in these proceedings are representative of the many outstanding presentations at the conference. The papers include those from people who have been awarded scholarship in teaching research grants and those who have achieved teaching excellence awards, either at a local or national level. Significant innovation and commitment to learning and teaching is evident in the work presented in these proceedings and provides a showcase of just some of the excellent teaching currently occurring at Charles Sturt University.

All abstracts of the presented papers and posters were subjected to peer review prior to the conference. Authors were encouraged to submit their papers to these proceedings to share their work with the academic community and are encouraged to continue to develop their papers for publication in other scholarly forums.

I would like to thank the contributors, reviewers, conference organizing committees and particularly Associate Professor Marion Tulloch, Caroline Rose, Ron Kerr and Julie Arthur whose support enabled the prompt publication of the proceedings. I am pleased to bring you these proceedings which I believe make stimulating reading and will further challenge us in our own learning and teaching.

*Sharynne McLeod, PhD*
Editor, 2005 Charles Sturt University Learning and Teaching Conference Proceedings

School of Teacher Education
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BATHURST NSW 2795

September, 2005
### 2005 CSU Learning and Teaching Conference

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Message from the Director of CELT

Colleagues

Welcome on behalf of the Conference Steering Committee to the CSU Learning & Teaching Conference 2005! We have entitled the conference:

Learning & Teaching @ CSU
Bright Ideas and Evolving Evidence

It will be an opportunity for staff to present some innovative ideas about the practice of learning and teaching. It will also showcase the scholarly work at CSU by those that have taken the further step of systematically evaluating the impact of their practice. Some of the workshops will assist those interested in undertaking scholarly research and publication in learning and teaching.

The program and organisation of the conference has been the work of a team of staff which include the Sub-Deans (Learning and Teaching), other academics and staff from CELT who have served on the Steering Committee, the Papers and Program Subcommittees or have undertaken essential behind the scenes organisation.

We warmly welcome keynote speakers from within and beyond the University. The program contains a variety of types of sessions: keynotes, scholarly papers, workshops, posters, a networking breakfast and a final plenary session. It should provide a variety of forums for engagement around learning and teaching.

A good conference should leave more than a warm inner glow! We hope it will contribute to changes for you as participants, for the University and ultimately for the students who come to learn at CSU. It can provide an opportunity for you to broaden your networks within the University across campuses and faculties. We don’t see the conference as an isolated event but as a starting point for ongoing collaboration in teaching innovation and scholarship in teaching within the University and beyond. It can also provide an opportunity for participants to contribute to the debate about future directions in learning and teaching at CSU.

I wish you all a stimulating and enjoyable conference!

Marian Tulloch,
Director, CELT
Factors affecting confidence at residential schools and effectiveness of a virtual environment as a preparative tool

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2. Centre for Enhancing Learning and Teaching Charles Sturt University
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This paper presents the results of a comprehensive qualitative and quantitative study of the laboratory experience for distance education students, undertaken as part of a scholarship in teaching grant. The study gathered data using focus group sessions, interviews and questionnaires, to determine the factors that impact on the level of confidence of distance chemistry students before and during their first chemistry laboratory sessions at residential schools. As part of the study, students were given the opportunity to prepare for their residential school by carrying out tasks in a 3D virtual laboratory, which was provided on CD-ROM. The virtual laboratory is an accurate representation of the teaching labs that the students attended. The study compared the experience of those students who used the virtual laboratory with those who did not. Further factors considered in the analysis included age, gender and level of prior study/laboratory experience.

Introduction

Many undergraduate students studying chemistry subjects at Charles Sturt University (CSU) do so by Distance Education (DE). CSU has been offering subjects in chemistry in distance mode for more than 20 years. One of the greatest problems that confronts us, and others (Hollingworth and McLoughlin, 2001; Kennepohl & Last, 2000) in providing DE subjects is how to adequately address the teaching of a laboratory component. The practical work for CSU DE chemistry subjects is completed at intensive three or four day residential schools. Thus, DE students have only a few days to face the challenges that are spread out over many weeks for on-campus students. Providing a quality laboratory experience for these students within that short period and within the constraints of our resources is the subject of ongoing review at CSU. Problems associated with high stress and information overload for the laboratory component in DE had been noted anecdotally and in the literature (e.g. Loonat, 1996). Adequately preparing DE students for residential school is a difficult task.

One strategy we have adopted to help prepare DE students has been the provision on CD-ROM of a 3D virtual laboratory, which is an accurate representation of the teaching laboratories. In an earlier paper at the UniServe Symposium (Dalgarno, Bishop and Bedgood, 2003), we hypothesised that as a pre-laboratory familiarisation tool, the virtual laboratory would include the following potential benefits:

♦ Students would feel more relaxed and comfortable in the laboratory;
♦ Less laboratory time would be wasted looking for items of apparatus;
♦ Students would be more likely to assemble and use apparatus in the correct way leading to more meaningful experimental results;
♦ Students could devote more of their attention to the chemistry concepts involved in the experiments because they would already be familiar with the procedural aspects of the task (p. 91).

This paper presents the results of a qualitative and quantitative study of the laboratory experience of DE students in first year chemistry subjects which provides initial tests of these hypotheses, as well as expanding our understanding of factors involved with the student experience of laboratory.
About the Virtual Laboratory

The virtual chemistry laboratory provided to students on CD-ROM is an accurate 3D model of the Charles Sturt University Wagga Wagga undergraduate teaching laboratory. The initial version of the virtual laboratory has been designed to enable DE chemistry students to become familiar with the laboratory prior to their residential school. Though the virtual laboratory does not yet allow students to conduct experiments, it provides an environment where students can freely explore, collect and assemble items of apparatus, and find out information about laboratory procedures and apparatus (see Figure 1). The virtual laboratory has been developed using the Virtual Reality Modelling Language (VRML) (Carson, Puk and Carey, 1999) as well as using additional enhancements to VRML provided by the Blaxxun Contact VRML Browser (Blaxxun Technologies, 2004). Blaxxun Contact runs within a web browser such as Internet Explorer, but can be run full-screen so that the web browser toolbars are not visible.

The Potential of a 3D Virtual Chemistry Laboratory

Dalgarno (2002) carried out an analysis of the potential of 3D learning environments in the context of contemporary theories of learning. Specifically, Dalgarno classifies the potential applications of 3D learning environments according to Moshman’s (1982) interpretations of constructivism: endogenous, exogenous and dialectical constructivism. The current version of the virtual chemistry laboratory is primarily an example of a ‘place simulation’, that allows elements of ‘skill practice’, each of which were classified by Dalgarno as applications of 3D learning environments consistent with Moshman’s endogenous interpretation of constructivism. Additionally, the embedded information about laboratory procedures and apparatus provide an example of what Dalgarno terms a ‘situated instructional resource’ which was found to be consistent with Moshman’s exogenous interpretation of constructivism.

There are various non-3D examples of simulated chemistry laboratories, designed to familiarise students with laboratory procedures before entering the laboratory (see, for example Carter, 1997), however, few have the level of fidelity provided by a realistic 3D environment. There has also been
extensive use of 3D molecular animations in chemistry (see, for example Tasker, 1998) but without the level of interactivity provided by a navigable 3D environment.

**Method**

All students who attended a residential school in the four first year chemistry subjects in Autumn session 2004 were asked to complete a questionnaire. In all, 95 students completed the questionnaire. Additionally, 16 students agreed to be interviewed about their experience before and during the first laboratory session at the residential school. Although these 16 students were not randomly selected, they included equal numbers of students from two of the subjects and equal numbers of students who did and did not use the virtual laboratory.

In the interviews students were asked about issues such as:

- Feelings of confidence and anxiety;
- Difficulties in locating, identifying, and using apparatus;
- Prior laboratory experience;
- Ability to focus on underlying chemical concepts during the practical;
- Effect of lab partner on confidence; and
- Pre-lab activities contributing to confidence.

**Results and Discussion**

**Confidence and anxiety**

Students were asked to indicate their degree of agreement with the statement “before the laboratory sessions commenced, I felt confident that I would be able to successfully complete them” using a seven point Likert scale with responses from very strongly agree to very strongly disagree. Thirty students indicated that they did not feel confident that they would be able to successfully complete the laboratory sessions, compared to 50 who did feel confident, with 15 undecided. Students were also asked to indicate their degree of agreement with the statement “Before the laboratory sessions commenced, I felt anxious about undertaking them”. 55 students indicated that they felt anxious about the lab sessions compared with 31 who did not and 8 undecided. As expected, a strong negative correlation was found between confidence and anxiety. These results support the anecdotal evidence gathered prior to the project, which suggested that many distance students approach their first laboratory sessions with a degree of trepidation.

**Perceived difficulty of laboratory tasks**

More than half of all students indicated that they did not have difficulty identifying, locating, choosing, assembling or operating items of apparatus, nor with following the required steps in the experiment. However, there was a significant minority who indicated that they did experience such difficulties. For example, 20 students indicated that they had difficulty locating items of apparatus and another 13 were undecided about whether they had such difficulty. Twenty six students indicated that they had difficulty working out the sequence of steps to be followed and another 8 were undecided. This suggests that even though for most students the laboratory tasks are not difficult, there are enough students finding them difficult to justify the provision of resources, such as the virtual laboratory, which are designed to familiarise students with the laboratory and its procedures.

Fifty one students indicated that they agreed with the statement “I was able to concentrate on the chemistry concepts involved in the laboratory experiments as I undertook them”, whereas 19 disagreed, with 25 undecided. Given that one of the reasons for requiring all students to undertake laboratory sessions is in order to provide a more concrete understanding of the theory, the fact that there are a sizable number of students who were not sure that they were able make connections to the theory during the laboratory sessions is of concern. This said, it is possible that for some students the
connections between the theory and the practical components will come through later reflections. In fact this idea emerged in earlier focus group sessions, with a number of students indicating that they developed their understanding later when reviewing and reflecting upon their laboratory experience in relation to theory.

Importance of pre-laboratory activities

Students were asked to rank ten pre-laboratory activities in order of their importance in contributing to their confidence in the first laboratory session. These results are summarized in Table 1. The preparative activities that students considered most important were pre-reading of the laboratory manual, prior study, pre-lab exercises and pre-reading of the textbook.

The use of the virtual laboratory as a preparative activity was ranked very low, but given that only a minority of students actually used it, and that students were asked to rank activities they had not completed last, this may be misleading. Students who used the virtual lab rated its importance in contributing to their confidence in laboratory session seventh out of the 10 activities.

Several online and electronic resources were available for student preparation: online and CD resources provided with the textbook, online resources posted by lecturers, and a web based communication forum. These resources were all low ranking in their contributions to student confidence. It is not clear whether this is a reflection of the quality of these resources or an indication that distance chemistry students prefer printed resources to electronic resources.

Table 1. Student rankings of pre-laboratory activities contributing to confidence before lab session

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<th>Ranked activity</th>
<th>Mean rank (1 indicates most important)</th>
<th>Standard Deviation</th>
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<td>Pre-reading lab manual</td>
<td>2.59</td>
<td>1.38</td>
</tr>
<tr>
<td>Prior study</td>
<td>3.32</td>
<td>2.23</td>
</tr>
<tr>
<td>Pre-lab exercises</td>
<td>3.78</td>
<td>2.02</td>
</tr>
<tr>
<td>Pre-reading textbook</td>
<td>4.19</td>
<td>1.76</td>
</tr>
<tr>
<td>Lectures/tutorials prior to lab</td>
<td>4.67</td>
<td>2.92</td>
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<tr>
<td>Prior work experience</td>
<td>5.55</td>
<td>2.93</td>
</tr>
<tr>
<td>Electronic or online- resources provided with text</td>
<td>7.43</td>
<td>1.60</td>
</tr>
<tr>
<td>Online resources from lecturer</td>
<td>7.58</td>
<td>1.68</td>
</tr>
<tr>
<td>Using virtual lab</td>
<td>7.82</td>
<td>2.42</td>
</tr>
<tr>
<td>Reading online subject forum postings</td>
<td>7.96</td>
<td>1.69</td>
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Factors contributing to confidence

In addition to the above question about pre-lab activities, students were also asked to rank 10 factors in order of their contribution to confidence during their first laboratory session. Table 2 summarises the results of this ranking. Factors ranked highest were the demonstration talk at the beginning of the session and the helpfulness of staff. Factors ranked least important were those relating to other students. This was surprising because a number of students interviewed indicated that whether or not they knew other students and could find a lab partner with whom they could work effectively were very important issues.
Table 2. Student ranking of factors contributing to confidence during lab session

<table>
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<th>Ranked Factor</th>
<th>Mean rank (1 indicates most important)</th>
<th>Standard Deviation</th>
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<td>The demonstration or talk at the beginning of the laboratory session</td>
<td>3.52</td>
<td>2.28</td>
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<tr>
<td>Helpfulness of lecturer(s) and laboratory staff</td>
<td>4.34</td>
<td>2.36</td>
</tr>
<tr>
<td>Preparation for the session</td>
<td>4.39</td>
<td>2.92</td>
</tr>
<tr>
<td>Clarity of instructions in the laboratory manual</td>
<td>4.88</td>
<td>2.53</td>
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<tr>
<td>Prior study or experience</td>
<td>5.02</td>
<td>3.45</td>
</tr>
<tr>
<td>Availability of lecturer(s) and laboratory staff</td>
<td>5.70</td>
<td>2.69</td>
</tr>
<tr>
<td>Sharing tasks with your partner</td>
<td>5.71</td>
<td>2.16</td>
</tr>
<tr>
<td>Discussions with other students</td>
<td>6.52</td>
<td>2.44</td>
</tr>
<tr>
<td>The friendliness of other students</td>
<td>7.11</td>
<td>2.33</td>
</tr>
<tr>
<td>Recognising/knowing other students</td>
<td>7.70</td>
<td>2.62</td>
</tr>
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Students were also asked to indicate their degree of agreement or disagreement with the statement “a positive relationship with one’s laboratory partner(s) contributes to confidence in the laboratory”. A vast majority, 93 students indicated that they agreed with this statement with the remaining 2 undecided. This suggests that the low ranking of factors relating to other students does not indicate that they thought that relating to other students was not important. Rather, it indicates that they thought that all of the listed factors were important.

Interviews revealed that a lack of mathematical grounding can detract from students’ confidence: they feel that it undermines their ability to progress in chemistry. While we have known this for some time, we were surprised at how often this was mentioned and the apparent magnitude of the influence. In order to explore this, further questions were added to the questionnaire for the third and fourth residential schools. Specifically, students were asked to indicate their degree of agreement or disagreement with the statements “my ability to perform mathematical calculations was sufficient to allow me to successfully complete the practicals” and “a lack of ability to perform mathematical calculations is a barrier to successful completion of practicals”. Out of 40 respondents to these questions, only five indicated that they thought their mathematical ability was insufficient, with another six undecided. However, 33 agreed that a lack of mathematical ability would be a barrier with only two disagreeing.

Gender

A T-test showed a significant difference between male and female responses to the statement “Before the laboratory sessions commenced, I felt confident that I would be able to successfully complete them” (p=0.002), with males averaging 4.82 and females averaging 3.94. A score of 5 or above indicated agreement, 4 indicated that the student was undecided and 3 or below indicate disagreement with the statement. In all, 21 females disagreed with statement and 16 agreed, whereas 9 males disagreed and 32 agreed. Burdge & Daubenmire (2001, p. 296) report that research suggests that women are still significantly less self-confident than men in introductory college science classes. There was no significant difference between male and female responses to the statement about level of anxiety.

There was no significant difference between male and female responses to questions about difficulty with tasks in the laboratory. This is slightly at odds with Hazel and Baillie (1998, p. 37) who suggest that women’s lack of technical background and behavioural tendency to ‘tinker’ less, may be a problem in their science learning. There was also no significant difference between male and female responses on the questions about the degree to which they thought they were able to concentrate on laboratory concepts or the degree to which they thought a positive relationship with one’s lab partner was important.
Prior laboratory experience

Students were asked to indicate in what year their most recent laboratory experience occurred if they had had one, as well as what type of experience this was (year 10, year 11 or 12, TAFE, University, work experience or other). Based on this the data was considered in three groups, as follows: students were classified as having ‘recent relevant experience’ if they had laboratory experience in 1999 or since, including year 11 or 12, TAFE, University, or work; students were classified as having ‘some experience’ if they were not in the first group, but had some experience since 1994, including year 10, year 11 or 12, TAFE, University, or work; and the remaining students were classified as having had ‘no experience’.

There was a significant difference between the responses of students in the three laboratory experience groups to the questions about their anxiety and confidence. For example, in response to the statement, “before the laboratory sessions commenced, I felt confident that I would be able to successfully complete them”, students with recent relevant experience averaged 4.68, students with some experience averaged 3.95 and those with no experience averaged 3.64, where a score of 3 indicated disagreement, a score of 4 indicated that a student was undecided and a score of 5 indicated agreement. An ANOVA indicated that some of the differences were significant (p=0.010). A Post-Hoc Tukey’s HSD test indicated that the difference between the responses of students with recent relevant experience and those with some experience was significant at the 90% level (p=0.090), the difference between the responses of students with recent relevant experience and those with no experience was significant (p=0.024) and the difference between the responses of those with some experience and those with no experience was not significant. This indicates that prior laboratory experience is an important factor in contributing to students’ confidence as they approach their laboratory sessions, with those students with such experience much more likely to feel confident.

As one would expect, there was also a significant difference between the responses of students in the three experience groups to the statements “I found it difficult to identify named items of apparatus in the laboratory”, “I found it difficult to work out which items of apparatus I needed to use”, “I found it difficult to assemble items of apparatus”, “I found it difficult to operate items of apparatus”, “I found it difficult to work out the sequence of steps I was expected to follow”. In each case, students with recent relevant experience were less likely to indicate that they had difficulty with these laboratory tasks.

There was no significant difference between the responses of students in the three experience groups on the questions about:
- the degree to which they thought they were able to concentrate on laboratory concepts,
- the degree to which they thought a positive relationship with one’s lab partner was important,
- the degree to which they thought that their mathematical ability was adequate, or
- the degree to which they thought that lack of mathematical ability was a barrier.

Age

Students were asked to indicate their age in years. Based on this, the students were broken into three age groups. Students aged 25 or less were placed into age group one, students aged 26 to 34 were placed in age group two, and students aged 35 or over were placed in age group three. Four students did not specify their age.

There was no significant difference between the responses of students in the three age groups on the questions about:
- their sense of confidence or anxiety,
- their difficulty with tasks in the laboratory,
- the degree to which they thought they were able to concentrate on laboratory concepts,
- the degree to which they thought a positive relationship with one’s lab partner was important,
- the degree to which they thought that their mathematical ability was adequate, or
the degree to which they thought that lack of mathematical ability was a barrier.

**Contribution of the virtual laboratory**

Twenty eight students (29.5%) chose to use the virtual lab in preparation for the residential school. Only these students responded to a section of the survey that had statements about the value and effect of the virtual lab. 33% of males compared to 26% of females chose to use the virtual laboratory in preparation for the residential school, but a T-test indicated that this difference was not significant (p= 0.417). We would have expected younger users to be more likely to use the virtual laboratory. The raw data was consistent with this expectation, with 41% of students in the younger age group using the virtual laboratory, compared to 31% in the middle age group and 19% of the older age group. An ANOVA indicated, however, that the differences were not significant.

Only three out of 11 of the students with no laboratory experience used the virtual laboratory. This is unfortunate because it is these students who were most likely to lack confidence and experience anxiety and it was considered that familiarity with the virtual laboratory would help to alleviate this problem. It is possible that these students generally struggled the most with the subject and needed to spend more time using the core resources in the subject and thus had less time to explore optional resources such as the virtual laboratory.

When the responses of those who had used the virtual laboratory were compared to the responses of those who had not, there was no significant difference in responses to questions about confidence or anxiety. Similarly, there was no significant difference between responses on question relating to the ease with which students were able to identify, locate, choose, assemble or operate items of apparatus. This implies that the use of the virtual laboratory prior to the residential school did not, as we had originally hypothesised, have a significant effect on confidence, anxiety, or the ease with which students were able to use the apparatus.

Those who used the virtual laboratory were asked to indicate their degree of agreement or disagreement with the statements “The use of the virtual laboratory made me feel more confident about my ability to successfully complete the laboratory sessions” and “The use of the virtual laboratory made me feel less anxious about undertaking the laboratory sessions”. Twelve students agreed that the use of the virtual laboratory made them feel more confident with seven disagreeing and ten undecided. None agreed that the use of the virtual lab made them feel less anxious with eleven disagreeing and eight undecided. This suggests that the virtual laboratory does have an effect on confidence and anxiety but not for all students.

Students were also asked to indicate their degree of agreement or disagreement with a series of statements about the value of the virtual laboratory in helping them to identify, locate, choose, assemble and operate items of apparatus. The results suggest that most students who used the virtual laboratory thought that it helped them to identify and locate items of apparatus, but not to assemble or operate the apparatus. There were equal numbers of students who found that the virtual laboratory did and did not help them to work out which items of apparatus to use.

When asked to indicate their degree of agreement or disagreement with the statement “in its current form, I would recommend that future students use the virtual lab prior to their first laboratory session” 19 agreed, four disagreed and five were undecided. Overall, there was also strong support for the statement “if the virtual lab allowed me to carry out virtual experiments, it would be useful as a resource to prepare for laboratory sessions”, with 24 agreeing, none disagreeing and three undecided. However, this support must be qualified by the fact that the students can only imagine what such virtual experiments may include.

Interestingly, 12 students agreed with the statement “a video tour of the laboratory would have been more valuable than the virtual laboratory as preparation for the laboratory sessions”, with eight disagreeing and seven undecided. This was surprising because it was anticipated that the ability to
carry out simulated tasks in the virtual laboratory would make it more effective than a video as a preparatory tool. Loonat (1996), however, did find ‘far-reaching’ benefits to the use of a 35 minute pre-lab video with DE chemistry groups.

Conclusions

This study, based on the self reporting of students, allowed the development of a number of conclusions about the value of preparation in a virtual laboratory. The levels of confidence and anxiety were found to vary broadly across the cohort. Statistical comparison of those who used the virtual laboratory with those who did not suggests that it had minimal effect on student confidence in their first practical session in the subject, particularly for those with no prior laboratory experience. Nevertheless, many of the students who used the virtual laboratory were positive about the value of the virtual lab in contributing to their confidence and reducing their anxiety about practical work. Many of these students indicated that the virtual lab helped them to locate items of apparatus, and to work out which items to use, which we expect would have improved their confidence. Responses of users indicated, however, that, in its current form, the virtual laboratory provides no improvement in student ability to assemble and operate items of apparatus.

The fact that there was such diverse ranking of important items for student preparation suggests that students utilize a wide range of approaches in their study and preparation for the laboratory. Provision of this resource caters to the particular learning preferences of a minority of students. As such, we consider the virtual lab as one of the suite of options available to students, in catering to the range of learning preferences among them. Despite mixed impressions of the virtual lab, a large majority of students recommend its use before attending residential school.

Aside from the findings in relation to the virtual laboratory, one of the key outcomes from this study was the reinforcement of our initial view that many students experience anxiety approaching their first laboratory and/or are unconfident about their ability to successfully complete it. Additionally, as we expected, we found that prior laboratory experience was a big factor in reducing anxiety and increasing the confidence of those student having such experience. Somewhat surprisingly, most students did not indicate that they had difficulty with the procedures carried out during the laboratory sessions. Some students indicated in their interviews that they were more worried about their level of understanding of the theory in the subject and the effect this lack of understanding would have on their ability to complete their laboratory exercises, rather than about the use of laboratory equipment and apparatus. If this view is common then our efforts in continuing to develop the virtual laboratory may be better directed towards the integration of chemistry theory into the resource than on further enhancements relating to familiarity with laboratory procedures.

These results are likely to be of interest to lecturers in chemistry and other laboratory disciplines, whether teaching on campus or at a distance. A better understanding of the student laboratory experience is essential if we are to ensure that students obtain the maximum possible benefit from their laboratory sessions.

Acknowledgments

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References


Academic and student reflections on the pedagogical implications of paperless feedback on assessment tasks

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The EASTS system provides distance students with a timely and effective electronic assignment submission facility and this has had a high degree of acceptance. Although the submission process is fast and efficient, the marking and return process, which is undertaken using printed documents, involves multiple handling with inherent delays, along with significant printing, postage and staff costs. This paper will describe the preliminary results of a formal trial of the ‘paperless’ submission, marking and return of student assignments.

The trial, which commenced in Autumn 2005, has been funded by the Division of Information Technology, and is supported by the Learning Materials Centre. It will evaluate currently unused features of the EASTS system for online return of feedback files, as well as the use of various marking technologies and procedures intended to address potential barriers to paperless marking for academics. For example, a tablet computer with handwriting capabilities, dual screen displays, audio feedback devices and relevant features of Microsoft Word and Excel are all being evaluated. Information on student and academic perceptions are being gathered using a combination of questionnaires and reflective logs.

Background

The EASTS (Electronic Assignment Submission and Tracking System) has been very well received by Distance Education Students, with the vast majority in many disciplines now submitting their assignments electronically. Griffin (2004), in a report on the EASTS system provides the statistics to support this claim:

Statistics maintained by the LMC’s Assignments unit indicate that for the 2003 calendar year, the EASTS system received in excess of 60% of all assignments submitted by the University’s Distance Education (DE) students. This equates to approximately 70,000 file submissions and in excess of 900,000 pages being printed in 2003. This represents a significant increase from 61,500 files (approx. 50% of all DE assignments received) and 700,000 pages in 2002 and a base of approximately 40% of all assignments received in 2001. The trend toward electronic assignment submission remains constant and CSU’s escalating online presence, coupled with increasing internet availability for students, the estimated percentage of DE assignments received electronically during 2004 is expected to reach 70%.

Although the EASTS system has capability for electronic return of assignments in addition to electronic submission, the potential for paperless marking and electronic return of assignments has only recently begun to be explored. As well as the potential for improvements to the quality of feedback and faster turnaround times (discussed further below), there is also the potential for substantial savings in the administrative costs associated with handling student submissions.

This paper presents the initial results from a year-long trial of paperless marking by four lecturers and four casual markers in 14 Information Technology subjects. The trial, which has been funded by the Division of Information Technology and supported by the Learning Materials Centre has built on the findings of an earlier trial of paperless marking in 2004 by two of the investigators, Daryl Miller and Anthony Chan. This initial trial identified a number of barriers to efficient and effective paperless marking. Thus, one of the goals of this trial was to explore possible solutions to these barriers. For example, one of the key problems identified was the laborious process required in adding commentary to student work, when compared to the convenience of handwritten annotations. To address this, the use of a tablet computer allowing electronic handwritten annotations has been trialled. A second key problem identified was the inconvenience and time consumed switching between viewing the student’s assignment and viewing the feedback sheet when using a single monitor. A solution to this problem using a dual monitor configuration has also been explored. In addition to addressing these issues, the project also includes an evaluation of the features of the EASTS system for electronic
submission and return of student work, from both the academic and student perspective. More broadly, student views on the desirability of more widespread use of paperless marking have been sought.

**Method**

The project began with an exploration of appropriate marking strategies and hardware and software configurations in the early part of Autumn session 2005. Selected strategies and configurations were then trialled in eight subjects with a total enrolment of 290 students in Autumn 2005. This trial was primarily qualitative, with markers recording their personal reflections on the techniques and configurations used.

The assignment types included in this trial included programming, web development, short written exercises, and written assignments with diagrams. The hardware configurations included conventional desktop computer, laptop, tablet computer and desktop computer with dual monitor. Feedback techniques included insertion of comments into a Word document, handwritten comments created using the tablet computer and converted to PDF and embedding of a spreadsheet showing feedback against criteria in a Word document.

An online survey of student perspectives on the paperless marking process was undertaken at the conclusion of the session (after obtaining approval from the Ethics in Human Research Committee). Based on the results of this qualitative evaluation a systematic quantitative evaluation of a smaller number of proposed approaches will be trialled and compared to traditional marking approaches using seven subjects in Spring 2005.

**Results**

**General Lecturer Reflections**

The following are the key advantages of paperless marking that have been identified:
- ♦ Reduction in the time taken to provide feedback to a student;
- ♦ Improvement in the quality of the feedback returned to a student, by eliminating problems students encounter interpreting hand-written comments, and through the potential to provide richer feedback with the use of visual and aural information in addition to text;
- ♦ In some situations providing greater flexibility in handling submissions, for example making it more convenient for casual markers to retrieve the assignments;
- ♦ Potential improvement in the management of student submissions due to a copy of the assignment and feedback being retained thus allowing the feedback to be later discussed with the student; and
- ♦ Potential improvement in the monitoring of student submissions, for example in making checks of plagiarism or collusion more systematic.

The following are the key disadvantages of paperless marking that have been identified:
- ♦ Better planning is required to manage paperless submissions, for example to advise students on the procedures to be followed for submission and retrieval of feedback;
- ♦ The required hardware and software to mark student submissions effectively and for students to read their feedback;
- ♦ Generally paperless marking increases the handling time for student assignments, due to the additional time required to download the files and upload the solutions, along with the additional quality assurance processes to ensure that assignments are sent back to the correct students; and
- ♦ Some markers have also found that paperless marking increases the time required to mark each assignment;
- ♦ Reduced flexibility with paperless marking, for example it becomes impractical to mark one question for all assignments, then the next question for all assignments, and so on, due to the time delays in opening and closing documents.
Results of Student Survey
Fifty-seven of the 290 students enrolled in subjects which used paperless marking responded to the online survey made available at the end of Autumn session 2005. Figure 1 shows the distribution of respondents according to study mode.

![Figure 1. Survey respondents by mode](image)

In most of the questions, students were provided with a statement and were asked to indicate their degree of agreement from very strongly agree, to neutral to very strongly disagree. For example, students were asked to indicate their degree of agreement with the statement “I prefer electronic submission through the EASTS system to conventional submission of assignments (via post for distance students or through an assignment box for on campus students)”. Figure 2 shows the results which suggest that respondents overwhelmingly prefer to submit their assignments electronically.

![Figure 2. Submission preference](image)

Students were asked to respond to the statement “I prefer typewritten or word processed feedback on assignments to hand-written feedback”. This question was designed to determine whether typewritten feedback was important irrespective of whether the feedback is then printed or provided electronically. The results are presented in Figure 3. Clearly there is a very strong preference for typewritten feedback.
Students were then asked to respond to the statement “I prefer to receive my assignments back via email or the web rather than by conventional means (in the post for distance students or in class time for on campus students)”. This question was intended to focus on the delivery of the feedback rather than the form of the feedback. The results are presented in Figure 4. There is a clear preference for electronic feedback. Figure 5 summarises the responses to this question by study mode. This chart illustrates that there is a sizable minority of on-campus students who would prefer to receive their feedback through conventional non-electronic means.

Figure 3. Feedback preference

Figure 4. Feedback retrieval preference
Students were asked to respond to the statement “If assignment feedback is to be electronic, I would prefer to download it myself from an online system rather than having it emailed to me” and the results are presented in Figure 6. There is no clear preference for either web based retrieval or emailed return of assignments. This probably suggests that the system should allow either for students to choose how their assignments are to be returned or for assignments to automatically be both emailed and posted to the web.

Students were asked to respond to the statement “the existing EASTS system is an effective tool for electronic submission of assignments” and the results are presented in Figure 7. It is clear that students on the whole are happy with the submission part of the EASTS system. They were also asked to respond to the statement “The existing EASTS system is an effective tool for the electronic retrieval of assignment feedback”. The results here, which are presented in Figure 8, indicate that students are not as overwhelmingly happy with the features of EASTS for retrieval of feedback as they are with its features for submission of assignments.
Figure 7. Effectiveness of EASTS for submission

Figure 8. Effectiveness of EASTS for feedback retrieval

Comments by Students in the Survey

The following were comments given by students for why they thought there should be wider use of paperless marking:

♦ I got my assignment back in under 6 hours of handing it in!
♦ Allows students to actually read the comments/feedback on their assignments - some lecturers handwriting is extremely hard to read and understand
♦ I can keep my feedback (marked Assignment) electronically, stored on disk with the submitted Assignment
♦ It allows students to submit assignments in their own time, rather than being limited to the hours that the school office is open.
♦ Gives all due day to work on assignment rather than till 5pm.

The following were comments by students for why conventional (printed) marking is better than paperless marking:

♦ It’s more personal.
♦ It is not convenient to recheck the feedback!
I’ve heard of some lecturers complain about using EASTS, saying that it is too difficult to mark assignments electronically, and that not enough tablet PCs are available to mark assignments on EASTS.

EASTS is a scary thing to use. You always have a fear that it won’t come out the way you want and you’ll never know until you receive feedback from a lecturer.

One thing that worries me is security. If it were used more widely, students could hack and get other students marks.

There will be less problems in retrieval, as the lecturer just has to hand out the feedback.

The following are student comments on the ease of use of the EASTS system for submission of student assignments:

- EASTS should be expanded to accept more content types
- EASTS should accept PDF files
- Interface is very clunky and dated
- When you select EASTS from within the subject, you still have to select the subject [again].
- It is very difficult to know how far along an upload is coming.
- You should clarify on the EASTS page that you can send more than one file.
- ‘Too Slow!’ for submitting about 4MB assignment, It may be timeout, it need to be submitted several times

The following are student comments on the ease of use of the EASTS system for retrieval of assignment feedback:

- The system is confusing. Why do I get a doc format back when it should be pdf or xls?
- There needs to be a standard format for receiving the Assignment. Sometimes I received a *.doc file which I had to rename to a *.pdf, other times it was a real *.doc file!
- Currently it is very hard to find and unclear of what to select to receive your feedback
- Better system feedback as to what format the marked assignment is to be downloaded in is required
- I think we should be able to download the assignment from a particular location instead of receiving emails as they get stored as junk mails if the particular “email-sender” is not known

The following are some additional student comments:

- I prefer the “handwritten marking” with a tablet computer to the insertion of comments
- [paperless marking] was one of the best things that happened for the overseas distance education students
- for some of the particular assignments it was harder to submit the actual assignment work via computer than it would be to hand write it

The last specific question on the survey was “Do you think that electronic paperless assignment feedback should be used more widely?” The results are presented in Figure 9. Clearly the vast majority of students would like to see paperless marking used on a wider scale.
Conclusion

The results so far suggest that students overwhelmingly prefer paperless submission and return of assignments. From the marker’s perspective, there are advantages to the use of paperless marking for some types of assignments. There are however a number of issues still to be resolved, and substantial improvements to the EASTS interface are necessary before the use of paperless marking should be encouraged more widely.

Reference

Professional portfolios: An autobiographical brag book?

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As part of the application process for the 2004 Minister for Education and Training and Australian College of Educators (ACE) Excellence in Teaching Award, I was required to document evidence of my “teaching excellence” against prescribed criteria. These criteria formed the basis for the selection of artefacts that demonstrated my professional competence and growth. I presented this eclectic array of student work samples, subject outlines, teaching evaluations, professional association memberships and feedback from professional development seminars in what appeared to me as a “brag book”. You know, the small photograph album that grandma carries to showcase the excellence of her genetic line. At first I thought that this contrived document really was a case of showing off, but as I painstakingly justified the inclusion of each artefact, I came to realise the reflective potential of such a portfolio. This paper will report on the personal and professional advantages of preparing a portfolio. PS. Yes, I won the award!

The nature of portfolios

Portfolios have the potential to serve many purposes. These purposes vary depending on the person creating the portfolio, the context in which it is constructed, and the audience for whom the portfolio is intended. Portfolios are not merely a container of teaching materials and student work samples nor are they a “scrapbook of teaching memorabilia” or memoirs (Campbell, et al. 2004, p.3). They can act as a proving tool, providing and justifying a selection of artefacts that validate practitioners’ knowledge, skill and professional growth and competence against externally-imposed criteria (Darling-Hammond, Wise & Klein, 1995). More recently, portfolios have been advocated as an instrument for teacher assessment in relation to professional standards and accreditation. Dietz (1993) offers a view of portfolios as self portraits (p. 8) and states that a portfolio is

an envelope of the mind, a collection of essential artefacts, and evidence that represent growth, continuous learning, and the current level of performance and interests of the learner. It is meant to be dynamic and changing as the learner experiences discoveries that lead to new directions and activities.

As practitioners construct narrative around each of their selected artefacts they are essentially creating an autobiography (Antonek, et al. 1997). This autobiography assists practitioners to examine their professional identity (Britzman, 2003; Walkington, 2005), reflect on the decisions they have made regarding curriculum design and implementation (Darling-Hammond et al. 1995) and create opportunities for educational change.

There are however, critics of the use of portfolios; viewing them as political and bureaucratic tools for surveillance (White et al. 2004), generating controversy around their corporate management model of teaching (Locke, 2001) and critiquing their ability to be authentic (Sachs, 2003).

Despite these criticisms, I enthusiastically prepared my portfolio in the knowledge that this process would allow me to celebrate my professional achievements and engage in a conversation about “who I am” in my professional life, and how I have come to be this person.

Portfolios as reflective tools

As teachers embrace the discourse of reflection, they are invited to select moments in their practice to revisit and (re)examine from multiple perspectives. As reflective thinkers, teachers are encouraged to make connections between experiences, values, and beliefs and the ways in which these personal
ways of knowing are played out in their decision-making in teaching contexts. “Reflective teachers are able to monitor, reflect, and make decisions appropriate to the changing needs of students and the demands of the context. … they can look at their own work with critical inquiry to initiate change” (Chamberlin, 2002, p. 70). As such, the portfolio has the potential to act as a canvas for recording reflective narrative and mapping incidents of growth and change.

The teaching award portfolio

The teaching award application required me to provide substantive evidence to validate my teaching excellence in each of the following areas:

- Professional beliefs and values;
- Context of teaching;
- Curriculum content;
- Pedagogy;
- Assessment and reporting of student learning; and
- Professional values, learning and development.

Framed in Vygotskian theory, my portfolio showcases evidence drawn from my students, my classrooms and our shared communities. It is a landscape of material that has both informed my practice and exhibits the outcomes of my students’ synthesis and application of their learning. A further inclusion in the portfolio was a career map; an opportunity as I saw it, to exhibit “where I had been” and “where I saw myself going”. I viewed this requirement as a reflective and celebratory journey of my professional accomplishments and learning experiences.

Conclusion

As a participant in this intrinsically-rewarding process, I recognise the opportunities that preparing a “presentation” or “showcase” portfolio offers. I can now clearly articulate to my professional peers what I am doing in my classroom, what theories have informed my doing, why I have made decisions regarding teaching and learning, and how I have improved my practice as a result of critical reflection.

References


1 one which focuses on “the connections between people and the cultural context in which they act and interact in shared experiences” (Crawford, 1996)
Getting to know you: 
The experience of an interdisciplinary teaching model

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Modifications in health care delivery models have led to NSW & Victorian state governments encouraging integrated models of practice especially in the rural sector. Therefore, the philosophy of those responsible for developing the allied health programs within the School of Community Health has been to promote students’ ability to work in an interdisciplinary collaborative framework as potential members of rural health care teams. This paper will present the findings from research undertaken in 2005 with funds from a Charles Sturt University (CSU) scholarship in teaching grant, to evaluate the use of an innovative interdisciplinary teaching approach applied in the School of Community Health. Findings describe students’ perception of team dynamics and team roles in the allied health context both as newly enrolled allied health students, and after participation in the interdisciplinary subject. Recommendations are made about the education of allied health professionals for rural and regional teamwork.

Working in health care teams is an integral part of being an allied health professional in the current Australian health system and especially in rural practice. Scrutiny of brochures for allied health undergraduate programmes, and advertisements for allied health graduate positions, reveals a recurring theme, the ‘ability to work in teams’. In addition, government documents show emerging foci on integrated care models especially in rural contexts. The New South Wales (NSW) government health department has even adopted the slogan ‘working as a team’ to show where their emphasis lies. Indeed, in the NSW government, directives on improving quality of client care state that ‘whenever possible, a multidisciplinary approach should be taken in applying concepts and strategies’ (Clinician’s tool kit 2001). Team work may be even more important for rural allied health professionals as multidisciplinary practice is seen as a vital strategy in helping to reduce isolation by providing ‘professional peer support to local clinicians’ (Rummery & Bowles, 2002). Rural communities are also seen to benefit from integrated practice models as they are ‘more consistent with a patient centred model of care’ (Rummery & Bowles, 2002).

Allied health professionals need specific skills if they are to be able to work effectively together. Detailed review of the health care team (HCT) literature reveals that a complex labyrinth of interdependent factors influences HCTs. It is evident that HCTs rely on these factors being finely tuned, with alterations in a single factor influencing several others. Small changes can result in a loss of team equilibrium, which may alter the perception, and experience of those involved with the HCT. Of importance is that teams (by their nature) are comprised of individuals. Thus, each team is unique (Hyrkäs & Appelqvist-Schmidlechner, 2003). Studies have found that if team conflict and failure are to be reduced, allied health professionals need greater understanding of individual roles, skills and expectations, in order to avoid stereotyping that may at times be negative (Hilton, 1995; Pietroni, 1991). As well, this understanding needs to be developed early in their education if it is to prove effective (Clark, 1997). Therefore, if allied health professionals are to work effectively together they need to have an understanding of factors that affect HCTs, and have knowledge of their own attitude and bias in relation to HCT work and the professions.

The School of Community Health at Charles Sturt University is in a unique position in that four rural allied health courses (occupational therapy, physiotherapy, podiatry and speech pathology) are offered at the same time on one campus. When students from these courses graduate they need to be able to work effectively in a range of mixed discipline health care teams. Essentially graduates from these four disciplines need to be able to learn to work together so that on graduation their different contributions will complement the care of their clients (Leathard, 1994). CSU grasped an ideal opportunity to enable these four health disciplines to learn together in the same environment, and to evaluate the effects of this learning model.
This study involved an evaluation of a first year, first semester, interdisciplinary subject (HLT101 Foundation Skills for allied health professionals, hereafter known as Foundation Skills) that was introduced in the School of Community Health at Charles Sturt University in 2004 for internal students. The subject introduced allied health students to the Australian health care system, being an allied health professional, being a member of a team, health care team models, generic skills in allied health (i.e. communication, client assessment, client record writing etc), and finally academic and scholarship skills (i.e. academic writing, referencing, information technology use etc). Prior to the implementation of Foundation Skills students from these courses were enrolled in the same subjects to learn anatomy, physiology and psychology. Informal observation revealed that students tended to sit in their discipline groups within the lecture theatre with little integration of professional groups occurring. The difference with Foundation Skills was not only the inclusion of material pertinent to allied health teams, but that students had to work collaboratively in mixed discipline groups in order to successfully complete the subject. Our plan was to develop a subject that assisted students to become more aware of their own attitudes and biases, as they developed teamwork skills in communication and collaborative processes.

Foundation Skills was developed and delivered by representative academics from the four allied health disciplines, with support from educational designers and academics from other fields such as gerontology, leisure & health and indigenous studies. A single academic from one of the allied health professions coordinated the development and delivery of the subject. Students experienced a range of lectures and workshops that used a variety of teaching methods. In most instances students were exposed to combinations of allied health professionals who developed and delivered lecture material. The aim was to model as well as teach interdisciplinary practice. In the first lecture, students were placed in groups of between six to eight, where each profession was represented, and no profession had more than two members. Students worked in these groups during the interactive elements of the lectures. Workshop classes were made up of three or four of the groups, and required students to interact in these groups during activities. A key assessment item depended upon students working collaboratively in their groups.

The key aim of this study was to explore the impact of this model of interdisciplinary learning on both students and lecturers who participated in this subject in autumn session 2005. This study also aimed to establish whether this model of learning changed students’ perception of their profession and HCT work. Finally, the impact on lecturers of being involved in this interdisciplinary teaching model was explored. This paper will focus on the students’ experience.

**Method**

A mixed methods approach using quantitative and qualitative research methods was used with two groups of participants eligible for inclusion in this project: first year students in occupational therapy, physiotherapy, podiatry and speech pathology; and lecturers who represented each of the disciplines that were involved in the development and delivery of Foundation Skills.

**Data collection**

Multi-source data collection was used and involved questionnaires, focus groups, semi structured interviews and field notes.

**Questionnaires**

Questionnaires were developed after a review of the literature pertaining to HCT and interdisciplinary teaching models. The questionnaire involved 40 items divided across the three domains. A series of closed-ended questions asked participants to rank their response on a six point likert scale (1 being strongly disagree to strongly agree being 6). The first domain consisted of the 18 item Interdisciplinary Education Perception Scale (IEPS) (Leucht et al 1990) This table has proven reliability in testing allied health undergraduates. The remaining two domains covered ‘HCT dynamics’ (14 items) and
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‘personal perception of working in a team’ (8 items). Participants also had the opportunity to provide open-ended responses. First year students completed their first questionnaire in week one of the subject, and a second when they completed Foundation Skills. The questionnaires were piloted on the inaugural cohort in 2004, with minor adjustments being made to reduce the number of items, remove redundant items and clarify the language used in the items.

Focus groups
A random sample of first year students was recruited for two focus groups, which were used to explore aspects that arose from the questionnaires and students’ experience of being involved in an interdisciplinary model of learning.

Semi structured interviews
All academics involved in this subject were given the opportunity to participate in semi-structured interviews. These were conducted by an independent researcher who was not involved in Foundation Skills.

Field notes
All subject development activities were documented since inception to give a clear record of the process of development.

Data analysis

Questionnaires
The questionnaires were divided into two subsets (those completed in week one and those in week 12 at the end of the first semester of study as an allied health professional) for analysis across the four professional groups. The data were collated, and statistically analysed using non-parametric statistics. Frequency calculations and cross tabulations were performed on the results. To explore differences between the subsets the Wilcoxon signed-ranks test (T) was used. The Kruskal-Wallis one-way analysis of variance by ranks (KWANOVA) was used to explore the differences across the professional groups. If the KWANOVA proved to be significant, a priori testing of that item with the Mann-Whitney U test was undertaken to establish where the difference lay. In all tests, an alpha level of 0.05 was used. All statistical calculations were carried out using SPSS version 12.0.2 for windows software package.

Focus groups and semi structured interviews
All focus group and interview data was transcribed verbatim. Data analysis involved the identification of themes which were then considered in relationship to the whole, according to the principles of the hermeneutic cycle (Tesch 1990).

Results
All students returned a questionnaire in week 1 for a 100 percent return rate. In week 12 only 73 students elected to return their questionnaire for a return rate of 48 percent. Whilst a significant proportion of the occupational therapists (OT) returned a second questionnaire, there was a major drop in the return rate for the other three professions; this was particularly evident for the Podiatrists (Pods).
There was no statistically significant difference between the professions in their attitude to teamwork on entry to their programs; all four profession groups displayed positive attitudes to teamwork. However, comparison of start data with data from the finish showed that the four professions’ attitudes to teamwork altered in statistically different ways. Whilst all four retained a positive attitude, the physiotherapists (PT) showed a drop (.003) and the speech pathologists (SP) a raise (.005) in their enjoyment of teamwork. It is also interesting to note that whilst the SP and OTs retained a strong preference towards problem solving in a team, these two professions showed a shift towards agreement with the teamwork item that states ‘I prefer to make decisions by myself’. These students may have recognised that problem solving in teams allows individuals to hear ideas from other people, whilst decision making in teams requires people to relinquish control.

Attributes that students identified as being necessary for effective teamwork fell into three domains ‘professional’ ‘personal’ and ‘team’. In the start, of the three domains, the personal attributes featured the most, perhaps reflecting students’ primary focus in week one of their exposure to university life and their new career as allied health professionals. All students identified ‘being a good communicator’ as the most important attribute for effective teamwork; recognition of communication strengthened from the start to the finish changing from over 70% to over 85% of participants. Whilst the team attribute ‘cooperation & flexibility’ was seen to be important to at least half of the OT, PT and SP, few Pods felt this way. However, by week 12 this attribute (along with other team attributes such as, ‘respect’ and ‘honesty & responsibility’ that received little attention in week 1), increased in importance, with more than 70% of all students and 90% of the Pods deeming cooperation and flexibility as one of the most important attributes for effective teamwork (figure 1).

Barriers to effective teamwork identified by students fell into two domains: personal factors; and interpersonal factors. The key change in students’ opinions at the end of the session was that a greater percentage identified poor communication, power struggles and disinterest in the team as being important barriers.

Evaluation of data related to students’ understanding of HCT dynamics revealed differences amongst the professional groups on entry to their program on three key items: ‘all HCT members should be good at problem solving’; ‘all HCT members should come up with innovative ideas’; and ‘the power in HCTs should be shared’. Whilst less than half of SP believed that all members should problem solve, three quarters of the OT, Pods, & PT agreed that problem solving was important. Conversely, whilst approximately half of the OT, Pods, & SP agreed that all members need to be innovative, more than three quarters of the PT were convinced that this was important. Whilst the majority of all professions believed that power should be shared, the PT were more unanimous on this point with over 90% in agreement. By the finish of the subject things had changed. All four professions were now in agreement on problem solving, the need to be innovative and power sharing in HCTs. The key statistical differences now lay in three different items ‘all HCT members should agree with decisions made by the HCT’, ‘all HCT members should be strongly committed to the HCT’ and ‘HCT members should feel free to challenge the leader’. By the end of the session few OTs believed that all HCT
members should agree with HCT decisions, whilst the half of the SP felt that agreement was important. It was evident by the end of the session that all the students strongly agreed that members should be committed to the HCT, but the SP showed a trend to be less committed. As far as challenging the leader, the PT would appear to be the least likely to do so.

Conclusion

This research has shown that these allied health students entered their respective programs with a desire to participate in teamwork; a vital factor that will assist us to train them for rural practice. However, whilst it is evident that there are some key similarities between these 1st year students there are also important differences. A major aim of Foundation Skills was to encourage students to be open-minded in their interactions with all people, as they learn early scholarship and professional skills. The findings from this research support our belief that we achieved this aim.

Acknowledgements

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References


Developing a student centric MBA subject:  
My adventures in online learning

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This paper provides reflections on an early career academic’s attempt to create an interesting and relevant ‘real world’ subject to the students, by providing a stimulating online learning environment where the students can engage with each other, the lecturer and professional literature. The paper initially provides an overview of the development and delivery of the subject materials. In order to emphasise the thought processes of the academic, this overview is presented in the form of a script. What has worked well, and what hasn’t, are then reflected upon by the lecturer. Hurdles to a successful implementation of an online subject, such as the lecturer’s academic inexperience, poor delineation of responsibility for online subject preparation, and student reaction to a ‘different’ learning experience are recognised. Lessons learnt and suggestions for overcoming hurdles, including the identification of champions are enunciated. Implications for the individual lecturer in adopting an online subject, including career and time management are discussed.

Putting it together

The development of the MBA subject took place somewhat irregularly over a period from when I commenced at Charles Sturt University (CSU) in July 2004, till when subject delivery commenced in May 2005. Shortly after I commenced employment I ‘discovered’ I was to write the subject material for Business Information Systems, a core subject in the new MBA program at CSU. In the following script I relate my early experience to demonstrate my feelings and thoughts. The words in italics represent my thoughts (albeit exaggerated) at the time of the event. The script is exaggerated to place emphasis on my thoughts as a lecturer. The script is not an historical record of past events, and shouldn’t be taken as fact.2

Lecturer: “Where do I start?”
I knew I had to start writing subject material but the School’s Educational Designer was on extended sick leave so I telephoned the Professor in charge of the MBA for advice.

MBA Professor: “The first thing you need to do is to get the subject profile, just download it from CASIMS.”

Lecturer: “What the heck is CASIMS?” “In your experience where is the best place to access CASIMS from?”

MBA Professor: “Your School secretary should be able to find it”
I then contacted the School secretary who did manage to find it.

Lecturer: “This subject profile has Learning Objectives and topics. This is wonderful. I wonder what materials are required for a subject. I can see what goes into ACC200, but those postgraduate subjects have a big white folder. Perhaps I need an ED”

I telephoned the Professor in charge of MBA again.

Lecturer: “Sorry to bother you again but I think I need an ED”

2 While the narratives for the rest of the paper remain in first person format, it is acknowledged that significant input was provided by the second author, the School’s Educational Designer.
MBA Professor: “Well, you can use one from my campus, or use one from another school on your campus”

Lecturer: “Who is the one from your school”

MBA Professor: “[Name], but our ED is on leave for four weeks.”

Lecturer: “I think I’ll use one from my campus.”

I emailed the ED and waited two days for a response.

Lecturer: “I thought the EDs were supposed to be here for the academics. I have to get this thing started. I’ll catch him in his office”

I walk down to the ED’s office and he is walking out the door. I strategically block his exit.

Lecturer: “You’re not going anywhere.” “I need to know how to start writing subject material for an MBA subject.”

ED1: “You need a template. I’ll email you one.”

I receive template via email.

Lecturer: “This is totally different to my accounting subject.”

I telephone ED1 to investigate.

Lecturer: “The template has some slight differences to my accounting subject.”

ED1: “Don’t worry. That’s because the template I sent uses the official CSU outline and sections”

Lecturer: “Now I am totally confused.” “Okay.”

I contact the publishers and arrange to be sent some Business Information Systems textbooks, which I start reviewing. ED2 returns from leave and I arrange a meeting to discuss the writing task and my teaching goals.

ED2: “I think you should put the subject online. It’s pedagogically sound, using the design I have in mind results in constructive alignment, and more easily differentiates your formative and summative assessment.”

Lecturer: “I’ve got no idea what she’s talking about but it sounds good.” “OK.”

ED2: “We need to arrange an appointment with the LML.”

The lecturer gazes back with a blank look.

ED2: “Learning Media Laboratory. They do some excellent cutting edge work, besides you get 1 point for your PBF.”

PBF (Performance Based Funding) was one of the first acronyms I learnt, because the Head of School had explained how important the PBF measures were.

Lecturer: “You’ve won me.”

An appointment with the LML coordinator was made, and in her office she demonstrated computing equipment, video camera, video editing software, graphics programs etc.

Lecturer: Drooling “I love this place.”

LML coordinator, ED2 and lecturer then sit down to discuss subject.

LML Coord: “So what colour do you want?”

Lecturer: “Who cares”

ED2: “Faculty Orange would be good, but the tangerine is a little bright, you might need to tone it down a little.”
Lecturer: “Well colour is one thing that I’m not going to have to worry about.”

After some discussion, we decided on the structure of the subject, to place subject content on CD and online, and worked out the colour scheme (with little input from myself on the latter). With much assistance from ED2, I eventually provided all the content to the LML coordinator, who worked tirelessly to manipulate the content into html format, and the subject material was able to be delivered on time to students. Well, almost!

The package

Despite what impressions the reader may have gained from the previous section, I did have a goal when preparing the MBA subject. I wanted to provide a stimulating online learning environment where the students can engage with each other, the lecturer and professional literature. This aligned with my teaching philosophy of providing innovation by utilising the latest technology, and also facilitates a more authentic learning experience (Brown, Collins & Duguid, 1989; Cognition and Technology Group of Vanderbilt, 1990, Harley, 1993; Bransford et al, 1990). This authentic learning experience was also in line with the CSU slogan at that time, a ‘Real World MBA’.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Outline</td>
<td>Print</td>
<td>Overview of Subject</td>
</tr>
<tr>
<td>Study Guide</td>
<td>CD &amp; Online</td>
<td>Explanation of various topics, with references to textbook, and hyperlinks to Readings and appropriate websites</td>
</tr>
<tr>
<td>Readings</td>
<td>Print and also in PDF format on CD-ROM, and links to Proquest materials</td>
<td>Mainly from professional literature, to provide a real world basis for Business Information Systems</td>
</tr>
<tr>
<td>Textbook</td>
<td>Print</td>
<td>Covers a broad range of topics, with a number of Real World case studies for each topic</td>
</tr>
<tr>
<td>Forum</td>
<td>Online</td>
<td>Main subject forum for general questions and discussion relating to subject. This is also the area for posting group syntheses.</td>
</tr>
<tr>
<td>Group sub forum</td>
<td>Online</td>
<td>The online forum tasks for topics 1-3 were responded to in a group sub forum comprised of 8-10 students. The group as a whole were then required to produce a group synthesis of responses to the first three topics, which was then posted to the main forum</td>
</tr>
<tr>
<td>Topic sub forums</td>
<td>Online</td>
<td>Forum tasks for Topic 5 onwards were posted to individual sub forums for each topic.</td>
</tr>
<tr>
<td>Optional workshop</td>
<td>Face to face</td>
<td>An optional workshop was undertaken in Sydney at the end of week two, to explain structure of subject and provide overview of subject content.</td>
</tr>
</tbody>
</table>
Table 2. Assessment items

<table>
<thead>
<tr>
<th>Assessment Items</th>
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<tbody>
<tr>
<td>Task 1 – 25% Online forum task required to be posted to group sub forum each week. Each group then needs to prepare a synthesis of all responses to Topics 1-3, which is then posted to main forum so other groups can read and comment on others’ contributions. An assignment must then be written by individual student based on one of the forum topics.</td>
</tr>
<tr>
<td>Task 2 – 25% Online forum task for Topics 5 and 6 required to be posted to Topic sub forum each week. A detailed case study required to be responded to in a written assignment.</td>
</tr>
<tr>
<td>Exam – 50% Comprised of multiple choice, short answer, and case study questions.</td>
</tr>
</tbody>
</table>

The Jana Pittman technique: Hurdles and how to overcome them

The biggest stumbling block in preparing the subject material was the lecturer’s academic inexperience. Even though I had previously gained extensive professional and industry experience, this was no preparation for writing an MBA subject. With the benefit of hindsight I should have declined to write the subject at such an early stage in my academic career. Although this can be a difficult response to a Head of School or Faculty Dean, sometimes it is important to recognise your own limitations. In my case the hurdle of academic inexperience was overcome through the identification of champions, who believe in your goals, and are as passionate as you about seeing the task through to the end. The School’s Educational Designer and CELT’s LML Coordinator were supportive throughout the whole task, and there is no way I could have completed the writing of the subject without their guidance, support and encouragement.

Another hurdle was the possibility of a negative reaction by students to a ‘different’ learning experience. There were some questions and comments with a negative connotation in the first week or so of the subject. I made sure that that I addressed these promptly, explained the reasons for the alternative learning design, and paid due attention to their concerns. One issue that arose was the lack of flexibility in having to post to the forum every week. I allowed the students to post at a later date if they wished, but explained if everyone did this there would be no interaction on the topic, and therefore limited learning. What was also interesting was the fact that many students who had attended the optional workshop became advocates for the design of the subject. As we had six hours face to face I was able to explain the reasons behind this design. The students could understand the benefits of the learning design, and defended it on the forum when other students questioned it. It may have been beneficial if time and resources permitted to provide a better preparation for the demands of online learning. As Palaskas and Muldoon (2003, p. 16) suggest ‘It is essential that students feel well prepared for the demands of flexible learning and that, as well as addressing their needs through the design and development of appropriate curricula, they are provided with suitable support and induction programs.’ Students in this cohort have been used to individualised resource-based learning where students have no interactions with others in the subject and that, unless specifically sought, the only time they receive feedback from the lecturer is during assessment time. It is therefore understandable that some students exhibited initial resistance to the learning design.

An online learning environment brings its own set of learning and teaching issues where online learning appears to change the context of academics’ work compared to that previously experienced in traditional distance education. CSU is well experienced in distance learning delivery therefore, its infrastructure, policy and support systems are very much oriented to a batch print production based mode of delivery. This batch based mindset regarding material delivery, coupled with an inadequacy of infrastructure to support interactive online learning results in inherent difficulties in meeting teaching goals in an online learning context.
One of the issues that arose several times was who was responsible for certain aspects of subject delivery, and who had the final decision on certain aspects of the subject design. Once you start producing material on CD or online, then you involve the Educational Designer, Learning Media Laboratory, Division of Information Technology, Centre for Enhanced Learning and Teaching, Learning Materials Centre and often the School’s Teaching and Learning Committee. My personal belief is that the subject material is the responsibility of the academic, and the academic should be given the freedom to develop the subject as s/he chooses, (obviously taking into account the advice of other experts and also the policies of the University). There was one instance in my subject where there was a technical problem with the subject CD-Rom for one particular student. It took four weeks before the student received an adequate response from the University, because no-one was willing to take responsibility for the issue. What has subsequently occurred though, is that a new procedure has been developed which will allow a more streamlined response in the future.

**Laying yourself on the line**

There is a large body of literature which suggests that online learning enhances the quality of student learning experience. (eg see Laurillard, 2002; McCombs, 2000; Muirhead, 2000; Harris, 2002; Sherry, 2000; Brown, 2001). When applied to online learning, the fundamental principles of good teaching practice are just as valid (Chickering & Ehrman, 1997; McCombs, 2000; Ragan, 1999) but it requires additional efforts in terms of the time and effort required in the development of online materials and the time that the lecturer needs to devote in the learning process. The following reflections indicate the implications for an individual lecturer, based on my experience in one subject. Although these implications may not be replicable to other subjects and situations, they do highlight some of the issues, which need to be thought-out when contemplating adoption of online learning approaches.

With online delivery, it is not enough that students are simply given materials to read, as one would in the traditional distance education delivery (Garrison, 2000). The affordances of technology enable the formation of online learning communities where students can interact not only with the materials but also with other students and the lecturer (Moore, 1993). Therefore, when developing online materials, it requires thinking about innovative ways to engage students actively in the learning process. Indeed, one aspect of subject design for online delivery mode should maximise student collaboration and communication through the use of information and communication technology (ICT) (Laurillard, 2002; Harris, 2002). However, this involves significant time and effort. While I believe that I have achieved meaningful conversations to occur in the learning process, the time required to facilitate this has had a significant impact on other academic activities. Therefore, one of the primary issues in adopting online learning that must be addressed is the issue of time management. Time needs to be allocated to review forum contributions, but it is important not to waste time getting immersed in them. It is easy to get side tracked reading and responding to a vast range of issues on the forum, given the quality and interesting nature of some of the student responses. Moreover, there is no doubt that the administration and marking of assessment items for this subject takes longer than it would for a traditional subject with no online content. It is important therefore to adopt appropriate time management techniques to ensure best use is made of the time available. It is indeed crucial to be time efficient, eg by collating like tasks together if possible. For the first assessment task, marks were allocated for the group synthesis. When marking them, I waited until most assignments were in and collated them into groups. This facilitated the easy allocation of marks for contributions to the group, particularly as the majority of these marks were based on self- and peer-assessment.

As developing an online subject is time intensive, it is also important to balance your allocation of time with other competing priorities, particularly research, as this is becoming an area of vital importance to academic success for the individual lecturer. In the next section I explain how developing a subject for online delivery can assist one’s research goals, but time must be prioritised on a day to day basis.
**The long haul**

Given that the development of a subject for online delivery is time intensive in terms of development and ongoing facilitation and assessment, are there any benefits to the lecturer in terms of career and academic development? Given my academic experience is limited to twelve months, readers need to review the following comments in this section carefully. However the comments are based on the wisdom of practiced academics from CSU and other institutions, through both verbal discussions and from the reading of their experiences in scholarly journals.

Whilst there can be a time conflict between development of an online subject and research as noted previously, the development of a subject for online delivery can assist one’s research goals. The development of an innovative subject provides an ideal research topic for a learning and teaching conference such as the CSU Learning and Teaching conference, and in my discipline the Accounting Educators Forum. Moreover, there are often Learning and Teaching streams at conferences dedicated to a specific discipline (e.g., AFAANZ). These conferences provide an opportunity to have one’s paper discussed and reviewed by experienced peers, enabling the paper to be refined with the intention of being published in an academic journal.

Realistically it will be some time before I can develop a paper in my chosen research area of Accounting Information Systems. By undertaking some research in learning and teaching, I am able to present at conferences, and gain an understanding of the level of academic rigour, and the processes involved in academic publishing. If you choose to research in learning and teaching, it is important to know what your goals are, and to discuss these goals with your supervisor and Head of School. This is particularly important if there is any possibility of a perceived conflict between your learning and teaching research, and your research specific to your discipline.

![Diagram](https://via.placeholder.com/150)

**Figure 1. Teaching and Research Improvement Cycle**

In the long run the circular process in Figure 1 will begin to take effect. Innovative teaching facilitates research into learning and teaching, which in turn improves your teaching and the cycle begins again.
Benefits of a higher order

As an early career academic recently moved from the accounting profession, I was surprised by the overall extent of satisfaction and motivation that I personally received, when students benefited from, or expressed satisfaction with the innovative learning design that underpinned the subject delivery. Some of the typical feedback received from students has been:

- In other subjects where there has been significantly less interaction with other students it has often proven difficult (for me) to know whether I was on the right track until after assignments were returned.
- Had a forum not been an active part of the learning experience I would have missed what was clearly a critical perspective picked up by other members.
- For us the ‘technophiles’ versus the ‘non-technophiles’ brought a balanced discussion to how much importance to place on IT

Academics continue to have many demands placed upon them and it is sometimes easy to overlook that we are here for the benefit of the students. My advice is that when you have goals of using online and innovative techniques to enhance student learning then let the students know. If it works well and students appreciate your efforts, this should be reflected in the subject and teaching evaluations. However as the standard questions in the evaluations do not reflect aspects of online learning well, it may be necessary to customise the evaluation questions to make explicit whether online learning objectives were achieved or not.

Conclusion

Developing an online student centric MBA subject can be a frustrating and time consuming process. However there can be significant rewards in terms of intrinsic motivation, teaching development, research development, and professional recognition by academic peers.

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Going bush: International student perspectives on teaching and learning at a rural university campus

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While there is a significant body of literature concerned with the experience of international students arriving to study in Australia, very little of this research addresses the issue of overseas students’ transition to life and study in rural areas. What issues do international students face when they arrive in rural Australia, and how is their experience different to that of their metropolitan counterparts? This paper draws on data from in-depth interviews with non-English speaking background students from Asia, Europe and the Middle East to identify the sorrows and successes of international students arriving to study at The University of Sydney, Orange campus (now a campus of Charles Sturt University). It explores how diversity, language, academic expectations and student dynamics work in combination to construct learning experiences at a small rural learning institution.

Introduction

The Orange campus of Charles Sturt University sits atop rolling hills on the outskirts of a sizeable regional centre. The campus was historically an agricultural college, where courses on offer reflected the needs of rural farming communities; from whence its students came. In 2001, under the mantle of the University of Sydney, a generalist management degree was introduced at Orange, attracting a more diverse student population to the campus. This change was followed in 2003 by the introduction of pharmacy, information technology and liberal studies courses. At this point, the campus began to take on a more multicultural flavour, not least because international students began to arrive in Orange.

This paper reports the story of the new international students of Orange; their perspectives on teaching and learning, and their transition experience. In this way, the paper aims to explore the students’ experience of engaging with a small tertiary campus that has historically been ethnically homogenous and dominated by an ‘agricultural’ hegemony.

While Australian universities have played a role in actively seeking international students since the 1990s (Forbes & Hamilton 2004; IDP 2004), there are few existing studies (see for example Ellis et al. 2005; Levy, Osborn & Plunkett 2003) which prioritise the perspective of international students in rural tertiary institutions in Australia, and fewer studies still which attend to issues associated with the regional locality or ‘rurality’ of the culture of these institutions. Consequently, we know little about the academic and social experiences of international students making the transition to life and study in the bush. This paper seeks to go some way towards redressing this ‘gap’ in the literature.

Method

The account provided here draws on data from in-depth interviews with non-English speaking background students from Asia, Europe and the Middle East. From a total population of 24 undergraduate students who arrived in Australia no more than three years before beginning a course at Orange, 19 students agreed to be interviewed. This data has been used to describe the transition strategies and perspectives of the international students arriving in Orange.

The majority of students interviewed were studying for a University of Sydney management degree, with the balance of students enrolled in pharmacy and information technology courses. Interviews were conducted in English, but Mandarin was used intermittently to clarify the responses of some Chinese students. Audiotaped interviews were transcribed and then analysed using a thematic clustering technique (Tesch 1990; Eiseman 1997).
International Student Perspectives on Teaching and Learning at Orange Campus

Pathway to university
International students arriving in Orange in the years 2001 – 2004 generally completed a tertiary preparation course, or the senior years of secondary education, prior to entering the University. Generally this study was undertaken in an Australian capital city.

Participants did not have a preference for study in a rural location, but rather went ‘bush’ due to insufficient UAI to gain admission to their higher priority course of study and/or University. For a large number of the students interviewed, the opportunity to gain admission to the University of Sydney, irrespective of location, was an important consideration. There was also a degree of ignorance as to the location of the campus, with a sizeable number of respondents not understanding the rural location of Orange campus, often believing that Orange was an outer suburb of Sydney. This misinformation led to considerable transition anxiety on the part of some students:

The student agent told me that Orange is just an hour away from Sydney, and so I think ‘oh, ok an hour is not real far away’, and then when I came here and I was, like, five hours train ride, and this so different. (Student 2)

A surprising finding was the fatalistic approach to the decision being made regarding study; despite encouragement from advisors and the University, few students sought course or campus information from the University website, or visited the Orange campus prior to commencing their studies. In part, this lack of engagement can be attributed to Orange studies being seen as expedient; a means to an end, with the ultimate goal being transfer to a metropolitan University campus in a preferred program of study.

The rural environment
Levy, Osborn & Plunkett (2003) suggest that international students arriving at rural university campuses undergo a ‘three-tiered transition’ process that sets their experience apart from their metropolitan counterparts. Along with their city peers, international students in rural areas face “the shift to a tertiary institute” and a “move to a foreign country”. However, they are also faced with a third tier of adjustment; “the move to a rural environment” (Levy, Osborn & Plunkett 2003, p. 5). A Chinese student best describes this process:

In the first year I was quite a bit uncomfortable with it because ... just trees and fields around and so it is quite different from [home]. You know, tall buildings and everything’s there ... But after a year I really love the environment in Orange ... It is very quiet here and so peaceful. (Student 2)

The majority of Orange international students come from urban backgrounds, and many initially find the rural landscape confronting. They also describe ‘town’ as unexciting. In this sense, the Orange city centre is treated as a ‘mini metropolis’, to be compared (unfavourably) with cities like Sydney, rather than as a unique rural entity. Engagement with the community beyond the university is minimal for our participants, irrespective of duration in Orange. Yet despite the widely held view that Orange does not meet social and entertainment needs, Orange is viewed as ‘good for study’ due to the lack of distractions - a value reported as appreciated by the students’ parents.

The accommodation lottery
Orange campus is somewhat unique in regard to student accommodation in that an overwhelming majority of first year students live in residence. For most international students this means living and studying in Orange are inextricably linked, where success or failure in one area can affect performance in the other.

Across the sample of international students interviewed, the arrival and ‘settling into study’ experiences were mixed. The particular residence students were allocated to, and the composition of residents in the accommodation, had a profound influence on the quality of the ‘starting out’
experience. This ‘home environment’ affected the students’ social and academic adjustment. In the worst-case situations, where the student felt alienated and anxious in their living arrangements, due in part to a lack of contact with other international students, motivation to study was severely affected. In more positive scenarios, students developed networks supportive of study and language improvement; sometimes with local students, but more commonly with other international students. As a Chinese student describes this process:

[My] speaking skill has improved more [here] because in Sydney I had only Chinese friends all the time, and did not really communicate with Aussie people very much—only Aussie people I communicate with is teacher; so speaking skills improve here. I think because of my accommodation . . . the people in my house is very nice and they very talkful. Sometimes, at first, at beginning, I was shy to talk but they forced me to talk ... no other Mandarin speakers [there].

(Student 19)

In the classroom

The cultural and learning experiences of international students studying in Australia have been extensively researched (see for example Burns 1991; Barker et al. 1991; Ballard 1995 cited in Ellis et al. 2005), though a majority of studies only engage with metropolitan university contexts. Within this literature, however, there is recognition that the academic, cultural, social and general living issues of international students are highly intertwined and interdependent. The research also suggests that the academic adjustments that international students make are the most challenging and enduring, with teaching approach, classroom culture, academic expectations and classroom interactions with local students (Burns 1991; Mullins, Quintrell & Hancock 1995) being common sites for anxiety. Infused with each of these challenges is English language capability; influencing both academic and social transition success. As Burns (1991, p.62) describes it, “inadequate language skills and social interaction problems interweave”.

For Orange international students, the challenges of language are predominant, particularly the capacity to understand rural accents, and the need to grapple with colloquialisms and pace of delivery, from both lecturers and local students. As in urban contexts, written English is a major issue, as international students not only have to understand the nature of academic writing, but also struggle with basic English grammar, spelling and meanings. The consequences for international students are returned assignments for re-presentation, and recommendations that they seek specialist academic support.

On a more positive note, for the international students interviewed for this study, the intimacy of the Orange campus was appreciated, with a small student population engendering small class sizes, familiarity with administrators, and accessibility to academic staff. An educational approach emphasising tutorials also provides a personalised education, and the students rapidly appreciate the benefits of this style for their understanding of subject matter, and the acquisition of generic academic skills.

Lectures, despite being relatively small (always less than 100 students), are more problematic, particularly in the commencement semester. International students struggle with the pace of lecture delivery, with accent, and the word choice of lecturers. Despite valuing the tutorial process, international students struggle with the confidence to contribute to discussion and group work:

It’s actually quite hard for the international students ... because first of all the language, and you know, the other students are, like, they can just express what is their opinion and what they are thinking in English. But for us we ... need more time to translate back into English. So I think this is a kind of challenge in tutorials ... The international students are quite quiet. They [not] really used to the discussion part ... and so when you ask them to have discussion they will just stand there and don’t know what to say. It takes them some time to think and to try to explain their opinions in English. (Student 2)
For many, particularly those from Asian countries, the Australian learning environment is a challenge, as students are accustomed to a more autocratic classroom culture in their home countries where the teacher taught, and they learnt. The more relaxed interrelationship between staff and students at Orange, however, along with two-way dialogue in the classroom, and the casual classroom behaviour of local students is a new experience, despite most students having completed transition studies in Australia. On this topic, a student comments:

In China we are more reserved. If you have some problem you need ... up hand, stand up and ask the teacher, otherwise you seem to be impolite. But here you have more freedom, talk and ask teacher any time you like in the tutorial. If you some problem you just argue with the teacher ... and you achieve and get marks for talking. (Student 19)

**Relationships**

Relationships between international students and teaching staff have a mixed report card in the academic literature. A widely cited research study of international students at ANU (Burns 1991), for example, reports student perceptions of academic staff as being uncaring and uninterested. So too, Robertson *et al.* (2000, p.101) observed “a shortfall in empathy” towards international student difficulties by University of Tasmania staff. In the same study, the student participants held the perception that lecturers gave international students less attention than local students. Mullins *et al.* (1995), too, in a study across three South Australian universities, reports negative views of academic staff by international students, particularly regarding accessibility. However, interestingly, studies at smaller campuses indicate a more positive interaction with academic staff, with accessibility and sensitivity being reported towards the needs of international students (Ellis *et al.* 2005; Levy, Osborn & Plunkett 2003).

The intimate relationship between students and teaching staff at Orange campus is particularly valued by those interviewed for this study, with students clearly appreciating this aspect of their education as a point of difference with metropolitan universities; a position not gleaned from personal experience, but based on discussions with city-based international students. Teachers were seen as friendly, accessible and culturally aware:

They are like friends [here] ... In China the teachers just let ... us know you have to respect your teacher ... The students and teacher are not in same situation, on the same level. They are different groups, different age groups. So you can only talk education things with teachers. You can ask them questions but not other things ... But here can talk everything. Teacher not like real teacher. They still can even make jokes with you and laughing, have lunch together. I think it is very comfortable for them. (Student 14)

I think the teaching staff are very supportive, and I’ve learnt a lot and very friendly, very. I think they really try to help students, spend a lot of time with the students and they were excellent ... Possibly they didn’t understand my culture, but they’re showing that they understand it. Which is appreciated. (Student 5)

On the other hand, developing relationships with local students is widely reported as problematic for international students across Australia, with an inability to succeed often resulting in loneliness and isolation; emotions that compound homesickness and alienation, and impacting negatively on academic adjustment and performance (Mullins, Quintrell & Hancock 1995; Barker *et al.* 1991; Volet and Ang 1998, Robertson *et al.* 2000; Levy, Osborn & Plunkett 2003). A comparative study of three ethnic groups in New Zealand universities, for example, found that overseas students desired interaction with local students, were concerned about ‘social isolation’, and believed “heterogeneous classes facilitated the achievement of their personal learning goals” (Beaver & Tuck 1999, pp. 2,12). In the same study, however, this sentiment for integration was not shared by Pakeha students (ie. those of European descent) who placed significantly greater value on homogenous classes and less value on “opportunities for social interaction” (Beaver & Tuck 1999, p.8).
The relationship with local students at Orange campus is often problematic for international students, who generally find local students difficult to build friendships with. International students also speak of an incompatibility of values, particularly as this relates to preferred social activities. In this sense, the relationship between local students and internationals is perhaps best described as ‘tolerant coexistence’. On the positive side of the ledger, some students appreciate opportunities to mix closely with local students in the accommodation blocks, and speak of opportunities to mix with and learn from local students in tutorial group activities:

I think I learn the Australian accent, especially strong Australian accent, more than my friends in either Canberra or Sydney ... Because, especially in other universities as well they are mixing more international students. Yeah, much more, and so they seldom really speak in English, and they would just make friends with their home, like the Chinese or Taiwanese or whatever. But seldom make friends with the local students. But here, because there are just only a few numbers of international students, so I had to make friends with the local students and I think I have benefited. (Student 2)

Negative experiences, however, are also linked to accommodation and classroom interaction; students pointing to instances of racial discrimination, cultural indifference, suppression of voice, anxiety surrounding having to speak and engage, and a perception that local students do not appreciate international students as partners in group work:

When the conversation goes very fast I can understand exactly what’s going on, but when I want to give my opinion I am afraid that I will take time and then possibly the other people won’t respect that, or think that basically I’m slow. For that, I remain silent … They [also] think because, without knowing me, only talking to me or seeing me, they believe because I have English as a second language so I shouldn’t be in their group. Which, it’s very frustrating. (Student 5)

Educational approach
Concerns over language competency infuse most aspects of educational adjustment; understanding concepts and assessment requirements, fathoming local accent and colloquialisms, finding ‘voice’ in tutorials, being valued as contributors to group work, and conceptually understanding content and skills in a second language (Burns 1991; Samuelowitz 1987 in Barker et al. 1991; Mullins, Quintrell & Hancock 1995; Verma 1995). In addition, the literature reports a stereotyping of the differences between western and eastern approaches to pedagogy; the western model built on critical thinking, constructivism, and independent learning, while eastern educational systems, stereotypically, feature authoritarian classrooms with an emphasis on memorization and regurgitation (Chalmers & Volet 1997; Robertson et al. 2000). The newly arrived international student is thus confronted with an educational culture, both at lecturer and system level, that undervalues their prior learning experiences, taking a ‘deficit approach’ to their skills (Samuelowitz 1987 in Dawson and Conti-Bekkers 2002), and making assumptions about a perceived approach to knowledge acquisition that is reliant on surface learning (Chalmers & Volet 1997). Some writers have argued that the ‘primacy’ afforded to the western education model is unwarranted (Vandermensbrugge 2004) and unhelpful in supporting the adjustment of international students (Dawson and Conti-Bekkers 2002). Burns (1991, p. 62), however, takes a more pragmatic view:

Generally studies of students from South East Asia report that they have been spoon fed, regard the library simply as a place to study, lack independent thought, seek one correct answer to everything, and cram. This picture of the South East Asian student is perhaps not so different from that of the typical Australian student or any student for that matter. Most are answer orientated and cram.

In seeking help for academic problems, international students are generally unwilling to approach institutional support services, preferring to be helped by other students, particularly international students of similar ethnicity (Burns 1991; Verma 1995). Yet despite the adjustment challenges, generally international students succeed academically (Burns 1991; Barker et al 1991; Wicks 1996 in
Beaver and Tuck (1999), although the academic literature does suggest poor performance levels, including subject failures, in the first year (Verma 1995; Levy, Osborn & Plunkett 2003).

For Orange international students, the western educational approach is problematic; critical thinking, evidence-based writing, tutorial discussion, group work, case studies, oral presentations, and having to give opinions, are all new experiences for international students that do not align with their prior educational experience. These processes demand dialogue, and as such, the international student’s lack of confidence in spoken English is brought to the fore:

Because English is only second language it is difficult to study. If it is Chinese I think it is very easy, but in English I take a long time ... I also fear to meet them [local students]. I don’t know, I just fear to meet Australian people [so] the Chinese students seem to stick together. (Student 7)

Yet, the international student’s capacity to traverse the change of educational environment is clearly linked to academic ability, motivation and language skills. Within half a semester, the more academically gifted and highly motivated international students at Orange describe academic expectation in terms that support their assertions that they understand what is required, and a belief that they are performing at that level. By way of contrast, another subset of students, whose academic performance is highly unsatisfactory, are characterised by a lack of motivation and an unwillingness to participate in initiatives to assist them. In between these two groups are the majority, where levels of academic ability, language capability, and motivation result in generally modest academic performance. The majority of participants studying management, for example, failed one or more subjects in their first year.

Most participants in this study were Bachelor of Management students - the only ‘non-rural context’ degree offered by the Faculty of Rural Management. However, the degree does share subjects with the Faculty’s rural management programs and, hence, shares the education tradition that has evolved from the Faculty’s predecessor, the Orange Agricultural College. This tradition is characterised by an education model built on praxis; the linking of theory and professional practice through the integration of authentic industry and community case studies. Comparatively small class sizes have tended to foster a personalised education, with strong student-staff interaction, and a delivery model that favours tutorials and case studies. Further to this, in the late 1990s the Faculty introduced a capability development program to make explicit the embedding within curricula of generic academic skills and graduate attributes. The initiatives associated with these capabilities appear to be influential on international students; they report improvement in these skills since commencing university; this improvement being most pronounced in the first year.

Yet while this ‘boutique’ educational model should, in theory, provide a supportive environment for international students, the results of this study provide mixed messages in this regard. On the positive side, students express general satisfaction with their courses of study. On the other hand, students made few explicit comments about the Orange educational approach, beyond a few positive references to the first semester business case study, which is undertaken in small groups:

I learnt that if I want to learn something it is not only in the campus or inside a classroom. You have to go to outside world and have a look ... We talked to the manager of the company ... It’s so different, you know, because the teaching staff just teach you something theoretical, but when you have a tour and visit, they would just tell you the experience and the practical thing, so it’s much more different. (Student 2)

That’s my first interview with business. So it’s very, it was a new thing for me. We talked to the manager directly and asked him questions ... I found I’m like a university student, not a high school student. (Student 3)

This lack of awareness of ‘the Orange approach’ may be attributable to none of the participants having prior university experience, thus leaving students with a lack of a basis for comparison. A more probable explanation is that the nuances of ‘the Orange approach’ are lost in the ocean of change.
being experienced by those who have recently arrived; educationally, in terms of lifestyle, and most importantly, as they struggle with academic literacy in a second language.

Going ‘Bush’

So what are the consequences of ‘rural’ for the international student? The quiet, distraction free environment, small community, and ‘Orange educational approach’ discussed in this paper are as much a product of Orange campus’ scale of operation and physical and social detachment from Orange city, as they are its rurality. In this sense, these outcomes are ‘second order’ consequences of the rural situation, rather than a direct product of them. It is also questionable how much engagement the majority of Orange international students have with rural environments and communities. The management, pharmacy and information technology degrees have little contact with farms, farmers or rural townships. Is Orange rural, then? The answer is dependent on the observer and his or her context – city visitors might think so, but rural students from farming backgrounds would likely have a different perspective. Either way, the international students in this study report minimal involvement with things rural, and not much more engagement with Orange — their visits to ‘town’ being limited to trips to the cinema, the supermarket, the basketball stadium, perhaps employment in a Chinese restaurant, and for some, accommodation, particularly after the first year of study.

The campus has a history as an agricultural college; roots that pervade the educational and social fabric of the campus. However, this legacy has been challenged in the last decade with the arrival of a more diverse student cohort, due largely to the introduction of a range of non-rural programs that have attracted city-based students with mixed ethnicities. During the same period, there have been initiatives to internationalise the curriculum - through the introduction of international study subjects, overseas study tours, and regular staff and student educational and cultural exchanges with Chinese institutions.

For students, the primary engagement with things ‘rural’ is through contact with rural staff and students of the university. Rural students, or ‘aggies’ as they are colloquially termed, provide tentacles to the more typically rural communities of regional eastern Australia for international and city based students. However this group itself is not homogenous, with a significant cohort being educated at city-based private boarding schools, thus having lived much of their teenage years in Sydney, or other large regional cities.

Overall, the outcomes of this study align closely with the results of Ellis et al. (2005); the only significant examination of rural issues and international students studying at regional universities in the contemporary Australian literature. As in our study, international students acknowledge the positives of the rural physical environment; it is clean, quiet, safe and aesthetically attractive (once it becomes familiar). The lower cost of living in the country is also recognised, as is the lack of social distractions; a situation that is viewed as being conducive to study. Educationally, the challenges non-English speaking background international students confront with teaching and learning issues are independent of context; metropolitan or regional. However, the responses to these challenges do vary, with rural campuses reporting more intimate classroom environments, small class sizes and familiarity, and some tailoring of pedagogy to address international student needs. There is also more familiarity with staff, both academic and administrative, often leading to service at a more personalised level; an outcome less likely to be experienced at metropolitan campuses.

References


Cost effective web access to quality information

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The key features of the Interactive Experience are the depth and quality of the information presented. Interactive Experiences are cost effective when compared to video and print media. The reproduction and distribution of quality interactive information over the Internet is highly cost effective when compared to print, TV, or video. The Interactive Experience consists of high resolution still photo and panoramic photo viewers. The user is able to view micro details and gain accurate spatial perceptions by manipulating the panoramic images. In all cases the user is able to absorb a greater degree of information given the resolution and the ability to view the images at an appropriate speed. The non-linear nature of the Interactive Experience allows the user to place emphasis where they require it.

The integration of detailed diagrams and explanatory models with photography allows the user to grasp complex concepts. Annotations can be readily superimposed on photographs to draw the user’s attention to key details.

The Interactive Experience incorporates key frame digital animation sequenced together with studio recorded mp3 sound. The inclusion of sound captioning and downloadable text, provides a complete multimedia experience for each user.

The Interactive Experience is ideally suited to web based distribution over dialup connections due to its high level of compression and the lightweight nature of its image composition. The availability of Macromedia Flash Player 8 with the Microsoft XP operating system makes it an ideal medium for deploying Interactive Experiences. The use of the Interactive Experience is illustrated in the Web Based Excursion of the National Measurement Institute and the Cadia Hill Gold Mine.

Introduction

The notion of using the internet as a teaching tool is not new. The virtual chemistry laboratory has been well described by Dalguno, Bishop & Bedgood 2003. However, the use of the internet as a teaching tool is dynamic and evolutionary. Web-based learning challenges traditional classroom teaching from a strategic perspective. Whilst the paper is centred within a teaching and learning resources theme, the content resonates with curriculum design, informs professional practice, enables a better understanding of the international student perspective, and more importantly, provides an alternative to traditional lecture/tutorial mode of teaching. The paper explores several web-based excursions which further embrace the dimension of story telling to stimulate learning.

The key features of the interactive experience presented by means of the web are: the depth and quality of information presented; cost effectiveness of the reproduction and distribution of quality interactive information over the internet when compared with print, television or video. The technology is illustrated in three web-based excursions. The first is the National Measurement Institute, the second the Cadia Hill Gold Mine and third is the continuum of care for a Pre-Hospital Care cardiac arrest from Basic Life Support through to Advanced Life Support. The authors have determined that this pedagogical approach has distinct advantages:

♦ Visualisation and auditory learning for the novice;
♦ It is flexible for self-paced learners;
♦ Enables learning due to its interactivity;
♦ Makes learning fun and interesting;
♦ Uses contemporary and leading edge technology;
♦ Its application is broad and can be adapted for different uses;
♦ Aids in understanding complex concepts.
The Web-Based Excursion of the National Measurement Institute

Aim

To create a web-based excursion aimed at providing high school and tertiary education students with a superior demonstration of the process of athletic drug testing. The demonstration is based on an anabolic steroid, testosterone. The goal is to create a new level of learning experience that is unparalleled in education today.

Rationale

The rationale for a web-based excursion has several objectives. These are the interactiveness of the learning experience, efficient use of resources, inter-agency linkages and innovation and benchmarking.

Objectives

1. Interactive Learning Experience
   To capture the imagination of high school students via a multimedia presentation including sound recordings of explanations, molecular modelling of chemistry/biochemistry concepts, key frame photography to display the testing procedures and equipment used. The modern student needs to be inspired by a web-based learning experience such that they are motivated to truly appreciate the science that drives much of what we experience in the modern world. Sport itself is excitement and inspiration through the pursuit of excellence providing a consummate foundation to engage students of all ages, cultures and backgrounds. In applying the same theme to science, it encourages students to apply thinking beyond the norms and strive to discover and invent.

2. Efficiency
   Large scale distribution via the Internet to both regional and metropolitan schools in an equitable manner. Overcoming conventional financial, geographic and human resource constraints is one of the primary designs of the web-based excursion. The volume and quality of information available will exceed that which a student can experience on a guided tour of the National Measurement Institute Facility, while the cost of access via the Internet is negligible when compared to the travel costs faced by most schools.

3. Inter-agency Linkages
   A web-based excursion will be a step towards building stronger links between government, industry and education. The unique position of the National Measurement Institute as a facilitator of government and industry initiative provides an opportunity to demonstrate these linkages under one roof. Drug testing, DNA sequencing and Forensics provide the necessary scope to establish strong linkages between the use of chemistry in government, industry and academic institutions.

4. Innovation and Benchmarking
   Providing a depth of knowledge beyond that able to be conveyed by conventional media (tests, journals, articles). Access to the pinnacle of scientific research and expertise provides an opportunity to present complex concepts and procedures in ways every student will understand and find fascinating.

Content of the Web-Based Excursion of the National Measurement Institute

Based on preliminary discussions and a tour of the National Measurement Institute Sports Drug Testing Facility conducted by a young scientist, the web-based excursion includes the following content:

1. Introduction to the National Measurement Institute
   a. History of metrological components
b. Current operations.

2. Introduction to the Australian Sports and Drug Testing Laboratory
   a. History including the IOC Sydney Olympics impetus
   b. Current operations
   c. Future directions with the biotechnological shift from substance detection to genetic testing.

3. Introduction to Drugs and their effect on athletes.
   a. A definition of Testosterone
   b. Hormone demonstration via a molecular model Pharmacodynamics using “lock and key” illustration
      Steroid conjugate formation.
   c. The effect of Testosterone on athletic performance.

4. Drug testing procedure using Testosterone as the example.
   a. Sample collection – Flow chart of procedure
   b. Chain of custody – Illustration of forms
   c. Hydrolysis demonstration via molecular model Glucuronide removal by enzyme specific reaction
   d. Solid phase extraction. Illustration using vacuum manifold apparatus with discussion of organic separation principles
   e. Derivatisation – Increase volatility of molecules to enable them to be analysed by Gas Chromotography/Mass Spectrometry.

5. Instrumentation
   a. Gas Chromotography/Mass Spectrometry – Illustration with “How it Works” discussion
   b. Mass Spectroscopy – Discussion and illustration of “Molecular fingerprinting” principles
   c. Carbon Isotope Ratio analysis using Gas Chromotography Carbon Isotope Ratio Mass Spectrometry photosynthetic plant chemistry to steroids.

Security

The following security measures were employed:

♦ No urine sample was identified in any photograph, written or spoken explanation.
♦ No drawn plan, photograph, written or spoken description identified the geospatial position of specific laboratory facilities.
♦ All materials printed, written, recorded or electronic will meet with the approval of National Measurement Institute management prior to publication on the Internet.

Summary

When completed this project will stand as the new benchmark in learning experiences involving government, industry and educational institutions. The obvious extension of the successful completion of this project is the development of web-based excursions of molecular biology and forensic drug laboratories. The product and its processes will have wide exposure at national and international chemistry and chemical education conferences. Evaluation will be by means of questionnaires to School Teachers.

Web-Based Excursion of the Cadia Hill Gold Mine
Cadia Hill Gold Mine is one of the largest open pit gold mines in Australia with an expected life of 14 years from the commencement of operations in 1998. The massive low-grade one body lends itself to economics of scale through the use of large scale open cut mining and processing. The mine is a traditional drill, blast, load, haul operation using large diesel powered hydraulic shovels and 230 tonne load trucks. Production averages nearly 300,000 ounces of gold and 23,000 tonnes of copper per annum. At the end of the mine life, over 400 million tonnes of ore will have been processed. An integral element of the dispatch system is a global positioning system which uses satellite to determine precisely where each piece of equipment is within the mine to an accuracy of 1-5 metres.

Processing of the Ore
The ore is supplied to High Grade and Low Grade Contractors which treat 22 million tonnes of ore annually. Both Contractors employ a conventional grinding and flotation process to produce a copper gold concentrate with a gravity circuit to recover free gold as bullion. In the grinding process the ore is reduced to 0.1mm particles by two ball mills which combine 65mm steel balls with the ore as the grinding media. After grinding the ore undergoes a process called “flotation” to recover the gold and copper. The process forms a froth rich in precious minerals which is recovered and forms the copper gold concentrate produced by the Cadia Valley operation. The concentrate is thickened to approximately 65% solid. The recovered water is recycled as the process water and the concentrate is pumped 32 kilometres through an underground pipeline to Blayney. At Blayney the concentrate is filtered to remove the remaining water and then loaded onto trains and railed to Port Kembla, ready for shipping to overseas customers for smelting and refining.

**From an educational viewpoint, the Cadia Hill Gold Mine web based excursion has several advantages when compared to a traditional 1-2 hour tour of the mine**

1. **Cost Benefits**
The primary advantage of the web based excursion is the nil cost. The ability of every student in Australia to access the web free of charge enables equitable access to the mine for all schools. Given the rising cost of fuel, the ability of students to travel to the mine is becoming increasingly limited due to cost.

2. **Geographic Accessibility**
The first aspect that strikes the mine visitor is the expansive nature of the mine. The ability to cover the geographic distance to view all parts of the mine rests solely with the web based excursion. Given the rugged and steep terrain of the mine, the ability to travel across the site by bus is extremely limited and is not attempted in the traditional tour.

3. **Safety**
Safety while on enclosed mining sites cannot be overemphasized. Compounding this is the increasing legal and OH&S demands on teachers regarding the students travelling on excursions. Many areas of the mine are too hazardous for students to inspect and as such the ability to view all parts of the mine rests solely with the web based excursion.

4. **High Quality Exploration**
The nature of some sites within the mine prevents the effective instruction of students due to noise and confined spaces, such as walkways that only accommodate single file. A conventional tour does not afford any more than a walkthrough of such areas, in which most of the effort and attention of the student is towards safety and keeping up with the other students. In most cases the tour guide is at the front of the group and instruction is undertaken at the beginning or conclusion of the walkthrough. However the student is unable to make the connection between what they are being told and what they are walking past without explicit reference. The ability of the web-based excursion to present the site without the noise or spatial restriction and couple this together with a high quality explanation soundtrack allows the student to make connections that are otherwise not apparent.

5. **Presentation**
In presenting the parts of the mine, the web-based excursion guides the student with the aid of annotations, diagrams, animation, sound explanations and video which is superimposed into the photographic viewer. This further facilitates student understanding as the reasons behind each activity in the mine are clearly explained.

6. Controlled Environment
Given the highly logistic nature of mining, it is rare that all activities on the mine would be undertaken on the day of the traditional excursion. Events such as blasts, maintenance shutdowns and weather conditions could influence the ability of the students to access parts of the mine. The web based excursion has been constructed over several days under the best conditions.

7. High Resolution
The panoramic photograph production that enables the web based excursion allows the student to view the environment in a much greater level of detail, at a pace determined by the user. The ability of the soundtrack to be manipulated independent of the panorama allows the user to place emphasis where needed and make the connection between the learning concepts of “how and why”.

8. Active Learning
The web based excursion does not allow the student to passively view the mine. The student must engage in viewing each site across the mine from the menu. Self marking questions are presented with each panorama such that the student is required to give feedback on what has been observed and the processes outlined.

9. Equitable Access to Rural Schools
The universal technology of the Internet allows students to view the mine on any computer connected to the Internet without installation or lengthy downloads. On the ADSL (Asymmetric Digital Subscribe Line) or ISDN (Integrated Services Digital Network) connection available to all schools, the panoramic viewer commences display within a minute. Schools can store the web based excursion offline and distribute the excursion within the school on several occasions and in seconds without any downloading.

10. Ease of Update
The low cost of production allows the web based excursion to be updated quickly in keeping pace with the rapidly changing mine environment. When compared to the static nature of print and video, the web based excursion can be updated in days rather than months. The nature of web based products allows updates to the production to be instantly distributed to every school without cost. The next time a student views the production, the updates will display without any need for installation.

11. Copyright
The secure nature of the technology driving the panoramic viewer prevents students from downloading and printing the images of the sites. In this way the copyright of Newcrest Mining Limited over the images used is protected from abuse and unauthorised distribution.

Pre-Hospital Care Web-Based Learning: A Cardiac Arrest in a Pre-Hospital Care (PHC) setting. The Care Continuum – Basic Life Support through to Advanced Life Support

Background and Rationale

The Pre Hospital Care (PHC) Discipline has been established in the School of Public Health at Charles Sturt University, Bathurst since 1998. As student enrolments into this discipline have continued to rise over the years, lecturers now face several challenges as they attempt to facilitate student learning and provide relevant clinical linkages to theory and practice.
One such challenge is the placement of students into the PHC environment (i.e. with Australian ambulance authorities) for several weeks of clinical internship. Each year, there are an increasing number of ambulance officers, medical students and university students competing for limited prehospital care clinical places.

The Pre Hospital Care Web Based Learning experience is an innovative and path-finding learning strategy that has been designed to overcome the environmental problems associated with clinical internship. It has been designed to link PHC theoretical constructs with the practice of care-giving in a created environment based on approved protocols and standards of practice.

This strategy is envisioned as an adjunct learning tool to the classroom and to hands-on practice in a skills-based laboratory setting.

**Aims / Objectives**

- To develop students’ holistic understanding of the continuum of effective clinical care in a PHC cardiac arrest from basic life support to advanced life support;
- To link several individual clinical skills into one comprehensive and practice-setting based PHC scenario;
- To enable students to visualise the use of several foundational theoretical concepts and their application in the PHC environment;
- To demonstrate effective collaborative PHC team work in the clinical setting;
- To demonstrate how basic life support and advanced life support clinical skills relate in their application to a clinical reality;
- To demonstrate how clinical skills interconnect with key learning objectives in the first, second and third year of the Bachelor of Clinical Practice (Paramedic) course;
- To effectively link PHC theory with practice in a reality based environment.

**PHC Web-Based Advantages**

- The primary advantage of this learning is the portability of specifically designed web-based learning scenarios to the PHC professional context. Specifically, it would advantage ambulance officers and / or defence force medics and those working in the rural and remote environment that may be deskilling and need to maintain clinical competence. Significantly, the web-based learning tool provides both an accessible, pragmatic and theoretical pathway to ensure clinical confidence and competence.

- The web-based learning tool has direct application for other health care providers such as the St John Ambulance Association and the Surf Life Saving Association. The learning tool with its hyperlink capability provides frameworks and structures to learn with an adult learner paradigm. These providers can participate in the clinical and theoretical learning objectives of realistic PHC scenarios, thereby facilitating their understanding of the holistic professional care of the patient.

- The web-based learning tool has design opportunities to develop other clinical scenarios such as medical, trauma and disease. For example, the treatment of an unconscious diabetic patient, a victim of a motor vehicle accident or a patient with cardiovascular disease.
Content of the PHC Web-Based Learning Scenario

Pre Hospital Care Web Based Learning: A Cardiac Arrest in a Pre-Hospital Care (PHC) Setting. The Care Continuum – Basic Life Support through to Advanced Life Support

Scenario 1: Ventricular Fibrillation Arrest (Shockable Rhythm)

An Ambulance is called to 45 year old male collapsed in a classroom. On arrival, the officers find the male patient lying supine on the floor unresponsive to voice.

<table>
<thead>
<tr>
<th>Task</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRABC</td>
<td>Check for Danger</td>
</tr>
<tr>
<td>May need to log roll</td>
<td>Check patient for a Response</td>
</tr>
<tr>
<td>Ensure universal precautions</td>
<td>Check Airway</td>
</tr>
<tr>
<td></td>
<td>Check Breathing</td>
</tr>
<tr>
<td></td>
<td>Check Circulation</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Unconscious</td>
</tr>
<tr>
<td></td>
<td>Pulseless</td>
</tr>
<tr>
<td></td>
<td>No respirations = Cardiac Arrest</td>
</tr>
<tr>
<td></td>
<td>Update communications centre</td>
</tr>
<tr>
<td></td>
<td>Call for assistance</td>
</tr>
<tr>
<td>BLS</td>
<td>Ensure airway is clear</td>
</tr>
<tr>
<td>Ambulance Officer 1 Airway Management</td>
<td>Size up Oropharyngeal Airway (Guedels)</td>
</tr>
<tr>
<td></td>
<td>Insert Airway Adjunct</td>
</tr>
<tr>
<td></td>
<td>Ventilate using 100% O2</td>
</tr>
<tr>
<td>Ambulance Officer 2 Defibrillation</td>
<td>Remove clothes</td>
</tr>
<tr>
<td></td>
<td>Place pads on chest</td>
</tr>
<tr>
<td></td>
<td>Attach defibrillator</td>
</tr>
<tr>
<td></td>
<td>Turn monitor on</td>
</tr>
<tr>
<td></td>
<td>Stand clear</td>
</tr>
<tr>
<td></td>
<td>Wait for identification of shockable rhythm</td>
</tr>
<tr>
<td></td>
<td>VF identified</td>
</tr>
<tr>
<td></td>
<td>Zoll monitor will charge up for the following 3 biphasic shocks - 150 Joules</td>
</tr>
<tr>
<td></td>
<td>150 Joules</td>
</tr>
<tr>
<td></td>
<td>150 Joules</td>
</tr>
<tr>
<td>Ambulance Officer 2 CPR</td>
<td>Commence CPR 5:1</td>
</tr>
<tr>
<td></td>
<td>5 compressions: 1 ventilation</td>
</tr>
<tr>
<td></td>
<td>Check for a pulse every 2 minutes</td>
</tr>
<tr>
<td>Ambulance Officer 2 Consider Defibrillation</td>
<td>Every 2 minutes cluster shock at 150 J X 3</td>
</tr>
<tr>
<td>ALS Preparation for Drug Administration</td>
<td>Cannulation 16 G antecubital fossa</td>
</tr>
<tr>
<td></td>
<td>Flush with isotonic solution (Hartmanns)</td>
</tr>
<tr>
<td>Drug Administration</td>
<td>Set up Hartmanns</td>
</tr>
<tr>
<td></td>
<td>Adrenaline – repeat every 3 minutes</td>
</tr>
<tr>
<td></td>
<td>Lignocaine – 2%, repeat after 5 minutes</td>
</tr>
<tr>
<td></td>
<td>Sodium Bicarbonate – after 2nd dose of Adrenaline</td>
</tr>
<tr>
<td></td>
<td>(Adrenaline → Lignocaine → Adrenaline → Sodium Bicarbonate → Adrenaline → Lignocaine → Adrenaline)</td>
</tr>
<tr>
<td>On going Defibrillation</td>
<td>Every 2 minutes</td>
</tr>
<tr>
<td></td>
<td>150 J X 3</td>
</tr>
<tr>
<td>On going CPR</td>
<td>5:1 only stopping for defibrillation &amp; pulse check</td>
</tr>
<tr>
<td>On going drug administration</td>
<td>Adrenaline IV every 3 minutes</td>
</tr>
<tr>
<td>Advise hospital</td>
<td>Place Code 3</td>
</tr>
</tbody>
</table>
Scenario 2: Asystolic Arrest (Non Shockable Rhythm)

An Ambulance is called to 45 year old male collapsed in a classroom. On arrival, the officers find the male patient lying supine on the floor unresponsive to voice.

<table>
<thead>
<tr>
<th>Task</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRABC</td>
<td>Check for Danger</td>
</tr>
<tr>
<td></td>
<td>Check patient for a Response</td>
</tr>
<tr>
<td>May need to log roll</td>
<td>Check Airway</td>
</tr>
<tr>
<td></td>
<td>Check Breathing</td>
</tr>
<tr>
<td>Ensure universal precautions</td>
<td>Check Circulation</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Unconscious</td>
</tr>
<tr>
<td></td>
<td>Pulseless</td>
</tr>
<tr>
<td></td>
<td>No respirations = Cardiac Arrest</td>
</tr>
<tr>
<td></td>
<td>Up date communications centre</td>
</tr>
<tr>
<td></td>
<td>Call for assistance</td>
</tr>
<tr>
<td>BLS</td>
<td>Ensure airway is clear</td>
</tr>
<tr>
<td>Ambulance Officer 1 Airway</td>
<td>Size up Oropharyngeal Airway (Guedels)</td>
</tr>
<tr>
<td>Management</td>
<td>Insert Airway Adjunct</td>
</tr>
<tr>
<td></td>
<td>Ventilate using 100% O2</td>
</tr>
<tr>
<td>Ambulance Officer 2 Defibrillation</td>
<td>Remove clothes</td>
</tr>
<tr>
<td></td>
<td>Place pads on chest</td>
</tr>
<tr>
<td></td>
<td>Attach defibrillator</td>
</tr>
<tr>
<td></td>
<td>Turn monitor on</td>
</tr>
<tr>
<td></td>
<td>Stand clear</td>
</tr>
<tr>
<td></td>
<td>Wait for identification of shockable rhythm</td>
</tr>
<tr>
<td></td>
<td>Asystole identified (non shockable rhythm)</td>
</tr>
<tr>
<td>Ambulance Officer 2 CPR</td>
<td>Commence CPR 5:1</td>
</tr>
<tr>
<td></td>
<td>5 compressions: 1 ventilation</td>
</tr>
<tr>
<td></td>
<td>Check for a pulse every 2 minutes</td>
</tr>
<tr>
<td>ALS Airway Management</td>
<td>Ensure patient well oxygenated</td>
</tr>
<tr>
<td></td>
<td>Intubate 9mm tube</td>
</tr>
<tr>
<td></td>
<td>Gold standard airway management</td>
</tr>
<tr>
<td></td>
<td>100% oxygen administration</td>
</tr>
<tr>
<td></td>
<td>Tie in tube</td>
</tr>
<tr>
<td></td>
<td>Insert bite blocker</td>
</tr>
<tr>
<td>ALS Preparation for Drug</td>
<td>Cannulation 16 G antecubital fossa</td>
</tr>
<tr>
<td>Administration</td>
<td>Flush with isotonic solution (Hartmanns)</td>
</tr>
<tr>
<td>Drug Administration</td>
<td>Set up Hartmanns</td>
</tr>
<tr>
<td></td>
<td>Adrenaline – repeat every 3 minutes</td>
</tr>
<tr>
<td></td>
<td>Atropine – give 2 more doses @ 3 minute intervals</td>
</tr>
<tr>
<td></td>
<td>Sodium Bicarbonate – after 2nd dose of Atropine</td>
</tr>
<tr>
<td></td>
<td>(Adrenaline ➔ Atropine ➔ Adrenaline ➔ Atropine Sodium Bicarbonate ➔ Adrenaline ➔ Atropine)</td>
</tr>
<tr>
<td>On going CPR</td>
<td>5:1 only stopping for pulse check (every 2 minutes)</td>
</tr>
<tr>
<td>On going drug administration</td>
<td>Adrenaline IV every 3 minutes</td>
</tr>
<tr>
<td>Advise hospital</td>
<td>Place Code 3</td>
</tr>
</tbody>
</table>

The Key Technology Features of the Web-Based Learning Interface

The web-based learning interface is comprised of sequenced slides that can play as a continuous presentation or as separate slides. The graphical and sound content of the presentation is divided into related units and is discretely contained on individual slides.

The presentation scope is viewed as a list of slide titles or a list of slide thumbnails enabling the user to gauge the overall scope of the presentation at a glance. The non-linear nature of the interface allows the user to place emphasis where they require it.
The graphical content can take the form of still images, animations, or key frame lightweight video clips. A single slide can contain all forms – that is a single slide can contain a still image, an animation and a video clip. Annotations, references and diagrams can be superimposed onto photography.

The panoramic viewer consists of stitched high resolution still photos to form a panoramic image of resolution (4000 x 30,000 pixels). The panoramic images are incrementally loaded to avoid the weight of loading such that the resolution can be maintained to enable micro detail and accurate spatial perception. The panorama rotation is controlled via the click and drag mouse action. Each panorama can be zoomed in to its native resolution and out to a minimum of 30%.

Each slide contains an mp3 sound clip that can be synced to the graphical content or play independently. The sound play control can be manipulated via a slider bar directly within each slide. Volume control is also available.

Each slide contains a caption and a searchable text repository. This text can be searched via a text search engine that is able to locate search strings (full or partial words) across all slides. The results are reported as a list of slides on which the search string is found.

The updating of web based technologies and subsequent distribution of is highly cost effective and time efficient when compared to print, TV, or video.

The availability of Macromedia Flash Player 8 with the Microsoft XP operating system via the Internet Explorer Web Browser makes it an ideal medium for deployment.

Thorough preproduction is an integral aspect of the web based learning experience as the prototyping process typically has a single iteration. Only a single iteration is necessary if the script and sequence has been carefully considered and documented prior to photography shooting. The typical production involves approximately 60 hours of photography, assembly and iterative adjustment.

Evaluation

Evaluation from a learning and teaching prospective can be carried out by adopting the frameworks set out in Bloom’s Taxonomy of Educational Objectives (1956). These sound educational objectives include knowledge, comprehension, application, analysis, synthesis and evaluation. The project is in an embryonic phase and evaluation will be developmental. The web-based technology is flexible enough to enable progressive adaptation of a variety of learning domains. A quality framework will also be adopted to evaluate the project itself. Points to consider in this framework are transferability to other domains, its representativeness of concepts, its confirmability as a teaching strategy and its dependability in delivering the learning outcomes.

Acknowledgement

The Authors wish to thank Ms Louse Brown for her editorial advice and to Vianne Tourle for her contribution to the literature search.

References


Making research relevant in pre-service early childhood teacher education

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2. School of Teacher Education, Charles Sturt University, Dubbo

Early childhood research is a priority area for Commonwealth and State governments, yet for the most part teachers tend to draw on practical advice rather than research evidence to evaluate and develop their teaching. Concern has also been expressed about the ways in which busy practising professionals can be encouraged to be involved in research, to publish their findings, and to promote a sense of personal responsibility for continuing professional development (Fleer 2001; Brew 2003). To address this, pre-service early childhood teacher education courses at CSU include a core research subject that aims to foster an appreciation of the implications and value of research for professional practice. Staff have designed a range of teaching-learning strategies to make research relevant, accessible, and fun for students. This paper examines the effectiveness of these approaches by tracking students’ changing views throughout a session of teaching. Results will focus on the processes inherent in students’ learning about research.

This CSU Scholarship in Teaching Award project was based on the concerns of early childhood teacher educators who see research as fundamental to the early childhood profession and the effective preparation of teachers. But, almost in direct opposition to this sentiment, the professional group into which our students will be inducted, for the most part, tend not to read or use research to inform their work. Fleer (2001), using data from 364 early childhood respondents attending conferences, reported that the preferred resources used to inform teaching/policy work were in-service programs, professional conferences, and curriculum materials. Journals and books were a fourth resource area, but the preference was for “curricula and practical teaching books” (p. 43). Research was nominated by only a small number of respondents. Particularly worrying was that, of the respondents who said that research informed their practice, only 2.4% were recent graduates with less than 1 year’s experience. This figure confirms the concerns of many early childhood teacher educators that pre-service teachers eschew research in favour of practical materials when seeking means to improve teaching practice or to solve particular challenges. The experience of the authors is that students press us to include more practical activities in their subjects - something they can use in the classroom, rather than more theory, analysis, or research.

Despite this, CSU and many other universities include a core subject devoted to developing early childhood students’ understanding and appreciation of research. The relevance of undergraduate research studies to early childhood teacher education is underlined by the number of recent publications devoted to this topic: Gray & Campbell-Evans, 2002; Edith Cowan University; Patterson et al., 2002; Macquarie University; Potter, 2001; Nanying Technological University, Singapore; Cooney, Buchanan, & Parkinson, 1001; University of Wyoming; Moran, 2002; University of Tennessee. Although these programs differ in approach and placement of the subject in the course, the expectations are similar: to develop competencies of critical thinking and problem-solving; to create an inquiry-oriented environment through collaborative projects with both staff and students; to teach new skills in designing, conducting, and reporting a research study; to enhance reflective practice through a structured process of collecting, analysing, and interpreting data; and, to develop skills in critical evaluation of research evidence. A longer-term expectation is that the experiences gained in the subject will contribute to changes in the research culture of the profession. These include: seeing teaching as integrally related to research; moving from being a receiver of knowledge to a producer of knowledge; feeling empowered in relation to decisions about practice and policy; and, engaging in a “rigorous questioning of the status quo and a creative discovery of more relevant ways of operating” (Potter, 2001, p. 12). The consensus view is that “teachers must be participants in educational research (and that this must begin) from their first education courses” (Gray & Campbell-Evans, p. 29).
Identifying effective ways of teaching research skills to undergraduates is therefore of considerable interest to many academics. There is a wealth of literature on ways and means of promoting effective, relevant research about postgraduate students (Holbrook & Johnston 1999; Green, Maxwell & Shanahan 2001). There is similarly a growing body of literature that focuses on the need and expectation that academics will incorporate research into their teaching in higher education (Brew 2003). It can be deduced, therefore, that those who are involved in teaching in higher education recognise that their practice needs a theoretical base (in their own research or scholarship of others’ research) and that the skills for both interpreting and doing research need to be taught directly.

Research subjects present students with unfamiliar content and terminology, new demands such as reading academic papers and reviewing a body of literature, and expectations for deep and critical thinking. These demands tend to highlight the diversity of undergraduate students’ academic aptitude. A key challenge in undergraduate research study, therefore, is to develop ways of teaching that make the content relevant and accessible to students at all ability levels.

The aim of the present project was to investigate the effectiveness of the undergraduate research subjects in the Bachelor of Education (Early Childhood) programs at CSU. Each course has a core subject dedicated to the teaching of research approaches and methodology. These are EER300 Inquiry in Early Childhood Education taught at Bathurst/Dubbo Campuses and EER403 Early Childhood Research taught at the Albury Campus. Although developed separately, essentially the aims are the same across all three campuses. Expectations are that students will: understand why and how educational research is conducted; develop an awareness of the strengths and weaknesses of a range of research approaches relating to early childhood education; recognise how the beliefs and values of the researcher influence what is researched and the methods used; be able to conduct a small-scale educational research project; read, understand and critically appraise research literature and reports. A similar range of learning experiences is also delivered at each site. These include: lectures and tutorials/workshops; on-line reading and forum postings; working collaboratively in small groups; studying a set research text; critiquing and discussing research articles; journal writing; conducting a small research project and presenting findings orally and in written form; organising and mounting a conference. The approach taken in these subjects is one of learning about research by active engagement in the process, by designing and implementing a research project, or by participating in a supervised project. The effectiveness of this approach was the focus of the present investigation, drawing on students’ perceptions of research in early childhood and their experiences during the subject. A particular interest was the extent to which students’ attitudes to research and the skills they developed changed over the course of the subject.

Methods

Design

The project was undertaken during the Autumn and Spring sessions of 2004, when students were enrolled in their core research studies subject. A key concern in designing the project was the need to separate the research study from the teaching and assessment of the subject. This was made possible by the Scholarship in Teaching Award, which provided the funds to employ a research assistant. As part of the teaching about research and the ethical conduct of the study, it was explained to the students that the reasons for having someone other than the lecturers undertaking data collection were: to obviate, as far as possible, the power relationship between teacher-and-student and assessor-and-assessed; to provide an open forum for students to talk freely about their experiences of the subject in progress; and to ensure confidentiality and privacy for the participants.

Albury students were approached in Autumn towards the end of the teaching session; Bathurst and Dubbo students were approached in the beginning of the Spring session, at the commencement of the research subject. The research assistant met with each cohort to explain the study, distribute an information sheet and consent form, and invite students to participate. Students were asked to complete questionnaires and to make available any work completed as part of this subject (eg. forum postings, journal entries, drawings, assessable work) to the research assistant. Students were also invited to participate in focus group interviews conducted by the research assistant.
assistant took responsibility for administering and collecting questionnaires, and conducting audi-taped interviews.

Participants
Student interest in the project was high, with most students in each cohort consenting to participate. The number of participants was 34 in Albury (cohort of 40), 21 in Bathurst (cohort of 24), and 15 in Dubbo (cohort of 16), giving a total of 70. The number of students who took part in the interviews was six (2 groups of 3) in Albury, six (1 group of 4, 2 individuals) in Bathurst, and twelve (2 groups of 6) in Dubbo. Unfortunately, not all of the Bathurst and Dubbo students could be contacted at the end of their teaching session; data was contributed by 11 and 10 students, respectively.

Procedures
A short questionnaire was administered at the beginning and end of the teaching session. The items were designed to assess four broad areas: students’ general understanding of research, eg. ‘my views and understandings about research are already very developed’ (4 items); students’ views about the use of research by early childhood teachers in the field, eg. ‘I think it is important for early childhood teachers to be up-to-date with the latest research in their chosen field’ (3 items); students’ use of research and research skills to evaluate or inform their work in the classroom, eg. ‘I look for research evidence of good practice and use this in my teaching’ (5 items); and outcomes for students of studying the subject, eg. ‘I believe this subject will contribute to my overall development as an early childhood professional’ (2 items). Statements were rated using either a 7-point Likert scale, ranging from very strongly disagree (1) to very strongly agree (7) or a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). Minor changes to the wording were made to adjust the questions for the beginning and end of session; for example, the Time 1 item ‘I often question the practices I see in the field because of the research I have read’ was amended for Time 2 to ‘After doing this subject I am now more likely to question the practices I see in the field.’ Students were also asked to give their age and details of any prior experience of working in an early childhood setting.

Interviews were conducted the beginning (week 1), mid-point (week 7), and end of the teaching session (week 12) using a semi-structured procedure. Similar content was elicited at each point, by adapting the following series of questions: What do you think are the reasons for doing research in early childhood education?; What are the most important things you think you have learned in the research subject?; What were the major learning methods you experienced in this subject; which did you think were most effective/which were the least effective?; What kinds of skills have you gained through doing this course (eg., interview skills, child assessment, reading and analysing research) and how might these influence your future work as an early childhood professional?; Do you think this course has given you the skills to design and conduct a simple research project?; Would you use these to improve your teaching?; If you were going to do some research in early childhood, what areas would you be interested in/why these areas? Interviews were audio-taped and transcribed in full.

Results
Cohort characteristics
Students’ age and prior experience in early childhood services were compared for the three student cohorts (Albury, Bathurst, and Dubbo) using one-way Analysis of Variance and Scheffe post-hoc analysis. Results showed that the groups differed by age: the Bathurst group was younger and less varied in age (M = 21.2 years, SD = 1.5) than the Dubbo (M = 25.3 years, SD = 6.6) and Albury (M = 24.3 years, SD = 5.7) groups, F-ratio (2,66) = 3.4, p < .05. Age was closely related to experience in early childhood services, r(67) = .43, p < .01. The three groups had a similar proportion of students who answered yes to this question: Bathurst 30%, Dubbo 33%, Albury 36%, and there was no difference in the average years of experience in early childhood services.
Beginning-of-session perceptions

Bathurst and Dubbo students contributed to data collected at Time 1, the beginning of the teaching session. Questionnaire data was initially examined at the single item level in relation to the four areas addressed in the survey: 1) students’ general understanding of research, 2) the use of research by early childhood teachers in the field, 3) students’ use of research and research skills to evaluate or inform their work in the classroom, and 4) outcomes for students of studying the subject. Scores for 7 items from sections 1 and 3 were combined to give an overall mean score for student self-perception of research (Cronbach’s alpha = .74). Scores for 2 items for section 2 were combined to give a mean score for student perception of research in the field (Cronbach’s alpha = .85).

Scores showed a clear difference between students’ perception of the importance of early childhood research in the field, $M = 5.33$ ($SD = .89$) which was above an ‘agree’ response on the 1-7 scale, and their self-perception of their own use and awareness of research, $M = 4.16$ ($SD = .62$) which was close to a ‘not certain’ response. For the latter, Bathurst students had slightly lower scores than Dubbo, $M = 4.01$ ($SD = .74$) versus $M = 4.37$ ($SD = .31$), $F(1,35) = 3.07, p = .09$.

Focus group interviews with Bathurst and Dubbo students suggested that most students thought that the major purpose of the subject was to teach them how to do research and to help them understand the nature of research in their chosen field. Doing the research subject, it was anticipated, would help students to understand the research reports they read. Many expressed apprehension about understanding ‘overly academic’ research articles, which they found incomprehensible and difficult to read. The subject would teach them the language of research. They wanted to be able to ‘critically analyse’ what they read, to judge whether research was ‘good’ or ‘bad’ and more especially, whether the results of particular studies were worth taking into account in their teaching. Overwhelmingly, they were concerned that the subject should assist them in practical classroom teaching and its relevance was considered conditional on that fact. They were of the opinion that if the subject did not assist them in practical classroom skills it would be of little relevance to them.

Mid-Point Perceptions

At the mid-point of the session, students had already chosen a research area to investigate and were making plans for the end-of-session conference. The majority of these projects were collaborative, developed and conducted with a small group of other students, with the support of their lecturers and other staff. The focus group interviews indicated change in students’ thinking about research.

Students recognised that they had developed different attitudes towards research. They saw the purpose of research as serving the early childhood field, answering questions that needed to be asked in order to give quality education to young children. They also felt it was important that practitioners had the skills to use the findings of research to refine and improve their teaching, especially in the areas of programming and assessment. Specifically, students considered that increasing and deepening their knowledge about young children - how they develop and learn - through using research, was an integral part of improving teaching.

Students pointed out that the field was continually changing. They said that research had already transformed the field and that, as professionals, it was their duty to keep up-to-date with the new knowledge generated by research. Also considered important was the idea that research could investigate hotly debated issues in the field so that some sort of uniformity of understanding could be arrived at.

So many people have got different perspectives and there’s so much argument and debate....(research helps us) try and find a common answer.

Students claimed they now knew how to be critical, and ask questions such as: Who did the research? Why was it done? Who is the audience? Who commissioned it? Is the research valid? How have the
outcomes been influenced? Who are the stakeholders? They thought they were now able to view research from a much more professional perspective.

Students considered that one of the most important things they had learned in the research subject was gaining an understanding of the nature of research, and the hard work involved in doing it. Students thought doing a research project was a very effective learning experience. Doing data collection and analysis was different from anything else they had done in the course so far. This research activity they saw as giving them much-needed analytical skills that could carry over into their teaching. Constructing questionnaires and conducting interviews, for example, were considered to have direct carryover skills for early childhood teachers who have to interview colleagues, parents and community members. They talked about the expertise they had gained in constructing items for questionnaires and the skills needed to design questions which would be sure to extract the information they wanted to answer their research questions.

Children were trying to give us what they thought were the “right” answers rather than what they really thought. That made us develop more critical skills in constructing good questions.

Reading the textbook falls into place when you’re actually doing the research. It suddenly has meaning.

It’s the hands-on that’s the most important – whether it’s critiquing an article and discussing that, or whether it’s actually getting involved in the research itself……..that is where I learn because there is a purpose in it.

Peer teaching and learning were also identified as being particularly effective. Students often made the point that learning from the experience of others was both exciting and valuable for developing collegiality. Debate and critical discussion in the formal situations of lecture and tutorial were also important in the group learning processes at work in the subject. One part of a focus group interview centred around the concept of learning about “generalisation” and what it meant in research. Students indicated that learning about this idea in the research subject gave them a concept they could transfer to their work as practitioners. For example, they were less likely to overgeneralise about what were effective/ineffective teaching methods or about the characteristics of parents or children.

The subject has taught me not to make assumptions, to look beyond what’s on the written page. It also teaches you about the nature of generalisations, how not to overgeneralise, how to be careful of generalising.

End-of-Session Perceptions

Albury, as well as Bathurst and Dubbo, students contributed to data collected at Time 2, the end of the teaching session. Questionnaire data was examined in relation to the groupings described for Time 1. Students’ self-perceptions about research were computed by combining the scores for 7 items (Cronbach’s alpha = .87), perceptions of the early childhood research were computed by combining 2 items (Cronbach’s alpha = .81). Analyses were conducted in two phases: first, to assess the pattern of change from Time 1 to Time 2 for the Bathurst and Dubbo cohorts, and second, to compare Time 2 outcomes for the three cohorts. Focus group comments further explain Time 2 outcomes.

Change from Time 1 to Time 2. Results showed a clear increase in students’ self-perceptions of their use of research skills. Scores for the 21 students who completed the questionnaire at Time 2 had increased to an ‘agree’ response on the 1-7 scale, $M = 5.00$ ($SD = .83$), (Time 1 scores were ‘not certain’). Examination of the group means, however, showed that the score was significantly higher for Dubbo, $M = 5.49$ ($SD = .47$), than for Bathurst, $M = 4.57$ ($SD = .85$). A similar pattern was seen for perceptions of the importance of research for the field. Although there was little change in the overall score between Time 1 ($M = 5.33$) and Time 2 ($M = 5.57$, $SD = .94$), scores for Dubbo were one point higher, $M = 6.05$ ($SD = .72$), than for Bathurst, $M = 5.14$ ($SD = .92$).
These effects were tested using a repeated measures ANOVA, including student age as a covariate. Results confirmed that scores for self-perceptions of research had increased from Time 1 to Time 2, \( F = 6.09, p < .05 \), and that the interaction with location was also significant, \( F = 4.14, p = .05 \). Perceptions of early childhood research had not changed significantly from Time 1 to Time 2 and were not significantly different by location. There was no effect of age on either of these analyses.

**End-of-session outcomes for all cohorts.** To compare outcomes for the three cohorts, Bathurst and Dubbo Time 2 scores were adjusted to give a 1-5 point scale. Data was available for 55 students. Mean scores for students’ self-perceptions of research and perceptions for the field were computed and compared using ANOVA and Scheffe post-hoc comparisons. Results showed that on average students’ self-perceptions of their research abilities were rated as ‘agree’ (point 4 on a 5-point scale), \( M = 3.93 (SD = .51) \). However, group differences were evident: scores were highest for Dubbo, \( M = 4.34 (SD = .36) \), mid-way for Albury, \( M = 3.92 (SD = .37) \), and lowest for Bathurst, \( M = 3.59 (SD = .72) \), \( F(2, 54) = 7.01, p < .01 \). Post-hoc tests showed that significance was due to the scores for Dubbo being higher than both Bathurst and Albury; there was no difference between Bathurst and Albury scores. A similar pattern was seen for perceptions of research in the field, being highest for Dubbo, \( M = 4.75 (SD = .33) \), mid-way for Albury, \( M = 4.31 (SD = .54) \), and lowest for Bathurst, \( M = 4.06 (SD = .76) \), \( F(2, 54) = 4.24, p < .05 \). In this test, significance was due to Dubbo scores being higher than Bathurst; there was no difference between Dubbo and Albury or Bathurst and Albury.

**Focus group outcomes.** By the end-of-session interviews, considerable attitudinal shift was seen on the part of students. In earlier data gathering periods students had doubts about the value of reading and doing research for their teaching. Now, at the end of their subject, they were able to see the value of research knowledge in terms of its transference to teaching and how their professional lives were enriched by it. This data gathering session was also different in the sense that students were much more confident talking conceptually about research and its value to them as practitioners. They were able to articulate clearly their understandings about critical thinking processes and transfer concepts learned in the research subject to practical situations.

*Every project has found something that you can take on board yourself as a teacher and think, ‘When I’m teaching I need to be aware of this’, or even as a parent as well or just a member of the community in your home environment.*

The issue of developing critical thinking was a frequently-mentioned topic. Elaborating on this, students said they had learned to make attempts to be objective and neutral when they examined issues from a research point of view. Previously, they had not seen ideas like trying to be objective as important. They also said they had learned not to take particular professional attitudes for granted, to question what colleagues and others were saying, to be critical about some of the so-called ‘commonsense’ knowledge that floats around the staffroom.

A number of students perceived the organising skills they had learned both in the conference and in the research project as being really important for them later as professionals. Students pointed out that learning how to break down a topic, narrow the focus to its ‘very essentials’ - to manageable research questions - could easily transfer to organising teaching units. More than that, they said they were not afraid to do research now, and would certainly do so if the need arose in their practical situations. Thus the research subject was perceived as making research accessible to teachers and provided them with the skills to explore an area of interest to themselves. This included becoming acquainted with the language of research and understanding new concepts, such as understanding the nature of qualitative and quantitative research, being able to choose evaluative techniques from a rich variety of research methods, which could be transferred into their professional lives.

*I guess when we are in the classroom as teachers, not being afraid to do research and not thinking ‘We can’t do it. We don’t have the knowledge’. But now we know where to start and how to carry out research in our own classroom. Even though it might be really small, you know, we can still do it.*
Underlying this attitudinal shift on the part of most students, however, another sub-theme ran counterpoint to the main melody. Some students saw the research subject as a low priority in their education, having small value in their development as professional teachers. These were the students who also said they would never do research in their own classrooms and who saw only limited transferability in the concepts and ideas the subject presented them with.

However, doing a research project assisted students in their understanding of research concepts they found both difficult and complex. Students at all three campuses maintain that they learned much more about research by doing it rather than reading about it or listening to someone lecture about it. Choosing their own topics meant that students were committed to and interested in their project.

*By learning the terms and processes and putting them into practice I could see how they work.*

Whilst students thought the reading was not valuable by itself, since they frequently did not understand what they were reading, they saw it as important in the whole scheme of the subject. It was seen as a necessary adjunct to the lectures, tutes and discussions and helpful to the research project. Students were adamant that the reading was no use without its practical illustration through their research projects.

*It was just so abstract (reading the text) that you couldn’t picture it in your head how that would work. The lectures helped but they still didn’t give us the understanding that we needed. It was the practical stuff that actually enabled us to understand better.*

*Probably there wasn’t any one thing in isolation that would have worked by itself, like you just needed to put the whole lot together whether it was the reading of the textbook, the lectures plus the forum tasks and then the project. You just needed the whole lot.*

One focus group cited an example of how important illustration was in understanding the readings. The lecturer talked about her own research as an illustration of a research paradigm described in the text, helping students to understand the concept of paradigm. So learning by modelling an illustrated example was an effective learning technique in the course.

*I guess because it is so academic and because it is at such a high level, higher than we had experienced before - so new to us. There needs to be just masses and masses of practical application.*

Another method of practical example cited by students as effective was to get guest speakers to talk to students about their own research. Students said they found it easier to understand complex concepts through relating the “illustrated” research described, to their own research.

**Discussion**

The overall results of this project provide strong evidence that the subject goals were achieved and that the teaching, learning, and assessment approaches used in the subjects were effective. The questionnaire data showed that students increased their self-rated knowledge and research abilities from the beginning to the end of the session and the focus group interviews provided many examples of how this had been supported by the strategies put in place to support students’ learning. There were also many reminders that the content and expectations raised by this subject were difficult for early childhood students. They started the session with little appreciation for the inclusion of a research subject in the core program, and were ready to deem it ‘irrelevant’ to their future work as teachers. This underlined the experience of the lecturers that the subject was a particularly challenging one for students and required critical attention to the development of authentic and relevant tasks to engage and motivate students. The use of a student-initiated research project as a means of teaching research skills and processes provided the necessary ‘practical’ application to bring to life the material provided in lectures and readings. Like the application of ‘the project approach’ to early childhood teacher education (Dejong, 1999), engaging in a topic that was of interest and relevant to the group achieved multiple goals: students gained new knowledge about the nature of research, developed skills in designing, implementing, organising, and interpreting research data, and reflected on and re-evaluated
their own dispositions towards research in early childhood. Further, they gained a broader appreciation of the ways that teaching can be improved, not just by good practice, but by critical thinking and the application of relevant research.

References


Meeting learners’ needs: A blended learning approach in designing appropriate course resources

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Flexible learning has long been associated with distance learning. It is also becoming increasingly associated with on-campus learning (Palaskas, Muldoon 2003). This paper explores the practical implications of flexible learning and examines the appropriateness of a blended approach to learning and teaching. The context of this study was Charles Sturt University, one of the largest distance education providers in Australia; it also has a significant on-campus cohort. The Bachelor of Social Science (Emergency Management) course is situated within the School of Public Health. The introductory subject for this course was developed on CD-ROM to make use of multimedia and online materials pertaining to emergency management, increase interaction with the subject by distance learners, and provide industry relevance via the use of a professional portfolio that promotes reflective practice. The subject development also needed to incorporate scaffolding for first year on-campus students. The authors sought to develop a model for this and future subjects that was able to meet the needs of a variety of learners with differing levels of experience in study and professional practice. Past and present students were asked to evaluate the subject using a number of instruments. The data gained from these evaluations formed the basis for focus group discussions lead by independent facilitators who gathered qualitative data. This paper seeks to extend the existing body of knowledge concerning the implications of blended learning approaches for meeting the needs of divergent groups of learners.

Introduction

Flexible learning has long been associated with distance learning. It is also becoming increasingly associated with on-campus learning (Palaskas & Muldoon 2003). This study explores the practical implications of flexible learning and examines the appropriateness of a blended approach to learning and teaching.

The context of this study was the delivery of an emergency management subject to on-campus students at Charles Sturt University (CSU), one of the largest distance education providers in Australia. In 2004 CSU had a student population of 33,736, of which 23,893 were distance education students and 9,843 were on-campus students. The Bachelor of Social Science (Emergency Management) course is situated within the School of Public Health. Resources developed for distance education were provided to both Emergency Management distance students, and on-campus students undertaking an Emergency Management subject as part of the Bachelor of Clinical Practice (Paramedic). In this instance, on-campus students received a weekly two hour tutorial to supplement the self-paced Study Guide.

Background

The Bachelor of Social Science, Emergency Management is a degree program developed for students who are generally already employed within the field and requiring qualifications. This program was developed for, and has historically run, in distance mode. The initial subject in the program, Introduction to Emergency Management (EMG100) has since become a requirement of the Bachelor of Clinical Practice (Paramedic) at CSU.

The Paramedic students are on-campus and are typically high school leavers in their first semester of university study, with little or no experience in emergency services. These students are provided with
the resources developed for distance education. The resources are comprised of an EMG100 self-paced Study Guide CD, and Emergency Management Course Resources CD. In addition students were given the option of attending a two-hour tutorial each week. The tutorial was designed to supplement the self-paced Study Guide through the provision of practical examples in the form of videos and scenarios, opportunities for interaction and discussion, and also practical assistance with study skills relating directly to assessment tasks.

This study was motivated by the need to evaluate the appropriateness of a blended learning approach to teaching EMG100. The key question was whether Paramedic students in their first year of university study were capable of following a self-paced Study Guide and, if not, whether the supplementary tutorials should be made compulsory. That is, was the approach meeting learner’s needs?

**Higher education and flexible delivery**

Most sectors of Australia Higher Education have embraced some form of flexible delivery and according to Freeman and Capper (1999, p. 12) most Australian universities have flexible learning, or “flexible delivery”, among their strategic initiatives. The term flexible delivery includes the notion of independence and self-directedness in learning (Smith, 2001, p. 105). This mode of delivery works well in a country with vast geographical distance, and varying time zones. It also suits the field of emergency services with its shiftwork, rosters and 24 hour standby. Collis and Moonen (2002, p. 229) state that the changing characteristics of students in post-secondary education are one of the most important arguments for flexible learning.

The move toward flexibility in delivery is evident at CSU in that staff and students are encouraged to make choices around working with print, audio-visual, kinaesthetic, and artefact material within the traditional learning environment as well as the e-environment. Reid (2003) states that learning and teaching should be flexible in the sense that “pedagogical decisions should remain a matter of judgement for the academic” (p. 5). Academics should choose the approach that best suits their subject and the circumstances in which they teach.

Resources designed for distance learning are frequently adopted to enhance on-campus classes. This paper looks at the benefits of blended learning for on-campus learners, and the practical implications of flexible learning. Blended learning in this instance means a combination of face-to-face instruction, in the form of weekly two hour tutorials, with the self-paced Study Guide. Flexible learning and distance learning are not synonymous. Collis and Noonen, make the decision that:

> Flexibility can involve options in course resources, in types of learning activities, in media to support learning, and many other possibilities. There is more than distance that can vary. (Collis & Noonen 2002, p.218)

Evans and Smith (1999) provide further clarification, stating that educators should distinguish between ‘the tools and the process of distance education’ and the ‘flexible delivery’ which implements them’ (p. 105), while Race (1998, p. 168) defines student-centred flexible learning as the place where “learners have some control of the time, place, pace and processes of their study”. Accordingly, the intention of the coordinators in this subject was to provide students with choice and an opportunity to develop autonomy in their personal study regime.

Teaching practitioners from the building industry, Murray, Donohoe and Goodhew (2004) integrated elearning in order to give their students flexibility and access. They emphasised “the integration as a ‘normal’ extension to the teaching repertoire for face-to-face and flexible classes, not merely as a tool for distance classes”. Anderson and Spalding (1996, p. 5) argue that students provided with more flexibility become more engaged, develop more autonomy, and thus develop improved lifelong learning skills, which should be of benefit to industry. In addition, continuing professional development (CPD) requirements for many professionals are stringent and there is a dearth of easily
available interactive CPD home study material suitable for young professionals. The subject coordinators hoped that the approach they adopted would help students build an understanding of the professional field, and to develop skills in self-directed lifelong learning.

**Methodology**

Data pertaining to the appropriateness of distance resources provided to on-campus students was collected from three evaluation surveys and one focus group. The evaluation was initiated by the School of Public Health to provide feedback regarding the appropriateness of a blended learning approach for the 49 on-campus first year Bachelor of Clinical Practice (Paramedic) students who make up approximately one third of the 148 students enrolled in EMG100.

The first evaluation was called “Weekly Evaluation of EMG100”. This single-page survey consisted of six questions, three of which were closed-ended and three of which were open-ended. The surveys were administered to tutorial students in week 2, week 3, week 10, week 11 and week 13. The students completed the survey at the conclusion of each tutorial. The survey asked about the quality of Study Guide resources, aspects of the tutorials and how much of each week’s topic had been completed.

The second evaluation was a single-page survey called “Evaluation of the Past Month — Week 9” and was administered in week 9 only. This survey form differed from the weekly survey to account for the five-week mid semester break that had preceded this tutorial. The survey asked how students had worked without tutorials over the preceding five weeks and the number of weekly topics that had been completed to that date.

At the conclusion of the subject, students were involved in a focus group, facilitated by members of Centre for Teaching and Learning (CELT), which allowed students to make comments about the course in an unstructured fashion.

Lastly, a single-page survey called “Your Thoughts on EMG100” was administered to second-year students who had completed EMG100 in 2003. The survey asked two closed-ended and two open-ended questions regarding students’ experience in the subject and suggestions for subject and course structure.

**Results**

Steven Gibbs of the Spatial Data Analysis Network, CSU, analysed the survey and focus group raw data and produced a draft report from which the figures have been extracted.

**Weekly evaluations**

The following comparison by week, in Figure 1, allows trends to be assessed for questions 1 and 2 of the weekly evaluation.
Most students surveyed each week agreed with all three statements. Figure 2 conducts a similar analysis for question 2.

Overall, the statements agreed to by most respondents each week were that the tutorial provided a practical illustration, for example, a video, picture or case study, and the tutorial provided an opportunity for questions and discussion.

One important consideration of this data is that respondents who were already self-directed learners were the ones most likely to choose to withdraw from the voluntary tutorials. Student numbers steadily
declined throughout the semester reflecting increased self-reliance in their ability to follow the self-paced Study Guide.

Focus groups

At the conclusion of the final tutorial in week 13 two staff members from CSU’s Centre for Enhanced Learning and Teaching (CELT) conducted a focus group with the students. The nature of focus groups meant that the summary of comments provided by CELT was unstructured and diverse. To make sense of these comments, each was summarised as a positive comment, negative comment or suggestion for change. These comments are summarized in the following table.

<table>
<thead>
<tr>
<th>Response</th>
<th>No.</th>
<th>%</th>
<th>Summary of comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>6</td>
<td>25%</td>
<td>The CD and tutorials provide much support for students. The degree is well structured. The class is relatively stress-free. Valerie Ingham is a good lecturer.</td>
</tr>
<tr>
<td>Negative</td>
<td>7</td>
<td>29%</td>
<td>EMG100 seems unrelated to the rest of the course, with the subject’s content sometimes inappropriate (particularly management). This subject could be completed at home since it is already a distance education subject. Friday morning is not a good time for the tutorial.</td>
</tr>
<tr>
<td>Suggestions</td>
<td>11</td>
<td>46%</td>
<td>Students should have access to the distance education forum. Subject should be more relevant, more hands-on, contain more small scenarios and more real scenarios. More guest speakers with practical experience (e.g. ambulance and SES). This subject would be better as a postgraduate subject, rather than as an undergraduate subject.</td>
</tr>
</tbody>
</table>

(Table prepared by Gibbs, 2005)

No new issues where highlighted in the focus group comments. Some of these comments support improvements proposed by the weekly evaluations to the subject structure in future on-campus offerings. In support of this, the following table illustrates that second year student’s comments reflect the first year student’s perceptions of the subject.

Second year students

<table>
<thead>
<tr>
<th>Question 1 responses</th>
<th>Positive</th>
<th>Neither</th>
<th>Negative</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14%</td>
<td>11%</td>
<td>83%</td>
<td>28%</td>
</tr>
<tr>
<td>No</td>
<td>86%</td>
<td>89%</td>
<td>17%</td>
<td>72%</td>
</tr>
</tbody>
</table>

(Table prepared by Gibbs, 2005)

Table 2 illustrates that almost all respondents who answered No to Question 3 “Would this subject have been more meaningful to you if it had been presented in second or third year” had a positive experience with the self-paced Study Guide. Almost all respondents preferring the subject to be offered in second or third-year had a negative experience with the self-paced Study Guide.
Findings

The use of the self-paced Study Guide and voluntary tutorials

Students demonstrated high approval for the self-paced Study Guide materials and tutorials. When asked whether the Study Guide materials were sufficient to *stimulate your interest, help you think critically about the topic and integrate topic material into your assignment*, more than 50 percent of students every week answered yes to all three criteria.

Respondents also demonstrated high approval for the voluntary tutorials. Overall, the majority of respondents each week agreed that the tutorial had provided a practical illustration and an opportunity for questions and discussion. Students also indicated a preference for a more comprehensive review of the previous week’s topics.

The majority of students surveyed provided positive feedback relating to the self-paced nature of the Study Guide. They also provided positive feedback on the structure of the subject, and agreed with the use of a two hour tutorial to support the self-paced Study Guide. The majority preferred that the tutorial remain voluntary. Almost all respondents preferred that the subject remains in first-year.

Positive and negative perceptions

Certain aspects, throughout the surveys, were noted as positive, while other aspects of the subject were noted as negative. On the positive side, students surveyed demonstrated approval of the videos utilised within the tutorials and regularly cited these as the aspect of the tutorial that most helped with learning. Students demonstrated approval of the help in some of the non emergency management aspects such as assistance with assessments and general study skills. This perhaps reflects the high percentage of students for whom EMG100 is one of their first university subjects. Group work and discussion was also rated highly by many students.

Negative aspects were noted less frequently than positive aspects. The most frequently mentioned negative aspect of the subject was related to time, with some students indicating that they thought that, at two hours, the tutorial was too long.

Should EMG100 be offered to first-year students in future years?

The majority of second-year students indicated that EMG100 was appropriately placed in first year, first semester of the Bachelor of Clinical Practice (Paramedic). Furthermore the general feeling amongst the first year students in the weekly surveys was positive, indicating that these students were developing autonomy in their personal study regime. Highlighted in the data was an apparent relationship between the minority of students who struggled with the subject and those who had negative perceptions towards the subject’s structure, with some indicating they would prefer EMG100 to be scheduled later in the Paramedic program. It appears, however, that this subject is appropriate as a first-year subject for the majority of students.

Future subject structure improvements

The surveyed students generally supported retaining the current structure of the subject, comprised of a self-paced Study Guide and a voluntary two-hour tutorial, although some students would prefer the tutorial to be compulsory. It is a worth noting that the students who demonstrated least approval of the subject structure were also the students who indicated preference for a two-hour lecture and two-hour tutorial instead of the self-paced Study Guide. Other suggestions for improving the subject in future years included:

- providing students with access to the online distance subject forum;
- making the subject content more relevant to paramedics and increasing its relationship to other subjects in the Bachelor of Clinical Practice (Paramedic);
- providing guest speakers with practical emergency management experience, and
- providing a better understanding of how to approach assessment tasks.
Blended learning and EMG100

Students expressed more positive opinions than negative opinions regarding EMG100. The effectiveness of the current structure of EMG100, in terms of the understanding and retention of subject material, is difficult to ascertain in this evaluation methodology. The surveys and focus groups detailed student acceptance of the current structure, but effectiveness implies a broader understanding as to whether the subject achieved its intended learning outcomes. This could form the basis for the next phase of study.

Discussion

At CSU on-campus subjects are typically structured as face-to-face lectures and tutorials. This study aimed to understand from the perspective of student needs, the appropriateness of a blended learning approach where the essential component was the self-paced Study Guide and the support was in the form of a voluntary face-to-face tutorial. The study found that it is appropriate to use resources developed for distance in internal settings if the target cohort needs are considered. Internal students benefit from the flexibility of the self-paced materials, and both benefit and appreciate the support given via face-to-face sessions. The blended learning approach meets the target cohort’s needs for both flexibility and support.

Although CSU has an impressive support structure in place for distance students, the efficacy of providing distance materials to on-campus students is an ongoing debate, and indeed provided the motivation for this study. The concerns for and against the flexible delivery of distance materials to on-campus students range from the cost of materials and production, the appropriateness of distance materials for school leavers, and efficiency issues for academics teaching in both modes. Tulloch et al state that:

In a balanced blended learning environment all media forms are present and on- and off-campus students can benefit from exposure to and choice between a diversity of supporting methods and technologies, providing flexibility for varying styles of learning, available study times, cultural differences and academic levels. (2005, p. 7)

In relation to the ‘balanced blended mode’, this study highlights the need to supplement the educational experience of recent high school leavers who typically lack professional experience, through the use of visiting professionals and the interaction with industry experienced distance students and academic staff. The current move away from the didactic approach of the lecture towards a more flexible and blended approach is supported by this study.

Conclusion

This paper explored the practical implications of flexible learning and examined the appropriateness of a blended approach to learning and teaching in relation to one on-campus subject. The findings indicate a blended approach is appropriate for first year on-campus students, and we envisage that this approach may be applicable in other contexts where student needs include flexibility of time, place and pace, and the need for support in the development of self-directed learning skills.

Ten years ago Stedman (1995) was heralding that ‘innovative methods of teaching and learning would be essential for any university that wished to position itself as a leader in the next century’ (Peacock & Middleton, 1999). One of these innovations is blended learning. This paper has demonstrated that blended learning has been readily adopted by the on-campus students in this study. The next investigation would be to determine whether this flexible approach leads to enhanced educational effectiveness.
Acknowledgments

The authors would like to thank Steven Gibbs of the Spatial Data Analysis Network, Charles Sturt University, for his analysis of the raw data and ensuing EMG 100 Evaluation, Draft Report.

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Perceptions of academic integrity at CSU: Preliminary findings

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2. University of Wyoming

Plagiarist student set to sue University: Mr Gunn, 21 claims that he was unaware that his activity – cutting and pasting material from the internet without attribution – constituted plagiarism and argues that the university failed to give proper guidance on acceptable research techniques. He says the University should have spotted the problem earlier through more careful marking and tuition and nipped it in the bud before it became too late to save his degree. (The Times Higher Education Supplement 27th May 2004)

Introduction

Academic integrity can be broadly defined as conducting one’s academic work with integrity, whether it be taking an examination without unauthorised assistance, giving credit to one’s sources, or not taking credit for co-authorship without making meaningful contributions. The list of potential forms of misconduct seems to grow longer over time and technology has changed the methods used in misconduct, but the problem of academic integrity is a growing concern in Australia.

Significant media exposure of plagiarism in Australian Universities highlights an ongoing concern for staff, students, and University communities generally. Negative publicity associated with academic misconduct is not only a potential threat to the reputation of the University and its staff and students, but also to accreditation. Institutional responses are varied but include attempts to define plagiarism, websites for staff and students, higher levels of detection and improved communication of assessment expectations. James et al. (2002) pose four strategies (underpinned by ensuring fairness) for minimising plagiarism: policies, procedures and staff practices; student education; assessment design; and highly visible procedures for monitoring and detection.

There are many activities a student may undertake while studying at university that some may consider to involve academic dishonesty. Individuals have different perceptions of what is acceptable and what is dishonest. As students prepare for future employment, what they learn as acceptable behaviour during their course of study may well inform their expectations of acceptable behaviour in their professional lives.

This paper reports preliminary findings of studies which explored perceptions of academic staff and students of the extent of academic misconduct amongst the Charles Sturt University (CSU) student cohort. Using a survey instrument previously developed in the US, students and staff were asked about a number of types of academic misconduct, their prevalence, and their seriousness in the view of the participants.

Background Literature

James et al. (2002, p.5) suggested that plagiarism varies in both intent and extent, ranging from deliberate fraud to neglect, or accidental failure to acknowledge sources of paraphrased material. They further suggest that while many students are aware they are cheating when they represent someone else’s work as their own, plagiarism also arises from ignorance of the conventions for attribution and differing assumptions in regards to the origin of ideas.

McCabe (2004) noted from his research in US high schools and colleges that cheating is widespread, students find it easy to rationalise cheating, and they cheat for a variety of reasons. Students also feel that many teachers ignore cheating, at least on occasion. McCabe has surveyed thousands of university students from across the United States about their academic conduct (for example McCabe & Trevino, 2002; McCabe et al., 2001; McCabe et al., 1999). He has found that over 50% of students admit to
cheating on exams, while a similar percentage admit to copying without proper citation. Roughly 25% admit to more substantial plagiarism. Kidwell et al. (2003) surveyed students at a small, private liberal arts university in the US. When considering all types of academic misconduct, they found 74.5% of students admitted to cheating and/or plagiarism on multiple occasions.

McCabe and Trevino (2002) also investigated the influence of honour codes on academic integrity. Briefly, honour codes are student-directed codes of academic conduct involving student judicial systems for handling most instances of alleged academic misconduct. Such codes do not eliminate misconduct, but they dramatically reduce it. Students at universities without honour codes reported exam cheating at a rate of 53%, whereas 29% of students at code schools cheated. Regarding plagiarism and other misconduct relating to written exams, 66% of non-code students but 42% of code students admitted such misconduct.

Kenneth Petress (2003) has described the problem as a “plague on our profession.” He notes the common rationalisations of plagiarism, e.g. “everyone does it,” “it’s not a big deal,” and “I didn’t know I was cheating,” and suggests that too few students know what is or is not acceptable. He also maintains that professors, and high school teachers before them, do not make their expectations clear enough or respond consistently enough to reduce the problem. Further, he argues that most students want to be honest; dishonesty is learned rather than innate. This argument is borne out by the findings of McCabe and Trevino (2002) in regard to honour codes, i.e. that when academic integrity is expected within the peer environment, students will conduct their work honestly.

McCabe (2004) also noted that students observe how academic staff members behave, and what values they embrace. Staff who ignore or trivialise academic dishonesty send the message that the core values of academic life are not worth enforcing. McCabe suggests that prompt and equitable enforcement of academic integrity policies does not have to be unduly punitive, rather sanctions for first offences can and generally should have an educational emphasis.

Brimble and Stevenson-Clarke (2005a, 2005b, 2005c) surveyed students and staff from four major Queensland universities in relation to prevalence, perceptions and reporting of student academic misconduct. The study found that approximately one in four surveyed students engaged in some form of academic misconduct at least once, and approximately one in thirteen could be categorised as ‘habitual cheats’ (Brimble & Stevenson-Clarke, 2005c, p.19). Staff estimates of the prevalence of academic misconduct for all scenarios were considerably less than student estimates. Only seven percent of surveyed students indicated having been caught, and the majority of students caught cheating received either a warning or no penalty.

The Queensland study (Brimble & Stevenson-Clarke, 2005b), supported the prior literature which suggests that students consider all forms of academic misconduct as less serious than staff and that students have a higher tolerance for academic misconduct. The latter is evidenced by the allocation of lower penalties by students for all of the misconduct scenarios presented. The study also found differences in the reasons that students provide to academics when caught engaging in academic misconduct and those that are actually driving their behaviour:

... Students commonly advise staff that their actions are due to personal crises, not thinking it was wrong, wanting to help a friend or the perception that other students engage in this activity. Actual reasons cited however are subtly different, being that assessment items are too difficult, time consuming and/or due at the same time as other pieces of assessment; confusion in terms of what constitutes academic misconduct (particularly in relation to plagiarism and referencing); and the perception that they are not likely to be caught. (Brimble & Stevenson-Clarke, 2005b, p. 25)

As a consequence of these findings, Brimble & Stevenson-Clarke (2005b) suggested that students are engaging in academic misconduct for more deliberate and self interested motives than they are leading academics to believe. In addition, they noted that while it appears that both staff and students are generally concerned about the prevalence of academic misconduct, they are disinclined to report known or suspected incidences (Brimble & Stevenson-Clarke, 2005a).
Research Method

The McCabe studies demonstrated that students are not shy about admitting their own cheating behaviours if asked under anonymous conditions. It is logical then to ask students what they are doing and to survey staff to find out whether they have a realistic understanding of student behaviour. This study was conducted at CSU to determine student and staff perceptions of the level of academic misconduct at this institution. As in prior research, we hoped to identify the major areas where academic misconduct is occurring, so as to inform our colleagues of the behaviours of our students.

The study utilised two survey instruments to collect data from students and staff across all faculties of the university. These surveys were based on questionnaires used in similar research published in the US. A student survey was sent to a broad cross section of CSU students studying in face to face mode or by distance education. While some surveys were sent overseas, the cohort was Australian distance education students living offshore rather than international students enrolled through partner organisations.

A total of 1500 surveys were distributed in the first mailing to students. Three hundred surveys were distributed to each of the five Faculties of the University. Approximately two-thirds of the surveys for each Faculty were sent to DE students with the balance sent to internal students. The mailing list was randomly generated from student lists provided by the Division of Information Technology (DIT). In accordance with the research strategy, a second request was sent to students who did not respond to the first survey. A total of 469 student surveys were returned from the two mailouts.

The staff surveys were mailed to all academics employed full time whose name appeared on an academic staff listing provided by the Division of Human Resources. A total of 433 surveys were mailed to academic staff and 124 responses were received (49.6% from female staff and 50.4% from male staff) with the following Faculty breakdown of responses received:

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>19</td>
</tr>
<tr>
<td>Commerce</td>
<td>18</td>
</tr>
<tr>
<td>Education</td>
<td>19</td>
</tr>
<tr>
<td>Health</td>
<td>34</td>
</tr>
<tr>
<td>Science &amp; Agriculture</td>
<td>34</td>
</tr>
</tbody>
</table>

Over 59% of responses were from academic staff appointed at Level B with a further 27% of responses from staff appointed at Level C.

Results

The surveys asked about a number of types of academic misconduct, their prevalence, and their seriousness in the view of the participants; and also addressed internal versus DE modes of delivery, courses and the demographic groups within the student body. Some students and staff felt very strongly about the issues raised and wrote at length on the survey about their views and experiences. The survey results are presented in two parts: the reporting of academic misconduct and responses to academic misconduct. Additional comments made by students and staff are included where appropriate.

Reporting of academic misconduct

Students were asked to respond regarding the number of times they had engaged in cheating behaviours in internal (on-campus) and distance education subjects since coming to CSU. A list of seventeen possible behaviours was provided including copying from another student, using unpermitted notes in an exam, getting questions or answers from others who have already completed a test or exam, copying material without acknowledgement and falsifying lab or research data. For each
behaviour, students were asked how often they had engaged in that behaviour and how serious they perceived the behaviour to be.

Table 1. Student reporting of specific behaviours which might be considered cheating

<table>
<thead>
<tr>
<th>Behaviours which might be considered cheating</th>
<th>Internal Students</th>
<th></th>
<th>DE Students</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never %</td>
<td>Once %</td>
<td>More than once %</td>
<td>Never %</td>
</tr>
<tr>
<td>Copying from another student during a test/exam without his/her knowledge</td>
<td>94.8</td>
<td>4.3</td>
<td>.9</td>
<td>99.7</td>
</tr>
<tr>
<td>Copying from another student during a test/exam with his/her knowledge</td>
<td>94.1</td>
<td>5</td>
<td>.9</td>
<td>99.7</td>
</tr>
<tr>
<td>Using unpermitted notes during a test or exam</td>
<td>97.8</td>
<td>1.9</td>
<td>.3</td>
<td>99.2</td>
</tr>
<tr>
<td>Getting questions or answers from someone who has already taken a test or exam</td>
<td>88.5</td>
<td>6.5</td>
<td>5</td>
<td>97.9</td>
</tr>
<tr>
<td>Helping someone else cheat on a test or exam</td>
<td>92.2</td>
<td>5.9</td>
<td>1.9</td>
<td>99.7</td>
</tr>
<tr>
<td>Cheating on a test or exam in any other way</td>
<td>96.6</td>
<td>2.8</td>
<td>.6</td>
<td>99.7</td>
</tr>
<tr>
<td>Copying material, almost word for word, from any source and turning it in as your own work</td>
<td>82.6</td>
<td>12.4</td>
<td>5</td>
<td>92.6</td>
</tr>
<tr>
<td>Fabricating or falsifying a bibliography</td>
<td>81.4</td>
<td>12.1</td>
<td>6.5</td>
<td>93.4</td>
</tr>
<tr>
<td>Turning in work done by someone else</td>
<td>95</td>
<td>4</td>
<td>.6</td>
<td>99.2</td>
</tr>
<tr>
<td>Receiving substantial, unpermitted help on an assignment</td>
<td>88.9</td>
<td>7.1</td>
<td>4</td>
<td>94.9</td>
</tr>
<tr>
<td>Working on an assignment with others when the lecturer asked for individual work</td>
<td>60.9</td>
<td>21.2</td>
<td>17.9</td>
<td>93.2</td>
</tr>
<tr>
<td>Copying a few sentences of material without footnoting them in an assignment</td>
<td>62.8</td>
<td>18.9</td>
<td>18.3</td>
<td>82.3</td>
</tr>
<tr>
<td>Writing or providing an assignment for another student</td>
<td>93.9</td>
<td>4.5</td>
<td>1.6</td>
<td>98.4</td>
</tr>
<tr>
<td>Turning in an assignment purchased from an ‘assignment mill’ or website</td>
<td>99.4</td>
<td>.6</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Plagiarising an assignment in any way using the Internet as a source</td>
<td>87.2</td>
<td>8</td>
<td>4.8</td>
<td>97.8</td>
</tr>
<tr>
<td>In a subject requiring computer work, copying another student’s program rather than doing your own</td>
<td>95.5</td>
<td>4.2</td>
<td>.3</td>
<td>99.7</td>
</tr>
<tr>
<td>Falsifying lab or research data</td>
<td>88.1</td>
<td>8.1</td>
<td>3.9</td>
<td>92.3</td>
</tr>
</tbody>
</table>

Table 1 summarises student reporting of cheating behaviours. The most common forms of self-reported cheating by internal students were working on an assignment with others when the lecturer asked for individual work (21.2% admitted once and 17.9% more than once) and copying a few
sentences of material without appropriate footnoting (18.9% once and 18.3% more than once). Approximately 12% of internal students also admitted to copying material word for word without acknowledgement and to falsifying a bibliography. The least common forms of cheating for internal students were handing in an assignment purchased from a website (.6% once and no occurrences more than once) and using unpermitted notes in a test or exam (1.9% once and .3% more than once). This level of prevalence of admitted cheating amongst internal students is consistent with the findings in the Queensland study of Brimble and Stevenson-Clarke detailed above.

Results for distance education students show consistently low engagement for most behaviours. The highest frequency reported for the distance education cohort was for copying a few sentences of material without footnoting. This behaviour was engaged in once only by 11.4% of the students and more than once by 6.3% of responding students. This finding is consistent with the isolated nature of distance education which significantly limits physical interaction with other students and thus limits the opportunities to engage in many of the listed behaviours.

Students were also asked to respond regarding their perceptions of the seriousness of each of the seventeen listed behaviours. As might be expected, the forms considered most serious were generally committed less frequently than others. For example, the behaviour most consistently reported as serious cheating was turning in a purchased assignment (reported by 92.3% of students). Turning in work done by someone else, using unpermitted notes during a test or exam, copying from another student during a test or exam with or without his/her knowledge, copying another student’s computer program and writing or providing an assignment for another student were all considered to be serious cheating by more than 80% of responding students. Similarly, students reported more frequent cheating in the form they considered least serious. The most common form of cheating reported above was working on an assignment with others when the lecturer asked for individual work. Of the responding students, 18.6% perceived this to be not cheating.

Academic staff were also asked to respond to a list of possible cheating behaviours. They were asked to indicate their perception of the prevalence of each type of behaviour at CSU and to indicate how serious they thought each behaviour to be. As noted earlier, the most common types of cheating reported by internal students were collaborating with others on an individual assignment and copying a few sentences without appropriate attributions. Staff perceptions were to some extent consistent with these responses as the majority of staff also identified these behaviours as fairly frequent or pervasive. Other related items perceived by staff to be similarly prevalent were receiving substantial unpermitted help on an assignment and copying material almost word for word and turning it in as your own. While the majority of staff believed the internet to be extensively used to plagiarise an assignment, students reported a very small number of occurrences. Table 2 provides detail of staff responses regarding prevalence and seriousness of cheating behaviours.
Table 2. Staff perceptions of specific behaviours which might be considered cheating

<table>
<thead>
<tr>
<th>Behaviours which might be considered cheating</th>
<th>Prevalence</th>
<th>Seriousness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rare or occasional</td>
<td>Fairly frequent</td>
</tr>
<tr>
<td>Copying from another student during a test/exam without his/her knowledge</td>
<td>90.7</td>
<td>8.3</td>
</tr>
<tr>
<td>Copying from another student during a test/exam with his/her knowledge</td>
<td>88.9</td>
<td>10.2</td>
</tr>
<tr>
<td>Using unpermitted notes during a test or exam</td>
<td>81.7</td>
<td>16.5</td>
</tr>
<tr>
<td>Getting questions or answers from someone who has already taken a test or exam</td>
<td>52.7</td>
<td>39.1</td>
</tr>
<tr>
<td>Copying material, almost word for word, from any source and turning it in as your own work</td>
<td>19</td>
<td>53.9</td>
</tr>
<tr>
<td>Fabricating or falsifying a bibliography</td>
<td>39.6</td>
<td>46.6</td>
</tr>
<tr>
<td>Turning in work done by someone else</td>
<td>57.5</td>
<td>34.5</td>
</tr>
<tr>
<td>Receiving substantial, unpermitted help on an assignment</td>
<td>29.7</td>
<td>56.8</td>
</tr>
<tr>
<td>Working on an assignment with others when the lecturer asked for individual work</td>
<td>24.4</td>
<td>53</td>
</tr>
<tr>
<td>Copying a few sentences of material without footnoting them in an assignment</td>
<td>7.7</td>
<td>48.7</td>
</tr>
<tr>
<td>Turning in an assignment purchased from an ‘assignment mill’ or website</td>
<td>50.5</td>
<td>43.2</td>
</tr>
<tr>
<td>Plagiarising an assignment in any way using the Internet as a source</td>
<td>20.2</td>
<td>56.1</td>
</tr>
<tr>
<td>In a subject requiring computer work, copying another student’s program rather than doing your own</td>
<td>54.8</td>
<td>32.1</td>
</tr>
<tr>
<td>Falsifying lab or research data</td>
<td>57.7</td>
<td>35.1</td>
</tr>
</tbody>
</table>

Staff were asked what they thought a student might do if he/she observed cheating in a test or exam. Seven possible responses were presented including: reporting to the lecturer, asking the student to report themselves, expressing disapproval informally, mentioning the incident to other students, and ignoring the incident. The majority of staff (54.4%) expected the student to mention the incident to other students but not to report it, however the strongest response from students to the same question was for reporting the incident to the lecturer or appropriate authority (28.7%). Students did however draw a distinction between other students in general and close friends. If it were any student, 28.7%
would report the cheating incident to the lecturer while 21% would mention the cheating to other
students but not report it. Where the cheating involved a friend, 6.6% of students would report it to the
lecturer and only 4.4% mention it to friends but not report. The most common response to a friend
cheating in a test or exam was to express disapproval informally to the student. These results are
summarised in Table 3.

Table 3. Responses to awareness of cheating on a major test or examination

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Another Student</th>
<th>A friend</th>
<th>Staff expectation of student behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Report to the lecturer/ invigilator /appropriate authority</td>
<td>28.7</td>
<td>6.6</td>
<td>8</td>
</tr>
<tr>
<td>2. Ask the student to report self and report if they fail to do so</td>
<td>16.9</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>3. Express disapproval informally to the student but not report</td>
<td>18.8</td>
<td>51.1</td>
<td>17.6</td>
</tr>
<tr>
<td>4. Mention the incident to other students but not report</td>
<td>21.4</td>
<td>4.4</td>
<td>54.4</td>
</tr>
<tr>
<td>5. Ignore the incident</td>
<td>11.3</td>
<td>9.8</td>
<td>10.4</td>
</tr>
<tr>
<td>6. Other</td>
<td>2.8</td>
<td>2.2</td>
<td>5.6</td>
</tr>
</tbody>
</table>

As not all subjects offered at CSU have exams, students and staff were also asked for their responses if
they were aware of cheating on a major assignment. Responses regarding friends were relatively
consistent with those offered previously however a higher proportion of students (34.2% compared
with 18.8% previously) would express disapproval informally if the assessment task were an
assignment rather than a test or exam.

Table 4. Responses to awareness of cheating on a major test or examination

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Another student</th>
<th>A friend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Report to the lecturer/ invigilator /appropriate authority</td>
<td>14.2</td>
<td>5</td>
</tr>
<tr>
<td>2. Ask the student to report self and report if they fail to do so</td>
<td>14.6</td>
<td>15.3</td>
</tr>
<tr>
<td>3. Express disapproval informally to the student but not report</td>
<td>34.2</td>
<td>54.9</td>
</tr>
<tr>
<td>4. Mention the incident to other students but not report</td>
<td>18.5</td>
<td>5.9</td>
</tr>
<tr>
<td>5. Ignore the incident</td>
<td>15.9</td>
<td>17.3</td>
</tr>
<tr>
<td>6. Other</td>
<td>2.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Students were also asked if they had ever witnessed cheating in tests, exams or assignments.
Of the responses received, 11.4% reported having witnessed cheating behaviours but less than 1%
(.6%) of respondents had ever reported another student for cheating on a test or exam. A higher
proportion of students (30%) were aware of a student cheating on an assignment while 1.7% of
respondents have reported another student for assignment related cheating. Of the academic staff who
responded to the survey, 22.4% percent reported having seen a student cheat during a test or exam and
29.8% responded that a student had reported another student to them for cheating.

Students were given the opportunity to identify the primary reason for which they might have
difficulty in reporting an incident of cheating that they had observed. A number of students felt the
behaviour of others was none of their business:

I would feel as though I was getting involved in something that was not my business and would feel guilty
as a result.

I have no desire to cause problems for others – as much as I would resent someone getting unfair grades,
I always tell my children you can’t always worry about what others do/don’t do, worry about your own
behaviour.

It’s none of my business if someone decides to cheat. I’ve cheated before, it would be hypocritical of me
to report it.

I don’t believe it is my business to do so. Exam supervisors and lecturers should check this.
Among the concerns expressed was a fear of being wrong and losing friends, not wanting to jump to conclusions, and the possible negative consequences of peers finding out you had ‘dobbed’:

Cheater may find out who reported them and target me.

Wouldn’t want anyone to know who ‘dobbed.’

I can’t tolerate cheating, but I wouldn’t feel comfortable ‘dodging’ on another student. They would have to carry the guilt of their cheating which could be a punishment in itself.

It runs against much in Australian (Anglo) culture. “Don’t dob in a mate.”

Some students reported lack of knowledge of procedures as a stumbling block to reporting. Others were reticent to report because of the perceived behaviour of academic staff:

Lecturer doesn’t really care (has happened before). Everybody else ignoring the incident, accepting it and not reporting.

Because such behaviour seems to be rife among academic staff in the first place, republishing articles under different titles etc. The fact that so many courses are fee driven means that lecturers are reticent to fail anyone. Rather a mockery don’t you think.

Students also identified some situations where it seemed to be ‘acceptable’ to cheat:

People who cheat would do so due to extenuating circumstances. My reporting them would certainly make matters a lot worse for them. Rather they would be better off with support that would enable them to seek extensions and help from lecturers.

Repercussions – harsh uni solutions may not take into account full life situations, learning by experience and second chance for student. Some of them are just stupid and scared, others are not.

The person may have valid reasons behind the incident, e.g. family issues. They have not felt comfortable talking to CSU staff for consideration.

Workload/ pressure at uni can sometimes force students to take drastic measures – then they need help, not to fail.

The chance of getting caught and the penalties for cheating were identified by students as very important factors influencing the decision to do honest academic work. Of least importance was the peer pressure element of ‘others do it’. Table 5 presents a summary of the relative importance of the nine factors presented to students. In light of the qualitative responses above, a further examination of the range of pressures faced by students would seem appropriate.

Table 5. Factors influencing the decision to do honest academic work

<table>
<thead>
<tr>
<th>Influencing factor</th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Fairly Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance of getting caught</td>
<td>11.8%</td>
<td>9.6%</td>
<td>24.4%</td>
<td>54.2%</td>
</tr>
<tr>
<td>Faculty policies on academic integrity</td>
<td>12.7%</td>
<td>20.1%</td>
<td>33.4%</td>
<td>33.8%</td>
</tr>
<tr>
<td>Penalties for cheating</td>
<td>9%</td>
<td>8.1%</td>
<td>31.2%</td>
<td>51.7%</td>
</tr>
<tr>
<td>Pressure to get good grades</td>
<td>20%</td>
<td>26.6%</td>
<td>31.6%</td>
<td>21.8%</td>
</tr>
<tr>
<td>The workload at CSU</td>
<td>20.7%</td>
<td>31.8%</td>
<td>30.9%</td>
<td>16.6%</td>
</tr>
<tr>
<td>Others do it</td>
<td>72.8%</td>
<td>14.7%</td>
<td>8.8%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Little penalty of caught</td>
<td>45.7%</td>
<td>24.8%</td>
<td>20%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Little chance of getting caught</td>
<td>43.5%</td>
<td>24.7%</td>
<td>20.8%</td>
<td>11%</td>
</tr>
<tr>
<td>Getting behind in my work</td>
<td>26.1%</td>
<td>27%</td>
<td>28.3%</td>
<td>18.6%</td>
</tr>
<tr>
<td>Pressure from family to succeed</td>
<td>46.5%</td>
<td>18.6%</td>
<td>21.4%</td>
<td>13.5%</td>
</tr>
</tbody>
</table>

Management of academic misconduct

An important aspect of academic misconduct is the potential consequences of such behaviour. Students were asked about the actions they perceived lecturers were most likely to take in response to
student cheating. Approximately 38% of students expected to fail a test or exam if they were caught cheating. A further 31% expected the activity to be reported to a higher authority. These results were largely consistent with activities reported by academic staff i.e. 59.4% of staff reported that their response to cheating would be to report the student to a higher authority. A further 24.4% would fail the student on the relevant assessment task. Student and staff responses regarding the most likely response to student cheating can be found in Table 6.

Table 6. Student expectations and academic responses to cheating

<table>
<thead>
<tr>
<th>Measure most likely to be used by lecturer for student cheating</th>
<th>Response Re Test</th>
<th>Response Re Assignment</th>
<th>Reported Staff Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Probably nothing</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>2. Reprimand the student and warn not to do again</td>
<td>6.3</td>
<td>8.5</td>
<td>2.4</td>
</tr>
<tr>
<td>3. Make the student re-take the test or examination</td>
<td>15.1</td>
<td>13.6</td>
<td>6.5</td>
</tr>
<tr>
<td>4. Fail the student on the test or the examination</td>
<td>37.5</td>
<td>45.1</td>
<td>24.4</td>
</tr>
<tr>
<td>5. Fail the student for the subject</td>
<td>7.6</td>
<td>8.3</td>
<td>0</td>
</tr>
<tr>
<td>6. Report the student to the appropriate authority</td>
<td>31</td>
<td>22.3</td>
<td>59.4</td>
</tr>
<tr>
<td>7. Other</td>
<td>1.5</td>
<td>1.3</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Students and staff were also questioned regarding the application of CSU policy regarding academic integrity. Students were asked what they believed lecturers most often do regarding the university’s current policy on academic integrity. Staff were asked about what they most often tell students regarding the University’s current policy on academic conduct. Approximately 42% of staff responded that they carefully spell out and explain what is expected. A further 25.6% skim over the policy in the subject outline. Student expectations of staff were consistent with the behaviours reported by staff i.e. the majority of students expected staff to either skim over relevant policy in the subject outline or to carefully spell it out and explain what is expected. Table 7 reports the responses for all categories of behaviour.

Table 7. Application of CSU policy

<table>
<thead>
<tr>
<th>Lecturer Response</th>
<th>Student Expectation</th>
<th>Staff Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ignore it</td>
<td>1.1</td>
<td>4.1</td>
</tr>
<tr>
<td>2. Say it is in the handbook</td>
<td>14.8</td>
<td>10.7</td>
</tr>
<tr>
<td>3. Skim over it in the subject outline</td>
<td>39.9</td>
<td>28.1</td>
</tr>
<tr>
<td>4. Carefully spell it out and explain what is expected</td>
<td>39</td>
<td>46.3</td>
</tr>
<tr>
<td>5. Other</td>
<td>5.2</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Seventy-six percent of academic staff reported being aware of CSU academic conduct policy. A number, however, made suggestions regarding how the policy could be improved including wider circulation of the consequences of cheating or plagiarism and maintenance of a central register of offenders. A number of respondents felt that although the CSU policy was adequate, there were significant concerns regarding its implementation:

*The problem is implementation. Staff workloads prevent close scrutiny of plagiarism.*

*The code is OK. Its application needs improvement – consistency in what constitutes cheating and plagiarism needed. Consistency in penalties needed.*

*Its not the policy that needs much improvement. The policy is quite good. It’s the implementation of the policies. Too many students who were found cheating had their penalties reduced or pardoned on appeal.*

*Policy is fine but actions not always taken.*

A number of staff commented on the time consuming nature of the ‘official’ processes for handling academic misconduct. The ‘unwieldy’ policy was perceived as encouraging individual responses with
resulting inequities and inconsistencies in approach. The perceived reluctance of the university to hand out severe penalties, even in cases of the most serious nature, was seen as potentially fostering dishonest behaviours.

**Summary**

This study surveyed CSU staff and students regarding their perceptions of the prevalence and seriousness of academic misconduct at the university. Collaboration on assignments was the most common form of self reported ‘cheating’ by internal students. This was actually not even considered to be cheating by 18.6% of students. For distance education students the most prevalent cheating behaviour was copying a few sentences without appropriate footnoting. The majority of staff who responded to the study believed the internet to be extensively used in plagiarised assignments. Interestingly, however, students self-reported a very small number of occurrences of this behaviour. On all behaviours, distance education students reported lower frequencies than internal students. This could be attributed to lack of opportunity amongst the DE cohort for engaging in some of the collaborative behaviours.

The study suggests that students are unlikely to report incidences of academic misconduct as they perceive this to be ‘none of their business’ and more appropriately a function of lecturers and exam invigilators. The anticipated outcomes if a lecturer detected cheating were consistent for staff and students. Both cohorts expected the activity to be reported to a higher authority and/or a failed grade to be assigned for the assessment task. Most academic staff reported being aware of the CSU academic policy. Many however expressed concern regarding its implementation and reported making individual ad hoc responses which further promote inconsistency and inequity.

Qualitative responses by students and staff highlighted key issues for further investigation. Students showed a significant level of acceptance of cheating behaviours under ‘extenuating’ circumstances. Further examination of the range of pressures faced by students would inform policy relating to assessment generally and academic conduct in particular. The study also signals a need to explore the issues surrounding policy implementation to ensure greater consistency in response to alleged cheating behaviours and thus encourage academic integrity.

**References**


In search of the holy grail: Reflective practice in the undergraduate practicum

Catherine Layton
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Reflective practice is a common goal in professional education, finding its place largely in the practicum component of the undergraduate degree. Studies of the differences between novices and experts, as well as those indicating the difficulties of critical reflection, would suggest that reflective practice for undergraduate students is something of a holy grail – highly desired but fundamentally elusive, maybe even non-existent.

A study of police students’ learning in community placements indicates that critical reflection is an unlikely outcome, but that reflection upon experiences, and learning manifest in changed behaviours or changed self-positioning, is common. These outcomes indicate a need to be far clearer about what is meant by the term ‘reflective practice’ when establishing the aims and objectives of undergraduate practica. Critical reflection may only be an appropriate goal for experienced practitioners.

Introduction

There has been very little research into how people learn, or do not learn, what would be helpful to them at and through their experiences at work (Billett 2001; Boud and Garrick 1999; Pogson & Tennant, 2000). Questions are raised about the effectiveness of work placements, in terms of the need to avoid technicist and unsituated approaches, and the absence of any differences in academic achievement following the placement (Chaiklin & Lave 1993; Coll, Taylor & Grainger 2002; Duignan 2002). Despite this, reflective practice is a common goal in professional education, finding its place largely in the practicum component of the undergraduate degree.

This paper is a reflection upon research I conducted between 1997 and 2004, with only a brief moment of data collection, on how identities change through participation at work (Layton 2004). The issues were explored drawing on the experiences of policing students, prior to their recruitment as police, through the study of the assessment items they submitted whilst engaged in a community placement in a service agency. The placement experience, instituted as part of the reforms of police education following the Wood Royal Commission, aimed to counter ‘them’ and ‘us’ aspects of police culture, and to offer models of professional practice in working with members of disadvantaged communities. One of my reasons for seeking the cooperation of one cohort of students lay in the remarks made by the subject coordinator and contract markers that they could see that the students were learning, but it was not reflection. Whilst the group of students participating in this study was small (26 students), the research also drew on my experience in marking well over 300 assignments in the years following the collection of the data.

In this paper, I suggest that we may need to avoid including reflective practice, particularly critical reflection, as a goal early in the undergraduate degree, because the immersion of individual students in what are unfamiliar environments, especially for a brief period (in this case, four weeks), is unlikely to lead to either. Misconceptualising what can be learned can mean that students do not receive the support they need for the learning that is actually occurring. Moreover, they may not even gain ‘marks’ for this learning, and fail the subject. Critical reflection may only be an appropriate goal for experienced practitioners, or, at least, for students in their final year of undergraduate study. It would seem that reflective practice for undergraduate students is something of a holy grail – highly desired but fundamentally elusive, maybe even non-existent.
Background to the study

My thesis aimed to establish how selves might change, working from the ecological premise, suggested by Burkitt (1991, 1997, 1999), a sociologist, that selves are socio-natural constructs. Burkitt incorporates notions of embodiment, thought, feelings, actions, social and natural contexts, pasts and futures (because of the principle of whole-of-system survival) into his ‘ecological’ understanding of selves in the late modern context. Although he 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 must be recognised, along with the multiple affordances inherent in this interplay (remembering, following Giddens, 1991, that the late modern era involves us simultaneously in multiple contexts for action and in handling the risks associated with these). Moreover, arising from Burkitt’s view of the importance of survival in constructing who we are, what we feel and what we think and do, I saw it as important to consider how the students saw their futures, and how this understanding of their future might have affected their actions in this unfamiliar situation. All in all, then, taking a holistic and interactive stance on selves opened the door to exploring a more far-reaching and complex view of learning, when the dominant perception of how people learn from experience (through a cognitive process of reflection) was proving inadequate to the task. Thus the study was not looking solely for cognitive change, but was concerned with a wide range of factors in the placement environment, including the type of work and contact with staff and clients; the intensity of the work; the affordances of, and guidance provided in, the particular workplace; and the affective and physical reactions to unfamiliar demands as set against a desired future.

The subject itself was developed in a collaborative process by staff of the NSW Police Service and the University. The learning model underpinning the community placement was that of reflective practice, drawing on Schön (1983, 1987), Kolb (1984) and Boud et al. (1985, 1996a, 1996b) but with a sociological flavour (they were seen as social investigators). Students were required to successfully undertake a range of tasks in order to pass the subject. Prior to the 160 hours they were to spend with an agency that was located near their home address, they negotiated a learning agreement with the person who was to be their supervisor. This agreement, which was not allocated any marks, was, in the early years of the subject, modelled on the learning contract, but became more of a competency checklist focused on professional conduct. Supervisors also provided a final report on the student’s performance.

Students were required to complete a daily log concerning their experiences, and because, in police education, there was a history of students not being able to articulate the emotional impact of their experiences – with possible ramifications for their later handling of the stresses of the job – they were encouraged to write about the feelings they experienced, and were provided with a brief ‘vocabulary’, offering words of differing intensity about feelings such as anger, sadness, and happiness. This daily log was in police notebook format, and, along with two reflections (one after 40 hours and the other at the end of the placement) was worth 40% of the marks available in the subject. It was the log which was the main focus of my thesis, in that this was the place in which any repositioning might be evident. The other assignment, worth 60% of the marks available in the subject, involved the completion of what started as 20, but became, over the life of the subject, 8, activities. These activities involved the practice of certain observation and communication skills, and reflection on the relevance of various readings on class, ethnicity and gender to the people with whom they were working.

The assessment rubrics had a strong emphasis on connecting theory with practice, and of questioning previously-held assumptions about their own and others’ life-chances and experiences – the early stages of critical reflection. The weight of the assessment, then, was focused on critical reflection – the capacity to relate the concepts addressed in the readings to experience, and to question previously held assumptions about class, gender and ethnicity. Students were being encouraged to develop a ‘sociological imagination’ (Mills 1976).
The students’ work

Despite the remarks that triggered my interest (that students were learning but it was not reflection), the study showed that students were learning, and that some of the time they were reflecting. However, this reflection was rarely critical. Illustrations of these points are provided below, although only a few examples of learning and reflection are described, clustered under learning processes and learning outcomes.

Learning experiences

There were qualitative differences in learning experiences, the first of which was related to the degree of unfamiliarity that students faced: the extent to which the experiences were ‘new’ or ‘novel’. These largely synonymous terms are used here (following the German), in slightly different senses, 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 (which are those most likely to be faced in early undergraduate studies) raised the question of survival, and appropriate action, more starkly than the new.

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)

The type and the intensity of the work was also an issue: emotionally demanding placements took up the majority of the students’ attention, whilst minimal activity in office environments offered limited opportunities for relevant learning:

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)

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)

The types of relationships and their affordances differed too, varying from quasi-familial to anonymous exchanges and detached observation.

One thing that I would like to comment on is today a lady in her eightie’s that has Dementia came into the [shop] and was talking to me, she started to talk about her husband (which had been dead for quite a few years). She said that he was having an affair with some other lady up the road and that he had been doing this for some time. She called this other woman every name under the sun which I did not believe would come out of a lady her age. […] This made me think off [sic] all the ladies of her days and how most of them would much prefer to just put up with things to save face with the local community and to keep the family unit together. This poses a couple of questions which in future I hope to answer. Is the family unit that important, that we must keep it together at
all cost? Is what the rest of the community things [sic] of you important? (Denis, early 20’s, charity shop, Day 2)

My relationship with the kids was developing much better that 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)

Finally, the level of guidance also varied: 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)

**Learning outcomes**

Although experiences differed significantly across placements, there were three types of learning evident in most students’ work. These were, firstly, the acquisition of practical knowledge, which should not be underestimated, or dismissed as mere technical competencies. ‘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: ). Secondly, of necessity, given Forester’s remarks, students’ work showed changes in self-positioning that were a consequence of acquiring relevant practical knowledge, and therefore being able to act effectively in the new environment. Finally, contrary to the markers’ comments that there was no reflection evident in the diaries, some reflection was identifiable.

Looking first at changed practical knowledge/changed self-positioning, the following three examples illustrate the evidence. The first example is from the student, Annabel, whose work, previously cited in this paper, indicated that she did not initially know how she might handle Ben, and was losing weight.

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 “F you Annabel, you Fing C” 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)

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)

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)

The reflection evident in the diaries 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, or to oneself. It was, however, rarely possible to ascertain exactly what a student had concluded as a result of his or her reflection, unless, as in the example drawn from Brittany’s work and provided above as an illustration of a quasi-familial relationship, it was a precursor to further action. The first extract below, 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:

Sadness experienced by the student when assisting a carer [the wife of a respite care patient] 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)

Where there was (rare) consideration of theoretical issues, this was not necessarily about the work, but it was associated with slow-moving or emotionally undemanding placements. In the following example, the student in question did not complete daily log entries because the work itself was uneventful and menial:

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 superbs 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 the expensive nature [and were concerned about] the views they would get form the home that was in mind (Denis, early twenties, charity shop, Day 27)

Reflections and implications

The issues of reflection and its predominance as a theme in students’ placements was not a major focus in my thesis, and it is only recently that I have begun to question the usefulness of having the concept of reflection drive undergraduate student placements, particularly in their early years of study. My questions concern both the adequacy of the ways in which the concept of reflection is understood and used, and how best to attend to the importance and quality of the experiences themselves, in order to foster the constructive alignment of learning objectives, ‘teaching’ and learning strategies, and assessment.
As a starting point for my own reflections, it would seem that each of the reflection frameworks used in the subject from which the quotes are drawn 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 by novices, and, anyway, is considered fuzzy and under-researched (Eraut, 1994; Usher, 1997); critical reflection is seldom a feature of students’ work (Bartrop 1992, Kerka 1996, Wilmot 1995); and, because few theorists have explored the intentional, future-oriented aspects of the experiential learning cycle discussed by Walker & Boud (1994), they are seen as a given (for example, in the learning contract), and are rarely assessed.

Could it be that other theoretical frameworks might explain the concept of reflection-in-action, and refine the way we implement placements? I wondered whether there might be some value in returning to the premises out of which Kolb devised the concept of the experiential learning cycle; whether paying attention to the demands placed upon students in the encounter with real-life problems was needed; and, most recently, whether the work of Biggs on the SOLO taxonomy, and the need he identifies for constructive alignment in the design and delivery of subjects might be of relevance. It is to these areas I now turn.

Reflection-in-action

Schön (1983) criticised most professional education as both failing to account for how professionals work in practice and for being unable to respond to the complexities of the real world. He proposed a new theory that recognised the way in which skilled practitioners responded to situations of uncertainty, instability, or uniqueness, through a combination of intuitive ‘knowing-in-action’, ‘reflection-in-action’ and ‘reflection-on-action’ (Schön, 1987). His ideas have been used in fields such as architecture (the source of Schön’s model of reflection-in-action), nursing, teaching and business studies – and policing. Indeed, Usher Bryant & Johnston (1997: 143) describe his work on reflective practice as ‘canonical’ – frequently appealed to by trainers in a variety of professional fields.

It is worth taking a second look at the concept of reflection-in-action, simply because it has been so influential and yet elusive. To do this, I turn to the research on the differences between novices and experts, ideas about situated learning, and to recent developments in neuropsychology.

Novice/expert studies have largely focused on the differences between novices and experts in occupational groups, such as milk-crate packing, taxi driving, teaching, nursing and medicine, and amongst games players, such as baseball and chess players (Chi, Glaser & Farr 1988; Daley 1997, 1998; Scribner 1986; Tennant & Pogson 1995, 2000). The struggle for novices is, firstly, to even identify what is happening in the new environment: novice teachers simply could not identify what was happening in classrooms when experienced teachers could (Sabers, Cushing & Berliner 1991). Early experiments by Bruner & Postman in 1949, using a modified pack of cards, illustrated how the unknown resists interpretation. The next issue for the novice is to establish which of the approaches supplied to them (either through the models available in the immediate environment, through rules and procedures, or through theory) might apply in the circumstances they face, a process that tends to be seen by novices as akin to undertaking a multiple-choice test (Benner, 1982, 1984; Benner & Tanner, 1987; Daley 1997; Dreyfus & Dreyfus, 1985; Scribner 1986; Wineberg 1991).

Explanations for these differences can potentially be found in the work of several theorists. According to Billett (1999), legitimate peripheral participation provides opportunities for novices to develop models for performance through observation; to generate tentative solutions to workplace tasks; and to secure those solutions directly or indirectly guided by others. Arising from this model, Billett sees non-routine work activities as particularly problematic for learning in the work context, especially where the knowledge is not immediately observable. Bowden & Marton consider abduction (finding a pattern from which your observations can be derived, with the observations explained by the pattern) to be the
way in which students arrive at a new theoretical understanding (1998:77-81). The pattern (principle) is not a summary of the observations, nor a discovery of underlying regularities. The pattern is arrived at through *experiences of variation* - the ‘ahah’ of the scientist is the pattern coming into the foreground, moving from a peripheral to the focal position, and novices are unlikely to have sufficient experiences to identify underlying principles.

Novice/expert studies might also align with recent work in neuropsychology, and on the role of feelings in learning, and thus support and explain the notion of reflection-in-action. Damasio (1996) hypothesised that each experience we have leaves a somatic marker – a bodily impression of the feeling response to that experience – that is cued, beneath our awareness, when we encounter similar situations. He suggests that, in situations in which we are faced with complex decisions, all sorts of images of possible actions flash into our minds, and the choice between them is not rational (this would be far too cumbersome, and is what novices are attempting to do), but is based upon the somatic markers for those choices. Unpleasant markers are rapidly discarded, increasing the accuracy and efficiency of decisions by reducing the number of alternative courses of action – the somatic markers are used predictively. Research attempting to articulate the role of affect in guiding judgements and decisions has been conducted, with Slovic *et al.* (2002) suggesting that experiential thinking is intuitive, automatic, image-based, fast, and intimately associated with feelings, and Mellers and McGraw (2001) finding that anticipated emotions play a part in the decisions people make.

It would seem, then, that there is support for the concept of reflection-in-action, as a process that occurs as a result of lengthy experience, and that, therefore, this is a type of reflection we should not anticipate from students who do not have any depth or breadth of experience. At the very most, we should be seeking, and seeing, a capacity to apply relevant rules and algorithms.

*Critical reflection and the experiential learning cycle*

Much of the literature on the role of reflection in learning from and through experience is cognitive-constructivist in its assumptions, and has its foundations in Kolb’s (1984) theories. The notion of critical reflection, at least in adult education, is closely tied to the work of two theorists, Stephen Brookfield and Jack Mezirow. The general consensus is that critical reflection is highly desirable, but rarely evident. How helpful are these ideas to understanding what might be happening in work placements?

Brookfield (1996, 2002) outlines, for teachers, ways in which they can critically reflect on their own practice, with the process involving four elements, all revolving around an acceptance of doubt and the necessity to question what might usually be taken for granted: assumption analysis, contextual awareness, imaginative speculation, and reflective scepticism. This stance is not one that is easily achieved by experienced teachers, unless the whole curriculum has built towards it (Brookfield 1996; Power, Clarke & Hine 2002). Early studies in occupational socialisation showed that student nurses and doctors rapidly adapt to the demands of the ward environment after initial attempts to behave in ways consistent with their university education (Becker, Geer & Hughes 1992; Melia 1987). More recently, a study by Eyler & Giles (1997) showed that, without regular reflection and feedback on reflection, service learning, particularly when mandated rather than voluntary, is likely to have a negative impact. Carr and Kemmis (1986: 45) argue that ‘critical analysis is only possible when both theory (organised knowledge) and practice (organised action) can be treated in a unified way as problematic – as open to dialectical reconstruction through reflection and revision’.
Mezirow (1990) identifies six forms of reflectivity: consideration of our feelings (affectional reflectivity); assessment of the usefulness of our ways of doing things (discriminant reflectivity); awareness of how we are judging our own feelings, behaviours and beliefs (judgmental reflectivity); questioning of the concepts we are using for a particular task (conceptual reflectivity); recognition of quirks in thinking (psychic reflectivity); and the recognition that these quirks are based in a particular paradigm (theoretical reflectivity, which leads to ‘perspective transformation’) (1990:128-129). This typology seems to better represent the many domains in which questions might arise about self and the situation when involved in work placements. However, the likelihood of them being discussed frankly in an assessment context is slender, even though, in this study, students’ work did show them turning to workers and volunteers for support in handling the feelings that the placement aroused, and coming to new understandings about themselves as a consequence.

Perhaps Kolb has one answer. The popularity of Kolb’s experiential learning cycle and its associated learning styles inventory, particularly through its redevelopment and marketing in development programs, have somewhat obscured the theoretical ideas upon which Kolb drew – those of Piaget. Piaget outlined a developmental shift in thinking styles, from concrete to abstract thinking, and Kolb posited, following Piaget, that adults either apprehend an experience concretely, or in an abstract fashion. The moment they move to an explication of an experience, they move from concrete experience to abstract conceptualisation. He proposed that there is a similar polar relationship in the actions taken in response to apprehension, where the response is either through active experimentation (concrete) or by reflective observation (abstract). He also suggested that predispositions towards concrete or abstract styles are reinforced by professional training and practices, and that what was needed, rather, was an integration of all of these approaches through the ‘learning cycle’. The task of the educator was, therefore, to encourage learners to use the full range of tools available to them to understand their experiences.

From the perspective of this discussion, what newcomers to any work area are trying to do is grasp the concrete realities in which they are to act (and be assessed), and to respond accordingly. One example given in this paper (the extracts from Denis’ work) shows how students with a detached, observational stance on the interactions they had with clients were able to consider why they behaved in certain ways, sometimes within existing assumptions, and sometimes using new perspectives and insights. Another example, the descriptions provided by Annabel, shows how high levels of demand and lack of ‘space’ embed thinking in the concrete worlds of action and relationships, and the learning is therefore tacit, and expressed in action. Thus, the busier, riskier and more demanding the workplace, the less likely it is that reflection will occur, given that it ‘requires space in the present and the promise of space in the future’ (Smith 1994: 40). The most effective solution for learners is to turn to what have been described as unsuitable ‘survival’ strategies (Zeichner 1982).

The experiential learning cycle and learning from experience

Kolb’s (1986) work on reflection as it relates to the learning cycle has been criticised as paying insufficient attention to the processes of reflection and occurring in isolation from social, historical and cultural contexts (Boud et al. 1985, 1996a, 1996b, 1999; Beard & Wilson 2002). In the work of Boud et al., the assumptions are also that learning takes place against a background of the individual’s personal experiences (familiar actions, relationships, thoughts and values) which are socially and culturally constructed, influenced by the socio-emotional context (both past and present) and a person’s intentions – and that reflection should not be intellectualised, because emotions are central to all learning. Boud et al. follow Dewey (1993) in seeing learning from experience as largely tacit unless reflected upon. Dewey’s position was that reflection is a form of response to experience and only when the impulse is to some extent checked and thrown back on itself, through an intentional endeavour to discover specific connections between something which we do and the consequences that result, does reflection ensue (Dewey, 1933, in Archambault 1974). Mead (1970 [1934]), a colleague of Dewey’s, asserted that it is in social behaviour that the process of reflection arises. Simple reflection he illustrated with the example of
deciding not to keep tugging at a drawer which is stuck, but, rather, to check whether there is an object inside which is preventing the drawer from being opened: this is a form of analysis that does not take us out of the field of impulses. Reflection involves at least two attitudes: there is a novel feature which gives rise to conflicting impulses (analysis); and a reaction to the novel feature that we indicate our reaction to it to ourselves as we might to another.

Reflection or reflective behaviour arises only under the conditions of self-consciousness, and makes possible the purposive control and organization by the individual organism of its conduct, with reference to its social and physical environment, i.e., with reference to the various social situations in which it becomes involved and to which it reacts (Mead, 1962: 91)

Given the need to locate apprehension and responses in the wider socio-emotional framework delineated by Boud et al. and Mead, it seems to me that, in the face of the concrete, and public, problem of how to survive and prosper in a new work environment, the most critical response will be the concrete one – actions are going to affect the future more strongly than private ruminations.

It is possible that the demand for action in unfamiliar contexts allows for the foregrounding of *bricolage* as the mechanism through which novices (and therefore undergraduate students in unfamiliar work placements) learn in placement contexts, rather than reflection. 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; Goffman 1972, 1976; Lave & Wenger 1991). 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.

Foregrounding *bricolage* as the central strategy shifts the focus away from the Holy Grail of reflection, into problem-posing and solving. A study by Tyre, Eppinger and Csizinszky (1995) showed that providing support for systematic problem-solving led to improved solutions, increased information-seeking, and encouraged more complete consideration of all the factors that might be in play, even, for experts.

**Implications for the practicum**

Boud & Walker (1998: 192) point out that the spread of reflective practices in some professions has involved partially understood concepts being taken into inappropriate contexts. My reflections suggest that the practicum, for students early in their undergraduate studies, may constitute one instance of an inappropriate context, one which goes across the professions. A kaleidoscope of perspectives indicates that novices are highly unlikely to engage in critical reflection, and that students are far more likely to engage in concrete problem-solving, active experimentation, *bricolage*, and rule-following. Is there a way forward, then, for maximising the potential of what are logically highly relevant learning experiences?

John Biggs developed a taxonomy to guide educators in selecting appropriate objectives for their courses, and to underpin the design of subjects in which learning objectives, activities and assessments are ‘constructively aligned’. Whilst the ‘SOLO’ taxonomy only deals with cognitive aspects of the placement (and therefore will not encompass all of the potential learning), it may nonetheless be useful through its recognition of different levels of response to a learning task, and because Biggs suggests that they can be used to structure the overall undergraduate curriculum.

Biggs suggests that there are five levels of cognition: the prestructural (in which there is an inadequate grasp of what is needed – Denis’ ruminations on sexuality rather than gender); the unistructural, in which isolated facts or procedures can be identified or performed (several students learned to conduct assessments for emergency relief); the multistructural, in which several facets that need to be taken into
account in dealing with an issue can be listed, combined, or performed according to the algorithms previously provided or encountered (Annabel’s more comprehensive responses to Ben’s difficult behaviour); the relational, where people can integrate data to compare and contrast, explain causes, or relate/apply theory to practice (Hector’s consideration of illness, and Denis’ consideration of Home World); and the extended abstract, in which people can theorise, generalise, hypothesise and reflect (characteristics of expert practice).

Importantly, Biggs’ view is that an extended abstract level is unlikely to be achieved even by an A grade student in the first year of study, and that, while most will conclude their undergraduate studies able to handle unseen problems drawing on known principles (one aspect of the extended abstract level), the capacity to question and go beyond existing principles, that is, to critically reflect upon one’s practice, is ‘a surprising bonus if it occurs’ (Biggs 1999: 47-48). In order to constructively align practicum objectives with the learning experience and assessment processes and products, perhaps our attention should turn to improving the quality of the processes in which we know students are engaging.

Whilst Biggs offers one way forward, there is a need to retain awareness that the practicum aims to foster a far wider range of complex achievements, often articulated in graduate attributes (Biggs 2005; Knight 2005). The types of skills and achievements that might be focused on for development and assessment include problem posing/solving; application and performance; attitudes, values and self-awareness; managing and developing oneself; communicating; and/or course related learning and study skills, strategies and behaviours (Angelo & Cross 1993; Nightingale et al. 1996).

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Team Botany 2005: Operation Saturation/Satiation Teaching

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Teaching first year internal students is challenging. In Botany (BIO126) lack of student enthusiasm and poor lecture attendance culminated in 25% of students failing in 2004. We have changed this trend with our version of Team Teaching (Team Botany!) with pass rates up by 14% in 2005. All three academics were often present for classes. We gave students a series of “reality checks” which included testimonials from the previous year’s students who had scraped a pass or were re-doing the year. We clearly explained important concepts and showed how these linked to higher-level subjects. We used humour as an important teaching tool and gave examples from industry, pop quizzes and model answers to help students maximise their potential. A proactive use of the forum, tutorials to revise topics and evening study sessions made for a positive learning environment.

Principles of Botany (BIO126) is a first year subject delivered in both Distance and Internal modes and servicing a number of courses in the Faculty of Science and Agriculture. Internal students tend not to perform as well in exams as distance students, which has a number of likely reasons such as a younger group of internal students with a different study ethos. The level of scientific background of both internal as DE students was also quite diverse, ranging from previous University study or degrees (including graduate degrees) to students without any high school science experience. This in itself leads to difficulties in preparing lectures that can reach everybody. Compounding this is the Agriculture students’ mind set of the “Gentleman’s Ag. Degree” (4 years required, as the first year is to have fun). Student results from 2004 were poor. The way lectures are scheduled- in 3-hour blocks has also been an impediment to quality teaching. This is exemplified by one of the events that triggered our reflection of the way we taught Botany which occurred during a 3-hour block lecture on a very difficult topic, Plant Genetics. The lecture began with the complexities of the DNA molecule and two hours-forty-five minutes later ended with Mendelian genetics. A student asked, “Does this (later concept) have anything to do with DNA (concept discussed nearly 3 hours earlier)”. The answer was “It had everything to do with it”. The problem was that we were failing to allow students time to learn the basics and build to the complex; we had to “Get through it in 3 hours”.

Surveys of students in 2004 indicated that some failed to make the necessary connection between topics and the relevance to their overall course or future career. What follows is a how and why we are making changes to the subject and the outcome of these changes so far that include quotes from student feedback. Informal feedback was gathered at the beginning, middle and end of semester using anonymous questionaries. For 2005, we took up the challenge to revise Botany whilst maintaining standards. Our aim was to improve students’ learning experience using a multi-pronged approach.

In an effort to improve student commitment to the subject we introduced a series of “reality checks” the first of which was from two students from the previous year who volunteered to address the class giving a student’s perspective of the subject. The first student had scores in the high 90s in his Biology HSC the previous year but only scraped through with a very low pass. He commented that unless substantial work was done in addition to the scheduled times, or you were incredibly intelligent, you had little chance of passing. The second student made more of an impact on his classmates; he was repeating and admitted this was because he continued working at a high school level as it had gotten him into University. He stated that he was now a year behind in study and approximately $700 poorer per subject he had failed. Feedback taken after three weeks had comments like “Thanks for giving us the kick in the bum, keep doing it” and “It comes better from one of us, thanks for the wake up call.”

Our first change was to split lectures so that instead of a 3-hour block we gave two 50-minute lectures on Tuesday and a 50-minute revision lecture on Thursday. We also concentrated on helping students
to understand concepts rather than just memorising facts. The revision lectures focused on important concepts and was scheduled so that students would revise the topics within 48 hours within class time so increasing the likelihood of transferring the concepts into their long-term memory. Research has shown that revision of a newly learned concept within 48 hours results in a 90% chance of retaining the concept. With revision of the material after 7 days, there is less than a 3% chance of retaining that information in long-term memory (B McGowan, per comm., 2005; Bolles 1988). The ‘revision’ lecture slot was also used to provide ‘prequels’ of at most 15 minutes to difficult topics such as photosynthesis, DNA and plant genetics. This allowed the students lacking high school science to have a basic level of understanding when we covered the topic in detail. Again the student feedback was very supportive, “Liked the DNA being introduced early, it takes some pressure off later.” Our future HD students also saw these sessions as useful revision.

Our team teaching involved a number of strategies that proved to be synergistic. All three academics attended most lectures that ranged from one academic presenting and the others sitting with the students, to two or even three presenting different aspects of a topic. We would interject with questions and challenges when we thought this would enhance the students’ learning. This “real-time feedback” from colleagues allowed us to clarify difficult concepts during the lecture and created an exciting dynamic that the students appreciated “Really like the way all of you come to the lectures. Different ideas or explanations really help” and “like that lecturers challenge each other.” This extra commitment has been questioned by colleagues but has only involved an extra 24 hours of attendance per semester for each lecturer. An unforeseen positive of our team-teaching model was the student’s comments that we were doing as much as possible to help them and that they would try to do the same.

Another form of “reality check” allowed students to see how Botany topics would link to other subjects in their course and in the industry rather than see them as independent pieces of information and not appreciating why they needed to learn them. Lecturers of second year subjects were invited to lectures to give their industry perspective on key topics. Responses were again very positive e.g., “Thanks for making things relevant to our industry” and “It is nice to see how this links to our course.”

Students were told that each week they would likely face 50 words new to their vocabulary. If they waited until the end to cram for the exam, they would have 600 new words to learn; we kept stressing the importance of keeping up to date and placed weekly glossaries on the Forum of the new words introduced that week. We reiterated that the best time to review materials is within a day or two after the material has been read or presented in lecture (Bolles, 1988; B McGowan, per. comm., 2005). Of the two ways to move short-term memory to long-term memory: rote learning and learning through understanding, we endeavoured to create a learning environment that fostered the understanding of concept rather than memorization. “One of the best ways to ensure that material passes from short-term memory to long-term memory is by rehearsal or repetition. Read over notes and texts several times” (Ludowyk, 2002). However, according to Bolles (1988), repetitive learning requires little understanding of the subject matter. Our goal was to develop an environment of “Learning through Understanding”; remembering main ideas and supporting details from a lecture because students understand the concepts. During our lectures, we would try to give students a short quiz on each topic. These were not used in the subject grading, but only to allow the students to gauge their level of understanding. Ten to 15 multiple choice questions followed by the answers only took 15 minutes. Two or three short answer questions like the ones they would have on their final exam followed by what we expected as a model answer allowed the students to know what detail was required. Overwhelmingly ~80% of students acknowledged and appreciated these quizzes. “Pop quizzes are great, lets us know where we are at” and “quizzes are great, they help pick out and at what level we need to know it”.

The Botany forum had an incredible rate of usage in 2005. The number of internal and distance students combined was 203 with 25708 distinct reads by the end of the examination period. There was an average of 126 reads per student, with 97% of students making at least one read. The forum was used by lecturers to distribute the presentation material before the lecture. It was decided to give the
students the lecture material as a means of reducing the need to copy every word down from the slides.

The risk of giving the material to the students was that they would not attend the lectures thinking they already had the material. Our way of dealing with this was to leave gaps in the material that they were given. Although we did not keep records of attendance in lectures, the vast majority of students attended every lecture, although there was a slight drop in attendance on Thursday 9.00 a.m. lectures. A contest was run with all students on the Forum with 50 multiple-choice questions; the first three to get all correct won Botany dictionaries and wine. The response was amazing. A series of sub-forums were also created to manage the Forum more effectively. Themes included jokes (originally botanical). One student commented, “The jokes were what got me on the forum, but I always looked in the other forums for extra help”. A goal was set to give feedback on the forum within 24 hours of posting, and we were able to fulfil this in almost all cases. A division of labour within the team accomplished this. Again, student feedback was very positive. “Have you seen when some of the replies are posted, 3 a.m., thanks for the quick turnaround” and “The zealous checking of the forums was appreciated; I never had to wonder how many weeks I would have to wait for a response”. In order for the Forum to be an effective means of communication and for students to make use of it, we (the lecturers) must show that we are willing to use it and make it worth their time in logging on.

Student feedback (both formal and informal) showed that humour and enthusiasm made the learning experience more enjoyable and therefore improved the learning outcome. Every 10 to 15 minutes during a lecture, we would show a humorous picture or video clip. The dual purpose was to amuse and draw students to attend lectures, but it also acted as 30-second mini-breaks from difficult concepts. We attempted to have the photos or clips relevant to the topic, but sometimes it was funny for humour sake. One concept that is often difficult to convey is that of diffusion of gases. The understanding clear and funny when the question was posed by a lecturer, “Who is the last person to know that someone farted in the class and why”. After the laughter died down, the concept of concentration and movement of molecules was explained and understood; but the trigger to recall that knowledge was a “The science of a fart”. Our enthusiasm was another positive commented on by students; “Lectures are never boring with you guys” and “As I was riding the chairlift, I thought, the vascular cambium must have produced all those branches... Oh No, I turned into a Botany geek.” We asked a senior lecturer to attend one of our lectures, as it was his area or research and expertise. On the ride back to the school, his comment was “do you always act like that?” He had just witnessed a lecturer jumping up on top of the front desk to emphasis a point about the fate of an excited electron. Props such as tennis balls bouncing down a staircase emphasised the difficult to visualize concepts such as electron transfer chains. “The use of props grabs out attention and makes abstract things clearer”, “The lectures were so enjoyable; you didn’t want to miss them”, “Had fun and learned a lot” and “Lectures are always exciting”.

Psychologists having identified a number of factors that can influence how effectively memory functions further support the use of humour and enthusiasm in lectures. “Degree of vigilance, alertness, attentiveness, and concentration aid in learning e.g., Choose to remember” (Dubuc, 2005). Our goal was to make it interesting, encourage attendance and involvement in lectures; if it was fun, it was hard not to learn. Interest, strength of motivation, and need or necessity fosters learning. “It is easier to learn when the subject fascinates you” (Dubuc, 2005). We worked hard to show students where and why this information was relevant to them; if they saw the relevance, learning was easier. “Visualize or picture in your mind what you wish to remember. A mental picture is often easier to remember than words” (Bolles, 1988). Throughout lectures, we endeavoured to find analogies, and mnemonics to help with the learning objectives. “Repeat what you wish to learn until you overlearn it. Say it in your own words. Even though you have already learned something, go over it one more time” (Bolles, 1988). Lectures, tutorials and study sessions were built in reviews. “We remember what we understand; we understand only what we pay attention to; we pay attention to what we want.” (Bolles, 1988), our goal was to ensure the students wanted to come to class and once they were there, to keep them interested.

During the first lecture, we made a commitment to the students; we would give them as much help as they wanted. Evening study sessions were planned around the three evaluation exercises. Although
this was done outside the “scheduled teaching times” a commitment was made to help with the learning, not to give them answers. For the first exam, a record of which students attended the study session was made. The students that attended the sessions received an average mark 10% higher than students who did not attend. Of course, we do not know that it was because those students attended the revision lectures that they got higher marks, they might have been the more conscientious students; some students attended but failed. Still, it is encouraging. Attendance at the study sessions for the three evaluations increased each time (from ~50% for the first to near 90% for the final exam study sessions). The extra time amounted to 12 to 15 hours over the entire term, but the feedback from students was overwhelmingly appreciative of our time. Results of an informal survey showed ~90% of students were appreciative and found the extra study sessions of benefit. “So grateful for willingness in organizing and attending study sessions before quizzes and exams” and “the study sessions that were held before the exams and quizzes were very good.”

We are making further changes for 2006. The topic schedule will be more integrated, with plant structure (anatomy) and function (physiology) taught together. At present anatomy and physiology are separated by as much as 5 weeks as lecturers have preferred to teach in blocks and also reflect the current textbook organisation. Lecturers will present more often but for a shortened duration over the 13-week term. This will require only small adjustments as we already attend most lectures. …and the Distance Education Students is another story with more great results and feedback. That is for next year...

The final words should go to the students, “The atmosphere of lectures and tutes was friendly enthusiastic and a very good learning environment” and “You guys (Team Bot) have taught me in a way that I may actually retain some knowledge after the final exam! I’m sure that is unheard of”.

References
From the classroom to Kajulu and beyond: Teaching and learning within an industry-professional context

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Teaching and learning strategies are changing as the contemporary view of effective education is to prepare students for assimilation into professional practice. Within the School of Communication at Charles Sturt University the distance between the classroom and the professional community is closing. At Kajulu Communications, the on-campus student advertising agency of Charles Sturt University, students must apply best industry practice to a range of authentic situations. Over the last three years, the author has been engaged in action research, investigating the strengths and weaknesses of the Kajulu model. Based on this research, this paper examines the pedagogical practices that naturally connect learning to authentic activity, context and culture, specifically detailing the 360 degree or ‘orbital view’ of authentic assessment tasks within Kajulu; peer, lecturer and client assessment, and draws on actual case studies to support the notion of authentic assessment within an industry-professional teaching and learning environment.

Introduction

Universities are under increasing pressure from both employers and students to equip their graduates with real-world skills and capabilities. As Morris (2005) indicates, it is becoming apparent that employers are seeking qualifications beyond simply the framed degree. They want hands-on skills, employees who are good communicators, team players and are dedicated to life-long learning. Executive Director of the Australian Association of Graduate Employers Ben Reeves sites industry experience undertaken by students during their final university year as being worth more on a resume than top-ranking academic results (Reeves, 2005). Joanne Tyler from the National Association of Careers Advisors concurs stating that today most undergraduate courses include a mandatory internship period to ‘chalk up some experience’ while they are studying, integrating industry experience into a university course. But, is the concept of industry internship or ‘chalking up some experience’ simply paying lip-service to the perceived needs of employers or is it a valuable augmentation to university student learning?

In line with the evolving model of the university graduate, teaching and learning strategies are changing as the contemporary view of education is to prepare students for assimilation into professional practice. Today the buzz-words in education are careers in curriculum, vocational focus, cognitive apprenticeship and importantly authentic assessment – assessment within the learning environment, predicated on acknowledged professional industry criteria, needs and expectations.

Much has been written in the literature concerning vocational teaching and, in particular authentic assessment. But what is ‘authentic assessment’, how may it be effectively assimilated into teaching and learning, and importantly how does it relate to values required in the workplace? To what degree does the notion of authentic assessment better prepare students for the real world?

This paper examines the teaching and learning strategies employed at Charles Sturt University. It discusses the situated cognition theory and specifically the cognitive model as a basis for learning and assessment. Using the experiences of the last 3 years within Kajulu Communications, the on-campus student advertising agency of Charles Sturt University, the paper analyses the effectiveness of pedagogical practices that naturally connect learning to authentic assessment, context and culture. The paper examines the 360 degree, or ‘orbital’ view of assessment tasks in Kajulu; peer assessment, lecturer assessment and client assessment, based on the notion that in situated approaches students collaborate with one another (as teams) and their instructor (master) toward a shared understanding. It does so by drawing on actual case studies to support the notion of authentic assessment within the industry-professional teaching and learning environment of Kajulu Communications.
In doing so the paper acknowledges Charles Sturt University’s stated commitment to the discovery and advancement of knowledge and the development of mechanisms for transferring knowledge via its position as a university for the professions, as enunciated in its statement of strategic direction:

Charles Sturt University graduates will be highly employable and recognised for their capacity for, and commitment to, service to the economic, social and cultural life of their communities, ethical conduct and continued personal and professional development.

(CSU Strategic Plan, 2002, p 7).

Defining authentic assessment

Van Merrienboer (1997) suggests that authentic assessment requires that students integrate knowledge, skills and attributes as professionals do, thereby implying that the tasks they undertake are congruent with those in the workplace. Gulikers et al (2004) maintain that an authentic task is a problem task that confronts students with activities that are also carried out in professional practice, claiming that an authentic task is therefore critical for authentic assessment. Newmann (1992) claims that the true criteria for authenticity may be reflected in three ways: assessment tasks, instruction and student performance.

Savery and Duffy (1995) add a crucial additional perspective, that of situation or environment. They introduce the aspects of the replication of real life situations in which teaching and learning take place, i.e. experiences that could confront students in future professional life. This then combines the concepts of the quality of teaching and the context in which it is taught, in terms of definable outcomes.

From the classroom to Kajulu

Regardless of individual points of view and definitions of the myriad terminology, most researchers seem to agree that teaching and learning strategies are changing. In the specific field of marketing communications and advertising, the requirement is for graduates with real-world skills who can ‘hit the ground running’.

Within the School of Communication at Charles Sturt University the distance between the classroom and the professional community is closing. The evolution of professional practice and vocational teaching and assessment began in 1999 with the establishment of the student agency Kajulu Communications. Kajulu replicates a real agency in every way; from systems, procedures and responsibilities to student roles and accountable outcomes. From briefs for real client organisations to the development and presentation of industry-standard integrated communication campaigns. In more and more instances these campaigns are going to market, thereby taking the process out of the realm of the traditional student assignment and exemplifying innovative approaches to learning and authentic assessment in terms of marketplace accountability.

Kajulu is a stand-alone entity on campus, responsible for its own premises and equipment. Final year advertising students leave traditional lecture halls and tutorial rooms behind as they work almost exclusively in the agency environment of Kajulu, in effect completing a full year’s internship whilst still at university. Everything about Kajulu is designed to meet professional industry standards and requirements, from the agency’s physical premises to the psychological approach students take to the development and presentation of client campaigns that go beyond student assignments.

The first thing one notices about Kajulu is that it actually looks and feels like an advertising agency, not simply a tutorial room paying lip service to the concept. Reception, meeting and presentation rooms, a production department equipped with the latest PC and Mac technologies, research and focus group rooms and mandatory ad campaigns and awards adorn the walls. Frenetic activity, often well beyond student campus hours confirms that this is a functioning advertising agency. Gulikers et al (2004) refer to this, in discussing a five-dimensional framework for authentic assessment as ‘the
physical context’, the location and surrounds where learning will happen and assessment will take place. Brown et al (1989) and Herrington and Oliver (2000) state that the physical context of an authentic assessment should reflect the way knowledge, skills and attitudes will be used in professional practice.

Within Kajulu students operate and work in Agency teams. The total student cohort is self-selected into teams of around 7 students and these teams decide the individual roles of team members, replicating actual agency roles and responsibilities. They maintain these roles during their time in Kajulu and represent these roles in relationships with and presentations to their clients. In addition to learning the latest theories and practices for communication, students are required to rigorously and professionally apply them to real-world situations for actual client companies and organisations.

The philosophy of Kajulu reflects the professional practice and industry-orientated teaching and learning model employed, and states:

When you leave CSU and Kajulu you are more than simply graduating.
You are leaving one agency and moving on to another (McCulloch, 2003, p 5).

**Authentic assessment within the industry-professional Kajulu environment**

Gulikers et al (2004) argue that in order to meet the goals of education, there needs to be a constructive alignment between instruction, learning and assessment. Traditional front-of-class teaching, or what is referred to as ‘chalk and talk’, is an example of such an alignment characterised as instructional approach-knowledge transmission (also referred to as rote learning) and is assessed purely on the basis of knowledge acquisition via traditional assignments and tests. They maintain that today’s educational goals should focus more on the development of competent students and future employees than on simple knowledge acquisition. Here they state that the goal of assessment is the development of higher-order thinking processes and competencies rather than simply factual knowledge and basic skills. This closely parallels the vision of a CSU graduate (CSU, 2003) in that they should have the ability to learn and to work both independently and collaboratively, exercise reflective and critical judgement and importantly, be able to apply this knowledge in the workplace.

Birenbaum and Dochy (1996) characterise alternative assessments, noting that students have a responsibility for their own learning, requiring that they reflect, collaborate and conduct continuous dialogue with their teacher. Here they maintain that assessment involves real-world or authentic tasks and contexts as well as multiple assessment opportunities and methods to reach a profile score for the determination of student learning and development. Brown et al (1989) introduce the concept of cognitive apprenticeship, the development of concepts through continuing authentic activity. Cognitive apprenticeship supports learning in a domain (environment) by enabling students to acquire, develop and use cognitive tools in an authentic domain activity… a real-world situation. In this environment, teachers (masters) make explicit their tactical knowledge by modelling strategies in an authentic activity then support students in their attempts at doing the tasks. Finally, they empower students to continue independently, thereby advancing the concept of continuous of self-learning.

**Real-world situations and processes**

Newmann (1992) proposes an integrated conception of authentic intellectual achievement based on three criteria: the development of student knowledge through disciplined enquiry beyond the classroom; disciplined enquiry that replicates the skills and techniques of professionals; and reflection and simulation of problems, issues and situations encountered in the real world.

The concept of Kajulu is in many ways predicated on the Newman model. Students work on the development of marketing communication campaigns for real clients, regional, national and international. They do this within the operational ‘real agency’ context of Kajulu Communications by operating as teams, in effect ‘mini-agencies’. They work on real briefs delivered in a realistic face-to-
face situation by their clients. The briefs seek marketing communications solutions, nominate marketing objectives, desired outcomes and provide actual budgets.

Students reflect of knowledge gained in the first two years of their course and combine this with on-going learning and instruction during their final year in the application of processes to identify consumer insights through applied research activities, formulate communication strategies and finally to present fully developed professional communication recommendations to their clients. Often, more than one team will be assigned to a client project, adding a realistic dimension of competition to the learning environment. This spirit of competition, combined with authentic industry time-frames for the development of campaigns, the knowledge that the client is in most instances paying for this work being undertaken, and the psychological reward for ‘winning the pitch’ is a critical motivator. The result is a standard of work that goes well beyond simply what would suffice to pass an assignment or even a subject. Additionally there is the pride and ‘ownership’ by students that comes from the realisation that in many cases these campaigns are actually going to market.

An orbital view of assessment
Traditionally assessment methods are predicated on students answering set assessment tasks. In the main these tasks are theoretical and text book-driven. Hence answers tend to reflect readings from the texts without the need to reflect on learning or the desire to venture further in the assimilation of knowledge or the development of an argument. Ramsden (as cited in Biggs, 2005) quotes one undergraduate as stating:

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 do all right in the test.

Biggs (2005) identifies the considerable variation in student-teacher perspectives on assessment noting that, whilst teachers traditionally see assessment as the end of the process and a measurement of a student’s accumulated learning, often the student’s starting point is the assessment item itself. They look at what needs to be learned to pass the subject without thinking about what is entailed in achieving the eventual outcome.

Teacher perspective: Intended Outcomes----------Teaching Activities----------Assessment

Student perspective: Assessment----------Learning Activities----------Outcomes

Within the industry-professional environment of Kajulu, student assessment is based on authentic tasks, a demonstration of student initiated reflective practice and progressive argument in line with intended outcomes, in this case client and industry expectations.

A 360 degree or ‘orbital’ view of assessment is implemented and is undertaken in 3 phases:

(i) Team or group assessment: Client campaign projects undertaken by Kajulu teams form an integral component of the final year student curriculum. They are fully assessable. Individual assignments augment the team work so as to more readily allow for the identification of individual student overall performance. The major client campaign development and presentation work is assessed utilizing the following industry-standard criteria:

♦ Team campaign presentation
♦ Report content
♦ Report documentation
♦ Practicality and persuasiveness of concepts
♦ Accountability and expected ROI

Additionally, individual assessment is undertaken by way of:
Progressive learning assessment: regular reviews and mini-quizzes to ensure that students comprehend strategies progressively delivered throughout the session and then to allow them to reflect on these strategies;

Content assessment: a specifically developed assessment matrix that highlights the various levels of student achievement through any or all assignments.

(ii) Peer Assessment: Success of an agency means that all members of the team must perform as one. Kajulu team members complete a confidential Peer Assessment form asking students to rank team member performance out of 100%. It also asks that the student reflects on his or her own contributions, their strengths and weaknesses and where they see they benefited most or least from the exercise. Peer Assessment is valued at 10% of the overall subject grade.

Additionally, it is important to identify how the Kajulu team interacts with the client, from initial brief to final presentation. A Client Relationship assessment procedure identifies key areas for consideration including: quality of the brief and information supplied, accessibility of the client throughout the process and clarity of communication. The Kajulu team leader completes this survey on behalf of the team. Whilst this assessment carries no actual marks, it provides invaluable data to aid in the further development of effective agency/client procedures.

(iii) Agency Performance Assessment: This is completed by the client at the conclusion of the project or assignment. It evaluates the way in which the agency related to the client, day to day contact, the ability to translate the brief in terms of effective recommendations, their overall professional performance and attitude towards developing an on-going relationship.

Foodbank – a case study

A major client for Kajulu teams in 2004 was the Sydney-based international, non-denominational, non-discriminatory intermediary charity Foodbank Australia. Foodbank facilitates food and grocery donations and then distributes them to more than 1,500 community-based welfare agencies in Australia and, as an international organisation, to thousands of charities globally. In essence, they are the ‘charity behind the charities’.

Foodbank was also the client for the International Advertising Association’s national advertising competition “The Big Idea”. Two Kajulu teams were assigned to work on this client, competing against university agency teams from all over Australia. For geographic reasons, the brief was delivered electronically and agency teams were given just 5 weeks to complete the project for presentation to the client. The initial presentation was to be undertaken electronically with the eventual winning team presenting to the client company in Sydney.

Kajulu Red from CSU was judged outright National Champions. The Foodbank project was also considered to be the teams’ final year major project and as such was assessed internally as well as by the client. The orbital model of evaluation was applied; campaign presentation and content and Agency performance assessment. Results were as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaign presentation</td>
<td>34/40</td>
</tr>
<tr>
<td>Report presentation and content</td>
<td>54/60</td>
</tr>
<tr>
<td>Client evaluation</td>
<td>75/100</td>
</tr>
<tr>
<td><strong>Total score</strong></td>
<td>81.5/100 (Distinction grade)</td>
</tr>
</tbody>
</table>

The Foodbank campaign developed by the winning CSU Kajulu team received favourable professional comment:

A highly professional presentation. We are delighted with the innovative and creative ideas and are committed to implementing these ideas in our 5 year campaign starting in 2005. (Broekenstein, 2004).
Whilst an overall team grade is awarded for the major project, it is recognised that individual team member grades must reflect individual contribution. Using the final element of the ‘orbital’ matrix, Kajulu Red group scores were overlayed with both individual assignment scores and peer evaluation scores to ascertain individual team member’s overall results.

Final team member individual grade distributions were as follows:
- 1 x HD (mid range)
- 1 x HD (low range)
- 3 x DI (mid range)
- 1 x DI (low range)

**Conclusion and ongoing activity**

Invariably in any marketing communications campaign the final assessment is made by the market. In the case of Kajulu team members undertaking the final year of the Advertising degree at Charles Sturt University, it is the quality of thinking and applied knowledge as judged to industry standards by academic staff, as well as the industry itself (the client) that is taken into account in the final grades.

Kajulu student agency teams have not only consistently produced excellent academic results they have competed successfully both nationally and globally. Teams have won the acclaimed International Advertising Association’s ‘InterAd’ global advertising competition 3 times in the last 6 years (in 1999, 2002 and 2005) and have been named Australian Champions in both 2003 and 2004 in the IAA “Big Idea” Australian competition.

Beyond the awards and accolades, graduate employment for CSU and Kajulu students is almost 100%. This would seem to support the notion that the full year’s ‘internship’ in Kajulu, combined with the rigour of the course is serving well the needs of employers in the industry it serves.

Action research is on-going. The author recognises the limitations in the current data qualitative collection process, specifically in terms of the on-going development of the course, and identifies the potential value of more rigorously applied systematic methodology to collate student-centred data and inform assessment practice. Currently students are required to assess each other’s performance (confidentially) in all team work projects. They are also asked to identify where they contributed most or least and what they learned. These questions, whilst providing insights, do not deliver quantifiable data. It is intended to re-design the Peer Evaluation form as a KEE – Kajulu Experience Evaluation. The objectives will be to:
- Develop a quantifiable method of tracking undergraduate continuous assessment for final year Advertising/Advertising major students;
- Collect individual student-centred data;
- Evaluate a range of aspects related to assessment and time management of assignments;

Data will be used to inform ongoing research into student learning practices, evaluation and assessment.

**References**


PBL, collaboration, portfolio and criterion referenced assessment in a science and technology curriculum subject for beginning teachers

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The teaching of science and technology in primary schools is fraught with problems. Teachers perceive science as being difficult and they lack the content knowledge and confidence to teach it. This paper describes an approach in a compulsory subject of the Bachelor of Education (Primary) degree that tackles the integrated skills required by pre-service teachers to address problems identified in various national and international reports. A problem-based learning approach is adopted. Students demonstrate their content knowledge, collaborative skills and pedagogical content knowledge within a criterion referenced assessment framework. Their development as teachers of science and technology is presented in an integrated assessment portfolio record of their experiences. A quasi-experimental pre/post-test design is used to assess students’ developing content knowledge, scientific conceptions and cognitive reasoning. In addition, three surveys were conducted by the CSU Evaluation Unit at the end of the semester. Results show significant increases in content knowledge and complexity of cognitive reasoning, reductions in alternative scientific conceptions, and high levels of satisfaction with the approach.

A national study conducted for the Department of Education, Science and Training (DEST) revealed that teachers estimated the average time they spent teaching science to be 59 minutes per week (Goodrum, Hackling & Rennie, 2000). The researchers acknowledge, however, that the self-reported data are not reliable and most likely to be overestimates. More than half of primary students reported that they never used computers or found information from the Internet. One third of students indicated that they never went on excursions. Half of the surveyed students indicated that they never visited zoos or museums and almost two thirds of them never had visiting speakers to talk to them about science. When practical activities were undertaken, the majority of students indicated that these were teacher directed. A large number of teachers reported that they were not required to report student learning outcomes in science to parents (Goodrum et al., 2000).

International reports such as Project 2061: Science for all Americans from the United States of America and Beyond 2000: Science education for the future from the United Kingdom identify many of the same issues confronting the effective teaching of science in primary and elementary schools. All reports highlight the need for science to be made relevant to the students’ lives, involve many, and different, teaching and learning strategies and prepare them to be critical consumers of scientific and technological developments. These aims are not achieved by the teaching of discrete topics assessed by multiple-choice testing and reported to parents as summative marks. Rather, scientific literacy is highlighted as being a major aim of educational initiatives in these countries. The definition of scientific literacy in the DEST report from Australia is similar to others and revolves around a goal for science education “to produce a populace who are comfortable, competent and confident with scientific and technical matters and artefacts. Such an education should enable them to express an opinion on important social and ethical issues with which they will increasingly be confronted.” (Goodrum et al., 2000: p. 9).

Researchers in the field (e.g., Abell & Roth, 1992; Appleton, 1995, 2002, 2003; Harlen, 1997) and government reports (e.g., DEET, 1989; Goodrum et al., 2000) have highlighted some of the problems in science education at the primary school level. A general lack of confidence to teach science has, in the past, been attributed to lack of content knowledge and attempts to redress this have indicated that the connection between competence and confidence is far from clear (Appleton, 1995, Skamp, 1997). Appleton (1995, 2003) highlights the major issue that confidence to teach science should not be confused with competence.

Appleton and Kindt (2002) demonstrated that pre-service teachers who are presented with a suite of activities that work are more likely to develop the perception that they could teach the content with
some confidence and were able to go on and devise their own activities. This suggests a strategy for primary school teachers to develop the science pedagogical content knowledge (PCK) necessary to become more effective teachers in the area. Here, PCK involves four central components: knowledge and beliefs about purpose; knowledge of students’ conceptions; curricular knowledge; and, knowledge of instructional strategies (Grossman, 1990). Science PCK applies to the teaching of science and is distinct from the PCK required to teach reading or writing or other curriculum subjects.

The purpose of this paper is fourfold. First we briefly describe the context for attempting change within the science and technology curriculum studies subject for primary school teachers. Second, the problem-based learning approach employed is described that attempted to develop content knowledge, pedagogical content knowledge, collaborative learning skills and which were assessed using a criterion referenced portfolio. The methods section describes how the data were collected. The results section reports the students’ content knowledge learning outcomes, complexity of cognitive reasoning, their alternative scientific conceptions and their evaluation of the subject. The paper concludes with a discussion of implications for practice.

The context for change

Previous iterations of the subject, Curriculum Studies I: Science and Technology K-6, employed a traditional lecture and tutorial format with students experiencing three contact hours per week for the semester. Instructors in the subject had experienced several problems with getting students to engage with the subject. These included:
- difficulty in getting students to read the set readings as evidenced by their inability to reflect on the content and implications for practice during tutorials and lectures;
- getting students motivated enough to engage in the practical activities and remain on-task as evidenced by their preference to talk about their social lives during tutorial activities;
- maintaining student engagement and getting them to question what they were doing, i.e., the pedagogical approaches they were supposed to be considering;
- lack of student preparedness for lectures as evidenced by their unwillingness to download and read the PowerPoint presentation posted three days prior to the lecture time or to read the relevant sections of the prescribed texts;
- getting students to express their understandings of what they were doing as evidenced by the deathly silences following instructor questions during tutorials and lectures;
- little or no student initiative as evidenced by instructors being asked to tell them what to do at every stage (almost learned helplessness) or simply waiting for instructor directions on how to proceed or wanting the instructor to explain everything; and, more mundanely,
- talking during lectures.

These problems/issues occurred in the context of a subject that attempted to cover the six curriculum content areas of the New South Wales Science and Technology K-6 syllabus and which only skimmed the surface of each while attempting to develop content knowledge, pedagogical content knowledge and positive dispositions to the teaching of science and technology. In short, the subject failed at all of these for most of the students on most occasions. An analysis of the subject indicated to us that all of the conditions for engendering surface approaches to learning were present (Gibbs, 1992). That is to say, a heavy workload and crowded curriculum, too many assessment items (two assignments worth 60% and an exam worth 40%), lack of choice and little time to reflect on what was being learned (if anything) disposed the students to behave as they did.

In an attempt to foster deeper learning approaches in the 2005 offering of the subject, we avoided the features that encourage surface learning and included active, cooperative learning; offered students choice and flexibility and implemented an assessment strategy that monitored student performance through a single cumulative process that required the students to be reflective, flexible and open about the difficulties they encountered in covering the content and to document, with evidence, all that was happening (Barnett, 1994; Entwistle, Entwistle & Tait, 1991).
The content and conduct of the semester

For practical reasons, the instructors decided to focus on two curriculum content areas one of which is widely reported in the science education literature as one which is avoided or, if taught, taught badly and a second that contains few resources for teaching in departmental curriculum support documents. Thus, the topics to be covered were the Earth and its Surroundings and Environmental Science.

A “Problem Based Learning” (PBL) approach, more commonly employed in the field of engineering, was used in the 2005 subject offering rather than the more traditional format of lecture plus tutorial. It employs an iterative approach to understanding the problem, the personal learning required in order to solve the problem, solving the problem and reflecting on the outcomes (Hadgraft & Prpic, 2004). The approach was adopted because of the problems listed above. We hypothesised that such an approach might overcome many of these problems that had led to a measure of frustration from the instructors’ perspectives.

Setting up “the problem”

The “problem” was set up by administering the Astronomy Diagnostic Test (ADT) (CAER, 2000) as modified and extended by McKinnon & Danaia (2004). The “test” was administered on unsuspecting students in Week 2 to identify their prior knowledge (or lack of it) in astronomy. (Week 1 of the semester was used by a Mentor Training program for other purposes). The “test” also ascertained students’ alternative scientific conceptions as they related to certain astronomical phenomena and, in addition, allowed an assessment of their ability to explain the reasons for their answers. Students were horrified at the results. The pre-test results for females and males are shown in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>σ</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1.71</td>
<td>1.42</td>
<td>91</td>
</tr>
<tr>
<td>Male</td>
<td>3.13</td>
<td>1.89</td>
<td>23</td>
</tr>
<tr>
<td>Group Total</td>
<td>2.00</td>
<td>1.62</td>
<td>114</td>
</tr>
</tbody>
</table>

The maximum score for items which are mapped to the NSW Primary Science and Technology syllabus document is 14. The range of scores was 0 to 7 out of a maximum score of 14. Only 20 students scored 4 or more and only one student achieved a score of 7. These results indicate that the vast majority, if not all, of the students did not have the pre-requisite content knowledge to teach the outcomes of The Earth and its Surroundings strand of the Primary Stage 2 and 3 curriculum (pupils aged 8-11 years). When given the results of the ADT, the students clearly understood that there was a problem: their lack of content knowledge. Many made the inspired leap in concluding that if they “did not know the content then how could they know how to teach it?”

The tools supplied to the students

Students were next introduced to the “tools” that were to be employed during the subject: Problem Based Learning (PBL) approaches, Cooperative Learning strategies and a Portfolio Assessment approach involving criterion-referenced standards to document their learning processes and learning outcomes. A range of cooperative learning strategies were covered, through compulsory readings, to provide the groups with the skills that would make the “problem” manageable within the nine-week time frame within which the Earth and its Surroundings had to be completed. The balance of the semester was to be devoted to applying the skills they had acquired in the first nine weeks to dealing with the environmental problem loosely framed as “Water quality in the Murray-Darling Basin.”
In the first formal tutorial after students received their results from the ADT, they were given the opportunity to form groups (size range 3-6) in which they were to work during the semester. They were asked to record their thoughts and feelings about their performance in the ADT privately in their log book before sharing their results and reflections with their group members. In recording their thoughts about the act of sharing the ADT results, students described their relief at finding their friends and peers were as ignorant as they were. In their discussions, they also articulated that they were probably just as ignorant in the other five content strands of the Science and Technology K-6 Syllabus and expressed grave concerns for their ability to be competent teachers of science. Many did recognise, however, that they had to learn the content before attempting to teach it.

Content knowledge support

A compendium of 31 Projects, pre-prepared by the instructors, was provided to the groups. The Projects were all related to the Earth and its Surroundings and contained materials that were associated with all of the six Key Learning Areas of the primary curriculum (Science and Technology, Mathematics, English, Human Society in its Environment, Creative and Practical Arts and Personal Development, Health and Physical Education).

From these, the groups could choose to do as many, or as few, of the projects as they felt necessary in order to address their content knowledge deficits (the problem). In deciding which projects to cover, in true PBL fashion to make the problem “manageable”, the groups pooled their collective ignorance and mapped what they did not know against the requirements of the syllabus. Thus, the students constructed for their group a curriculum that would be enacted over a period of seven weeks.

In developing this personalised group curriculum, students, without realising it, were employing some of the cooperative learning strategies they would be required to use throughout the semester. They came to realise that other cooperative learning strategies could be used to reduce the magnitude of the problem still further. These included: Jigsaw II where one student became the expert on a topic and taught it to the others in the group; group investigation where each member adopted specific roles for particular purposes that changed from week to week; and, think-pair-share where students identified what they individually already knew and then, in pairs, pooled this knowledge before going off to extend it and subsequently returning to share and work through it as a group. In sum, students quickly recognised that the collaborative learning strategies were the means by which the overall task of content knowledge acquisition could be made manageable.

Portfolio Assessment and the Marking Rubric

The single assessment item by which student performance was to be judged in this subject was a portfolio involving criterion-reference standards to document their learning processes and learning outcomes. The criterion-reference framework contained 60 outcomes covering Problem Based Learning (18 items), Cooperative Learning (13 items), Academic and Knowledge components (8 items) and Portfolio components (21 items) and was supplied to students in their Subject Outlines at the beginning of the semester. This “Marking Rubric" is supplied as an appendix to this paper.

Each outcome was assessed with respect to an ordinal scale indicating the level of performance as follows:

5 – Excellent, Superb, Extremely Well Done, Wow!
4 – Very Good, Very Well Done
3 – Well Done, some gaps, can be improved a little
2 – Many gaps, can be improved a lot
1 – Barely mentioned, needs to be addressed in detail
0 – Not Present.
Gateway Tasks

Students were required to submit components of the Portfolio on four occasions during the semester. The occasions were referred to as “Gateway Tasks” and were designed both to provide the students with formative feedback and to ensure that they did not leave the entire portfolio construction until the last moment. The minimum standard that was acceptable for a pass in the subject was a mean score of “3” on the rating scale described above.

The first Gateway Task involved students formally describing their personal reactions to the result they had obtained in the ADT, their reactions to their group members’ results and reflections about the reactions. A second component of the first task involved a set of eight research papers related to the teaching of astronomy in primary schools being distributed to the groups with directions being given that each student had to choose a paper that had to be summarised and the main concepts reported to the group the following week. Each student also had to find an additional research paper covering a similar topic to the one supplied and the contents reported in the same way as the paper that had been provided. Students used a combination of cooperative learning techniques to do this. At the next tutorial, each student reported their findings of these two papers to the group. They were also required to record their personal reactions to the presentations of the members of their group. Thus, they experienced the effective “divide and conquer” approach of collaborative learning predicated upon the key concepts of positive interdependence, individual accountability and personal responsibility.

The second Gateway Task required students to map the curriculum outcomes and indicators from each of the six Key Learning Areas of the primary syllabuses to the projects that the group had chosen to undertake. The students adopted a similar divide-and-conquer strategy to this task. In their groups, individuals assumed responsibility for a sub-set of their group’s projects. Most students communicated their curriculum maps to the members of their group using email while some met face-to-face to exchange their information. The second component of Gateway Task 2 was to write individually a rationale for their curriculum and later to share this with their peers and then collaboratively to develop a rationale for their group curriculum.

The third Gateway Task required the group to do the projects they had chosen by employing cooperative learning strategies. Thus, individuals adopted differing roles and had to document their perspectives both as teachers and as learners. In adopting these roles, students developed both content and pedagogical content knowledge and became quite adroit at identifying the learning issues both for their peers and for the pupils they would teach in the future. They also had to construct a personal critical reflection on what they had done and learned in relation to the knowledge, skills, attitudes, pedagogy and assessment/evaluation components of the primary curriculum in general, and the science and technology curriculum in particular, and to share these reflections with their peers.

Gateway Task 4 involved students working in their groups to address the ill-defined problem of “Water Quality especially as it relates to the Murray-Darling Catchment.” They used the PBL and the cooperative skills and strategies that they had developed while covering the astronomy component. In this case, however, none of the learning issues were to be addressed through practical activities. In essence, the students were developing for themselves a personalised curriculum for themselves that they would need to follow if they were to teach the topic to their pupils.

The Gateway Tasks were then to be collated, organised and presented in the Portfolio together with any additional materials that individuals felt needed to be included to address the evidentiary nature of the assessment criteria.

Method

This section describes the participants involved in the subject, the way in which the Astronomy Diagnostic Test was treated and the use of the formal surveys of the subject administered by the University Evaluation unit.
Participants

The participants in this study were the 114 students enrolled in the Bachelor of Education (Primary), Bachelor of Primary Education Studies, and the Double Degree in Primary Education and School Counselling programs at a rural Australian university. These students were undertaking the compulsory curriculum subject, Science and Technology I.

Of the 114 students, the two enrolled in the BPES degree went on a practicum experience at the end of week six and returned at the beginning of week 11 of the semester. Of the 25 double degree students, 19 completed the first nine weeks of the semester before going on their practicum experience with the remaining six completing the 13 weeks of the semester. The entire cohort of 87 Bachelor of Education (Primary) students completed the entire 13 weeks of the semester.

Astronomy Content Knowledge

During the whole-group lecture in week 2 of the semester, students completed the Astronomy Diagnostic Test (CAER, 2000). This instrument has been developed by the Collaboration for Astronomy Education Research in the United States of America. Researchers at Charles Sturt University have modified the instrument by adding an additional four questions which require students to draw a picture of four astronomical phenomena and to explain what their pictures mean. The original 21 multiple-choice items of the ADT were modified by inviting students to explain their reasons for choosing a particular multiple-choice option thus avoiding the major danger of an “educated guess” prompted by the stem of the question and the alternatives.

Scoring of the ADT

Four variables were assigned to each item in the ADT. The first variable indicated whether the student had answered that question correctly. The next two variables identified the alternative scientific conceptions that were evident in the students’ written reasons for either explaining their diagram in the first four questions, or explaining why they had chosen a particular multiple-choice option in the remaining 21 items. The final variable described the complexity of the students’ written response using the Structure of the Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982).

In an earlier research project conducted by the authors, a total of 59 alternative scientific conceptions related to astronomical phenomena had been identified and collated into a manual describing them. This was done to ensure a high degree of reliability in the coding of students’ responses. The same manual was employed for this research project.

The SOLO taxonomy describes a hierarchy of learning outcomes according to the complexity of the students’ written response. If a student did not provide an answer, a “0” was assigned. If the student did provide an answer but indicated that it was a guess, a “6” was assigned. A response that does not appear to answer the question is described as pre-conceptual and is coded as a “1”. The remaining codes were assigned in order of increasing complexity of answer as follows. A “2” was assigned if there was only one “piece” of information in the response. An answer of this type is described as uni-structural. A “3” was assigned if there was more than one “piece” of information in the response. An answer of this type is described as multi-structural. A “4” was assigned if the pieces of information in the multi-structural type response had been related together. An answer of this type is described as relational. A “5” was assigned if a relational response was detected but the student had gone beyond the question to develop an “extended-abstract” response. A response of this type typically goes well beyond what is asked in the question but the argument presented by the student clearly indicates how the additional information relates to the question. No extended abstract responses were detected on either the pre-intervention or post-intervention ADTs.

The 14 items of the ADT that relate directly to the content of the Science and Technology K-6 syllabus are used to construct a total test score of content knowledge. The items all relate to: day and
night; phases of the Moon; the orbits of the Earth and Moon about the Sun; the seasons; the movement of the Sun in the sky; the structure of the solar system; and, the colours of stars. A mean SOLO score was also computed for these 14 items for each student.

Subject evaluations

Subject evaluations were administered at the end of the semester for each of the courses described above. Three surveys, constructed by the Evaluation Unit, were administered covering the offering of the internal subject, the teaching of the subject and the tutoring methods employed. Additional questions related to the unique components employed (PBL, cooperative learning, gateway tasks and the portfolio assessment task) in the subject were asked. Students provided free-form responses to these items. The questionnaires were forwarded to the Evaluation Unit for processing. Free-form responses were coded thematically and are yet to be analysed.

When the student surveys were returned after processing by the Evaluation Unit, all data were entered into the Statistical Package for the Social Sciences (SPSS v 11.5) for more sophisticated statistical analyses.

Results

This section presents the results of the various components described in the Method section. First, the results of the ADT are presented in three sections: the knowledge component, the SOLO as it relates to the complexity of students’ reasons given for their answer and the alternative scientific conceptions evident in these written responses. Second, more powerful statistical analyses are employed to determine the learning effects from the Pre-ADT to Post-ADT occasion. The results are presented in the same order as for the pre-intervention occasion. Third, an analysis of the formal evaluations is presented. Fourth, a brief analysis of the assessment outcomes derived from the marking rubric are presented.

Pre-intervention results

Table 1 above shows the pre-test mean scores for females and males for the 14 items related to the content of the primary school Science and Technology K-6 syllabus. The outcomes of this test, as suggested above, clearly indicate the parlous nature of the students’ content knowledge about the simple astronomical phenomena that they will be expected to teach in Years 3 to 6 (Stages 2 and 3). Table 2 presents the mean score of the students’ SOLO responses on the pre-intervention occasion. The table shows that, on average, the students’ reasons for their drawing or multiple-choice answers are at a pre-conceptual level indicated by the mean score close to “1” for both the females and the males. The difference between the mean female and male SOLO responses is significant (F=9.972, (df=1,112), p < 0.002) with males offering, on average, a more complex reason.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>σ</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1.12</td>
<td>0.50</td>
<td>91</td>
</tr>
<tr>
<td>Male</td>
<td>1.49</td>
<td>0.48</td>
<td>23</td>
</tr>
<tr>
<td>Group Total</td>
<td>1.20</td>
<td>0.52</td>
<td>114</td>
</tr>
</tbody>
</table>

The alternative scientific conceptions evident on the pre-intervention occasion are presented in a set of multiple-response tables. This is because two variables were assigned to classifying students’ alternative scientific conceptions. The tables present both the count and the proportion of students who offer each of the alternative scientific conceptions listed. It is possible that the percentages in the right-
hand column can add to more than 100% because the student offered one or more alternative conceptions.

Table 3. Alternative scientific conceptions related to the causes of Day and Night

<table>
<thead>
<tr>
<th>Day &amp; Night: Earth orbits Sun to make night/day. Earth orbits Sun daily.</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day &amp; Night: caused by the Sun going around the Earth.</td>
<td>13</td>
<td>11.4</td>
</tr>
<tr>
<td>Day &amp; Night: is equivalent to the seasons.</td>
<td>11</td>
<td>9.6</td>
</tr>
<tr>
<td>Day &amp; Night: Moon blocks sunlight at night. Moon orbits the Earth daily.</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the range of alternative scientific conceptions that some of the students hold about the causes of day and night. A surprising 11.4% of students think that the Earth goes around the Sun daily with a further 9.6% thinking that the Sun goes around the Earth daily.

Table 4. Alternative scientific conceptions related to the movement of the sun across the sky

<table>
<thead>
<tr>
<th>Movement of Sun: The Sun is directly overhead at noon every day.</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement of Sun: The Sun always rises in the east and sets in the west.</td>
<td>66</td>
<td>57.9</td>
</tr>
<tr>
<td>Movement of Sun: Sun is only directly overhead on one or two days per year</td>
<td>59</td>
<td>51.8</td>
</tr>
<tr>
<td>Movement of Sun: confusion with northern hemisphere</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows the range of alternative scientific conceptions that students have about the apparent movement of the Sun across the sky. A total of 57.9% of students think that the Sun is directly above their heads every day at noon and 51.8% think that it always rises directly in the east and sets directly in the west. One student’s response shows that perhaps they have only read texts that describe the movement of the Sun from a northern hemisphere perspective.

Table 5. Alternative scientific conceptions related to the orbits of the Earth and Moon about the Sun

<table>
<thead>
<tr>
<th>Orbit: Earth rotates at centre of system Sun goes round the Earth.</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbit: Sun &amp; Moon go around Earth in same orbital path.</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Orbit: Earth orbits the Sun by day and the Moon by night.</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Orbit: Moon and the Earth orbit the Sun together in the same orbital path</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Orbit: Moon orbits the Sun. Earth not mentioned.</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Orbit: The Moon goes around the Earth in a single day.</td>
<td>1</td>
<td>.9</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 5 show that for a small number of students there is a degree of confusion about how the Moon and the Earth orbit in relation to the Sun. For 3.5% of students, the results of the Copernican revolution have not yet filtered through.
Table 6. Alternative scientific conceptions related to the phases of the Moon and eclipses

<table>
<thead>
<tr>
<th>Conception</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phases: of Moon caused by shadow from the Earth.</td>
<td>53</td>
<td>46.5</td>
</tr>
<tr>
<td>Phases: Eclipse of Sun happens at full Moon BIG ENOUGH to cover the Sun</td>
<td>33</td>
<td>28.9</td>
</tr>
<tr>
<td>Phases: Total eclipses (Sun) can happen at any phase of Moon</td>
<td>10</td>
<td>8.8</td>
</tr>
<tr>
<td>Phases: caused by amounts of sunlight shining on Moon.</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Phases: caused by cloud blocking the light reaching the Moon.</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Phases: caused by distance from Earth/Sun</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Phases: caused by Sun covering Moon.</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Phases: caused by Sun orbiting Moon.</td>
<td>1</td>
<td>.9</td>
</tr>
</tbody>
</table>

Table 6 presents the results for students alternative scientific conceptions related to the causes of the phases of the Moon. The most common conception is that the Earth’s shadow is responsible for the different shapes. A further 8.1% of students offer varying reasons for the phases of the Moon. A total of 28.9% of students believe that a total eclipse of the Sun can only happen at a full Moon because then, and only then, is it big enough to completely cover the Sun while a further 8.8% believe that the eclipse can happen at any phase.

Table 7. Alternative scientific conceptions related to the causes of the seasons

<table>
<thead>
<tr>
<th>Conception</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasons are caused by the Earth’s distance from the Sun.</td>
<td>108</td>
<td>94.7</td>
</tr>
<tr>
<td>Seasons: Sun on one side Earth hot for 6 months other side colder.</td>
<td>1</td>
<td>.9</td>
</tr>
</tbody>
</table>

Table 7 shows that a massive 94.7% of the second and third year teacher education students think that the seasons are caused by the distance of the Earth from the Sun. One surprising alternative conception seemed to indicate that the Sun had a cooler side that caused winter and a warmer side that caused summer.

**Post-intervention results**

Table 8 shows the mean scores, standard deviations and Ns for females and males who supplied data on the pre- and post-intervention occasions for the 14 items related to the content of the primary school Science and Technology K-6 syllabus. The post-intervention outcomes of ADT clearly indicate that the students have made significant progress towards improving their content knowledge about the simple astronomical phenomena that they will be expected to teach in Years 3 to 6 (Stages 2 and 3).

Table 8. Mean scores, standard deviations and Ns for females and males for the 14 items

<table>
<thead>
<tr>
<th>Gender</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>σ</td>
</tr>
<tr>
<td>female</td>
<td>2.03</td>
<td>1.65</td>
</tr>
<tr>
<td>male</td>
<td>3.30</td>
<td>2.08</td>
</tr>
<tr>
<td>Group Total</td>
<td>2.29</td>
<td>1.81</td>
</tr>
</tbody>
</table>
The differences were tested using an ANOVA with repeated measures on the occasion of testing and the gender of the respondents as the independent variable. There is a significant main effect due to the occasion of testing ($F=182.92$, (df=1, 93), $p < 0.00001$) with an effect size of 0.663 (eta squared). Both females and males increased their scores significantly although there remains a significant between-groups main effect due to gender ($F=5.64$, (df=1, 93), $p = 0.02$). The difference between females and males on the post-intervention occasion is, however, less than on the pre-intervention occasion as indicated by Figure 1 which shows the closing of the difference between the mean scores of the two groups.

![Graph of mean knowledge scores on the pre- and post-intervention occasions for females and males](image)

**Figure 1. Graph of mean knowledge scores on the pre- and post-intervention occasions for females and males**

Table 9 shows the mean scores, standard deviations and Ns for females and males who supplied data on the pre- and post-intervention occasions for the mean SOLO content of the reasons given for answer to the 14 items. The post-intervention outcomes of the SOLO analysis of the ADT clearly indicate that the students have made significant progress towards being able to explain the reasons for their answers at a higher level.

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>Mean</td>
<td>σ</td>
</tr>
<tr>
<td>female</td>
<td></td>
<td>1.12</td>
<td>0.50</td>
</tr>
<tr>
<td>male</td>
<td></td>
<td>1.49</td>
<td>0.48</td>
</tr>
<tr>
<td>Group Total</td>
<td></td>
<td>1.20</td>
<td>0.52</td>
</tr>
</tbody>
</table>

The differences were tested using an ANOVA with repeated measures on the occasion of testing and the gender of the respondents as the independent variable. There is a significant main effect due to the occasion of testing ($F=39.525$, (df=1, 93), $p < 0.00001$) with an effect size of 0.3. Both females and males increased their scores significantly with the females offering more complex reasons than the males on the post-intervention occasion though the difference due to gender is now no longer significant ($F=1.454$, (df=1, 93), $p = ns$).
The difference between females and males on the post-intervention occasion is reversed with the females outscoring the males as indicated by Figure 2 which shows the crossover in the mean scores of the two groups.

![Graph of estimated marginal means for occasions](image)

**Figure 2.** Graph of mean SOLO scores on the pre- and post-intervention occasions for females and males

The alternative scientific conceptions evident on the post-intervention occasion are presented in a set of multiple-response tables. The tables present both the count and the proportion of students who offer each of the alternative scientific conceptions listed.

**Table 10. Post-intervention alternative scientific conceptions related to the causes of Day and Night**

<table>
<thead>
<tr>
<th>Day/night: caused by the Sun going around the Earth.</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day/night: Earth orbits Sun makes night/day. Earth orbits Sun daily.</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Day/night: Moon blocks sunlight at night. Moon orbits the Earth daily.</td>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>Day/night: Earth orbits the Sun by day and the Moon by night.</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Day/night: Earth rotates at centre of system, Sun goes round the Earth.</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

Table 10 presents the results of the analysis for students’ alternative scientific conceptions on the causes of day and night. Comparison with Table 3 above shows that there has been a reduction in the incidence of alternative conceptions with a count of 13 from 13.8% of students retaining an alternative conception compared with 25.4% of students on the pre-intervention occasion.

Comparison of the results presented in Table 11 for the post-intervention occasion with Table 4 for the pre-intervention occasion shows that there has been a halving of the alternative conceptions related to the movement of the Sun across the sky with a drop from 129 to 55 detections. There has been a major drop in the incidence of students thinking that the “Sun is directly overhead at noon every day” from 57.9% of students to 1.1%.
Table 11. Post-intervention alternative scientific conceptions related to the movement of the sun across the sky

<table>
<thead>
<tr>
<th>Conception</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement of Sun: The Sun always rises in the east and sets in the west.</td>
<td>31</td>
<td>32.6</td>
</tr>
<tr>
<td>Movement of Sun: confusion with northern hemisphere</td>
<td>13</td>
<td>13.7</td>
</tr>
<tr>
<td>Movement of Sun: Sun is only directly overhead on one or two days per year</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>Movement of Sun: The Sun is directly overhead at noon every day.</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 12 show that a small number of students still retain a degree of confusion about how the Moon and the Earth orbit in relation to the Sun. Comparison with Table 5 shows that there is a qualitative difference in the alternative conceptions that the students express. Only two remain exactly the same with “Sun & Moon go around Earth in same orbital path” and “Moon orbits the Sun. Earth not mentioned.” It would appear that some students have incompletely integrated the movement of the Moon about the Earth and the Earth about the Sun. They appear to have focussed on only one aspect of the system and confused the movement of the Sun around the Earth to cause day and night rather than answering the question about the orbits of these objects.

Table 12. Post-intervention alternative scientific conceptions related to the orbits of the Earth and Moon about the Sun

<table>
<thead>
<tr>
<th>Conception</th>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbit: The Sun goes round Earth. Moon not mentioned.</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Orbit: The Sun goes around the Earth in less than a year.</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Orbit: Sun &amp; Moon go around Earth in same orbital path.</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Orbit: Moon orbits the Sun. Earth not mentioned.</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Orbit: Moon and the Earth orbit the Sun together</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Table 13 presents the alternative conceptions expressed by students for the causes of the phases of the Moon and solar eclipses. Comparison with Table 6 above shows that there have been major reductions in all alternative conceptions. For example, the post-intervention incidence of the phases being caused by “shadow from the Earth” has dropped from 46.5% of students to 31.6%. The reason for a total eclipse of the Sun happening only at full Moon “because it is big enough to cover it” has fallen from 28.9% to 20%.
Table 13. Post-intervention alternative scientific conceptions related to the phases of the Moon and eclipses

<table>
<thead>
<tr>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>31.6</td>
</tr>
<tr>
<td>19</td>
<td>20.0</td>
</tr>
<tr>
<td>12</td>
<td>12.6</td>
</tr>
<tr>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>77</td>
<td></td>
</tr>
</tbody>
</table>

Table 14 shows that now 41.1% of students believe that distance from the Sun causes the seasons compared with 94.7% on the pre-intervention occasion. This is a further example of incomplete integration within the students’ mental model. It was evident from analysing the written responses that many students thought that because the tilt of the Earth’s axis pointed them towards the Sun in summer that they were “closer” and hence “warmer” compared with winter when the tilt pointed them “away.” This has lead to confusion with their previously “wrong” mental model of the Earth’s distance from the Sun causing the seasons.

Table 14. Post-intervention alternative scientific conceptions related to the causes of the seasons

<table>
<thead>
<tr>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>41.1</td>
</tr>
<tr>
<td>39</td>
<td></td>
</tr>
</tbody>
</table>

One question asked students to list in order of distance from the Earth, the Moon, Sun, Pluto and stars. Table 15 presents the results of two further alternative conceptions that were detected. One was evident in 11.6% of responses where there is confusion between the size of the object in the sky and its distance. The Sun “looks” bigger than the Moon so it is closer. The second alternative conception related to the same question equates faintness with distance, e.g., “Pluto is very faint therefore it is further away than the stars”.

Table 15. Other Post-intervention alternative scientific conceptions detected

<table>
<thead>
<tr>
<th>Count</th>
<th>% of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>11.6</td>
</tr>
<tr>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

The apparent reduction in the detection of expressed alternative conceptions on the post-intervention occasion compared with the pre-intervention occasion was tested with an ANOVA with repeated measures. Here the number of expressed alternative conceptions by each student on both occasions was calculated to produce two dependent variables. Students who did not offer a reason(s) for their answer were not included in the analysis. On the pre-intervention occasion, 54% of the possible written reasons for their answer were left blank while on the post intervention occasion this had fallen to 30%. That is, students appeared to be more disposed on the post-intervention occasion to offer a reason for their answer.
The results showed that there was a highly significant reduction in the mean number of expressed alternative conceptions on the post-intervention occasion with the mean number for females falling from 3.9 to 2.4 and for males from 3.5 to 1.7 ($F=24.330$, (df=1, 93), $p < 0.00001$). The effect size was a modest 0.307. Figure 3 presents these reductions graphically. Perhaps if students had offered reasons for their answers then more could be classified as “alternative”. Nonetheless, the reduction in expressed alternative conceptions is highly significant.

![Figure 3. Graph of mean number of expressed alternative conceptions on the pre- and post-intervention occasions for females and males](image)

Subject Evaluations and Grades

In this section, the 2005 cohort evaluations of the subject are presented together with the grade distribution. The student evaluations were administered during the final lecture for the subject. Three instruments were used: the subject evaluation, an evaluation of teaching, and an evaluation of tutoring. A subset of the data are presented here to illustrate the visual correlation between the subject grades awarded and the evaluations received from students. It is not possible to compute a correlation coefficient between the grades awarded and the students’ evaluations of the subject because of the anonymity of response to the evaluation instruments.

It is, however, possible to compute a correlation coefficient (Pearson) between reliable factors within the Subject Evaluation instrument that emerged as a result of an Exploratory Factor Analysis computed on the 19 items. Five factors emerged in the analysis accounting for 67% of the variance. Two of these factors are quite different from each other and serve to illustrate an issue that will be taken up in the discussion. These two factors were: a instrumental factor related to the objectives, content coordination and assessment within the subject (4 items) and a teaching factor related to how the subject was taught and the availability/approachability of the lecturer and tutors (7 items). The internal consistency (Cronbach’s alpha) of the two scales were 0.8328 and 0.8455 respectively.
Figure 4 presents the distribution of marks awarded for the students’ efforts in the subject together with the normal distribution superimposed as a curve. The bi-modal nature is evident with approximately 20 students falling in the lower part of the distribution and who were deemed to have failed the subject. Figure 5 presents the distribution of scale scores for the Factor related to the instrumental aspects of the subject involving objectives, content and assessment. A bi-modal nature, though not quite as evident as in Figure 4, is nonetheless present, with a number of students awarding a scale score of 17 or less out of a total possible 28 for this instrumental aspect of the subject.

Figure 6 presents the distribution of the scale scores for the teaching of the subject. Again, a bi-modal distribution is evident with a small number of students scoring the teaching at 32 or less out of a maximum score of 49. This translates to an average rating by these students on each of the seven items of undecided or disagreement. Figure 7 presents the distribution of students’ rating of the tutoring in the subject (using the Tutoring Survey). Here, the bi-modal nature is also clearly evident with 18 students rating each of the 10 items in the instrument at best as a Disagree.

A simple correlation analysis was computed for the two scales extracted from the Internal Subject Survey and whose distributions were presented in Figures 4 and 5 above. The Pearson correlation coefficient is 0.642 (p < 0.000001). That is to say, when students responded to both the instrumental scale and to the teaching scale, they did so in very similar ways. Those students who rated the teaching
positively also rated the objectives, content and assessment positively. More importantly, when they rated one negatively, they rated the other equally as negatively. In short, this small group of students were alienated by the subject content, and its teaching.

Though a relationship between the marks obtained by a student in subject cannot be traced to a student’s ratings of the subject, there is evidence to suggest that such a relationship exists as evidenced by the highly significant correlation above and the bi-modal nature of all of the distributions presented.

**Discussion**

This paper has described an intervention involving Problem Based Learning approaches in an area of science education that is normally taught badly in primary schools. Data were collected from a cohort of students that tapped their astronomical knowledge, alternative scientific conceptions, ability to explain phenomena and their reactions to the subject through the formal evaluations conducted by the University.

The results presented above show that students learned a great deal in a problem based learning environment with high task expectations that employed an assessment system based on an extensive set of criteria that scaffolded the portfolio they were required to submit for marking. Students’ knowledge increased significantly with a learning effect size of 0.667, a significantly increased ability to explain the astronomical phenomena and a significant reduction in their alternative scientific conceptions. From a content perspective, these results are impressive.

Students’ evaluation of the subject and its teaching could not be tracked back to their performance in the subject because the evaluation responses were anonymous as required by the University’s Evaluation Unit questionnaires. The evaluations revealed a bi-modal distribution of responses to the subject, and its teaching, that mirrored the bi-modal distribution of final marks awarded to students for their efforts in the subject.

It is to the issue of students’ evaluations in this period of performance based funding to schools for teaching performance that we now turn. “For Schools, the target for teaching performance is that 50% of permanent academic staff meet the University’s criteria for continuing professional development in teaching in 2005. If this target is met, then the 7.5% funding available in relation to teaching will be made available to the School in 2006.”

To meet the criteria for continuing professional development in teaching, an academic staff member must either have received an award for teaching excellence sometime in the past three years or undertaken two of 10 approved activities described in the Performance Based Funding document (2005). Of these 10 approved activities, the majority of academic staff are likely to undertake a Subject Review with a reflection paper of 500 words (Conversation with Educational Designer, 2005). The Subject Review requires the academic to use “University student evaluation data” as well as other evidence to compose their reflection paper.

The subject described in this paper employed new approaches to teaching science and technology curriculum studies. The results obtained showed highly significant changes in outcomes that we as lecturers were interested in achieving. The latter part of the Results section highlighted the correlation between student performance and students’ evaluation of the subject. A small number of students delivered very negative evaluations of the subject and who were likely to be the students who did not achieve a passing grade in the subject.

This raises the concern that the “student evaluation data” obtained at the end of the subject is of absolutely no use to the lecturer and of even less benefit to the students, and more, it has cost them money through the HECS fee for failing the subject. There is no utility in the information on how the lecturer can implement changes on the next iteration to address issues identified by the evaluation data. This is because there will be a new cohort of students involved who will have their own peculiar
reactions and dispositions to this new offering of the subject. In short, the Subject Evaluation Data is of little formative use while the subject is being delivered. In essence, the question that is raised is how to identify the students who will deliver negative evaluations because of their experience in the subject and who are likely to fail before they develop overwhelmingly negative attitudes and, later, fail the subject.

Thus, the authors are more concerned with being able to make adjustments to the subject while it is running, identifying the students who are struggling during the subject delivery and implementing interventions with them to redress the situation before summative evaluations are undertaken both of, and by, them. This will likely have the combined benefits of making the students’ experience more positive as well as less expensive.

The student experience at university is a product of many factors and includes their experience within each of the subjects they are studying as well as the other features that the Student Experience Questionnaire (SEQ) is designed to tap. Negative experiences within subjects may well influence performance. Formative evaluations are now possible as evidenced by the online administration of the SEQ. Subject formative evaluation data could be acquired and made available to the lecturer throughout the delivery of the subject for educative purposes.

The decision to make evaluation data “anonymous” has some problems that need to be addressed by the University. Who are the students who are reacting negatively to the delivery of the subject? Why are they reacting in this way? What interventions can be designed for them? Can the interventions overcome the disposition to failure for these students? These questions may in part be addressed by requiring students to provide identifying information to a third party, e.g., CELT or the information systems databases, so that students are adequately protected while they are studying the subject yet the information they provide can be useful to the lecturer in a formative sense.

In this period of performance based funding of teaching activity, the subject evaluations will assume an even more important role in the judgments managers make of academic staff. Attention should also be directed at the potential benefits to students who can provide feedback to their instructors while the subject is running so that their university experiences in general, and their learning experiences in particular, become more meaningful, positive and worthwhile.

References


Appendix – Marking Rubric
Marking Rubric EMS200 K-6 Science and Technology, Autumn 2005

Name:_________________________________
Student Number:________________________
Contact number:________________________
Email Address:__________________________
Tutorial Group: 1  2  3  4  5  6 (Circle)

1. This sheet MUST accompany each of the Gateway Tasks 1-3 AND accompany the submission of your final Portfolio.
2. The ticks against each criterion indicate to you how well you have addressed each one.
3. Not all criteria apply to all Gateway Tasks.
4. In essence, the rating scale against each criterion can be regarded as developmental. That is, if you score a 1 (not clearly evident) against the criterion on Portfolio Aspects Evidence of student participating in selecting contents of group curriculum, on submission of the Gateway Task 1, it is possible to increase this score to a 2, or greater, by addressing it in more detail in subsequent Gateway Tasks or on submission of the completed Portfolio. This can be done either by re-addressing the Gateway Task 1 or developing what you need to do in later Gateway Tasks to address the criterion properly.

Marking Scale:
5 – Excellent, Superb, Extremely Well Done, Wow
4 – Very Good, Very Well Done
3 – Well Done, some gaps, can be improved a little
2 – Many gaps, can be improved a lot
1 – Barely mentioned, needs to be addressed in greater detail
0 – Not Present OR Not Applicable in this Gateway Task

I certify that unless otherwise acknowledged, the contents of the Gateway Tasks and the completed Portfolio are all my own work.

Student Signature:_______________________________

<table>
<thead>
<tr>
<th>TASK</th>
<th>Signature of Subject Tutor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Task 1</td>
<td></td>
</tr>
<tr>
<td>Gateway Task 2</td>
<td></td>
</tr>
<tr>
<td>Gateway Task 3</td>
<td></td>
</tr>
<tr>
<td>Final Portfolio</td>
<td></td>
</tr>
<tr>
<td>Final Mark</td>
<td></td>
</tr>
</tbody>
</table>
### Marking Rubric + Components

<table>
<thead>
<tr>
<th>Portfolio Components</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evidence of student participating in selecting contents of group curriculum.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Contains criteria for selection of contents.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Contains Evidence of Enlarging the view of what is learned.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Contains Evidence of Fostering learning about learning.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Contains Evidence of Demonstrating progress toward identified outcomes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Contains Evidence of Providing a way for students to value themselves as learners.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Contains Evidence of Offering opportunities for peer-supported growth.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Contains samples of work that stretch over a period of time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Contains particular subject matter across the 6 KLAs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Contains evidence that a learning process is occurring.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Contains reflections upon experiences, thinking processes used, and the habits of mind employed at given points in time and across the time periods.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Contains Evidence of risk taking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Contains Evidence of creative solutions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Contains Evidence of learning to make judgments about their own performances.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Contains Evidence of students’ monitoring of their own comprehension.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Contains Evidence of students’ monitoring of their own metacognitive reflection.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Contains Evidence of students’ monitoring of their own productive habits of mind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Cooperative Learning Components

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
</table>

1. Contains evidence of using face-to-face promotive interaction.
2. Contains evidence of using Positive Interdependence
3. Contains evidence of using Individual Accountability/ Personal Responsibility
4. Contains evidence of using Interpersonal and Collaborative Skills
5. Contains evidence of using Reflection/Group Processing of Interaction

### Commonly Used Techniques:

6. Contains evidence of using and evaluating Think-Pair-Share strategy
7. Contains evidence of using and evaluating Three-Step Interview strategy
8. Contains evidence of using and evaluating Roundtable strategy
9. Contains evidence of using and evaluating Numbered Heads Together strategy
10. Contains evidence of using and evaluating Pairs Check strategy
11. Contains evidence of using and evaluating Send a Problem strategy

### Team Learning Techniques

12. Contains evidence of using Jigsaw II strategy
<table>
<thead>
<tr>
<th>Academic Components</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evidence of wide reading of scholarly literature.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Evidence of correct referencing techniques.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Knowledge Components</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1. Evidence of having acquired knowledge of scientific content.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Evidence of having acquired knowledge about, and how to use, the K-6 Science &amp; Technology syllabus.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Evidence of being able to conduct scientific experiments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Evidence of being able to draw scientific conclusions from experiments conducted.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Based Learning Components</td>
<td>5</td>
<td>4</td>
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<tr>
<td>1. Has effectively used a Logbook.</td>
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<tr>
<td>Key Steps in PBL</td>
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<tr>
<td>2. Contains evidence of attempting to Understand the problem</td>
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<td>3. Contains evidence of Addressing the problem</td>
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<td>4. Contains evidence of Modeling the problem</td>
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<td>5. Contains evidence of Generating solutions</td>
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<td>6. Contains evidence of Iteration in the initial stages of PBL.</td>
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<td>7. Contains evidence of attempting to Solve the problem</td>
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<tr>
<td>8. Contains evidence of Identifying learning issues and assigning to group members.</td>
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<td>9. Contains evidence of collecting new information and evaluating it</td>
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<td>10. Contains evidence of sharing new information with group</td>
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<tr>
<td>11. Contains evidence of Applying learned information to solving the problem (L)</td>
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<tr>
<td>12. Contains evidence of Assigning learning issues to group members (L)</td>
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<tr>
<td>14. Contains evidence of Generating alternative solutions (R)</td>
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<tr>
<td>15. Contains evidence of Evaluating solutions</td>
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<tr>
<td>16. Contains evidence of using brainstorming</td>
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<td>17. Contains evidence of using de Bono’s six hats approaches</td>
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<td>18. Contains extensive evidence of engaging in Critical Reflection</td>
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</table>
Publishing scholarship in teaching and learning

Sharynne McLeod1, Marian Tulloch2, Leonora Ritter3, Jenny Kent4

1. School of Teacher Education, Charles Sturt University
2. Centre for Enhancing Learning and Teaching, Charles Sturt University
3. School of Social Sciences and Liberal Studies, Charles Sturt University
4. School of Commerce, Charles Sturt University

We are continually encouraged to engage in scholarship in teaching. However, once we have undertaken research (whether it be theoretical, qualitative, or quantitative), we may be unsure about how and where should it be published. This paper will overview potential sources for publication of scholarship in teaching and learning in higher education and will provide an extensive bibliography containing relevant associations, conferences and journals. Furthermore, insights will be given into the process of publication including submission and peer review. Finally, suggestions will be made regarding targeting the most appropriate conference and journal, including information about acceptance rates and journal impact factors.

Teaching and research in the higher education sector is highly interrelated. Research complements teaching by developing new theories that can be implemented, by injecting new knowledge about the learning/teaching process, by interrogating old theories and challenging assumptions, and by finding solutions to practical problems.

Potential sources for publication in higher education

One of the most important steps in publishing scholarship in teaching is to locate the most appropriate journal and/or conference for your material. One of the best ways to understand the culture of a conference or journal is to join the relevant society.

♦ Appendix A lists a selection of national and international societies that are focussed on higher education. Most of these offer a conference and also publish at least one journal.

♦ Appendix B lists a selection of journals that are potential places for publication of research and scholarship in the area of higher education. The journals within Appendix B have been selected due to their broader focus on higher education in general.

♦ Appendix C lists many journals that are interested in research and scholarship in higher education, but this time they are focussed on specific discipline areas.

Process of publication

The preparation of a conference abstract or manuscript for submission to a journal should take a considerable amount of effort, paying particular attention to the guidelines for submission, including the page length and referencing style. Hoit (2005, p. 91) provides the following questions for new authors to ask of their research manuscript:

♦ “Is your topic relevant to the readership of the journal?...
♦ Does your title reflect your content?
♦ Is your abstract the best it can be?...
♦ Is your method clearly described?
♦ Do your results tell a story?
♦ Is your discussion rich with ideas?
♦ Does your manuscript contain too many words?
♦ Is your manuscript easy to read and understand?
♦ Is your manuscript error-free?”

For most journals it is extremely important that you embed your research and insights in the current literature. This literature should include papers from the journal or conference you are targeting. Engaging with relevant literature is joining in the international conversation about the topic.
Once a paper is submitted, typically the editors review the paper, then, if appropriate, send it to reviewers. Typically two reviewers consider the manuscript and then return their reviews to the editor who decides on the outcome of your submission. It is uncommon for papers to be accepted without changes. Papers can be accepted with minor changes (typically typographical and minor wording changes), with major changes (sometimes requiring further peer review) or they can be rejected. If a paper is accepted with changes, you are encouraged to respond to the reviewers’ comments in a line-by-line letter to the editor in addition to re-submitting your manuscript containing the recommended changes. Be explicit in explaining changes that have been made and if you disagree with a point made by a referee, be clear and polite in your response. If your paper is rejected, use the feedback to assist you in reconceptualising your work. At times, your paper may have been rejected as you have submitted it to the wrong journal. Use Appendices B and C to determine an alternative place to submit your work. A paper can always be improved. The revision process can clarify strengths and weaknesses of the paper and improve its focus and motivation.

The time between submission of your paper and receipt of a response from the editor can be considerably longer than you anticipate. With the pressures of academic work, turnaround by referees can be slow. Creedy (2005) suggests “when referees receive papers, they cannot be expected to take high priority when all academics are under great pressure to produce their own work. Almost the only incentive facing referees is a vague feeling that they are part of a community, and cannot expect to have their own work refereed seriously if they are not also prepared to contribute to the system”.

**Targeting the most appropriate conference and journal**

There are many reasons for publishing your scholarship in teaching and learning. These may include: to share your ideas with others, to challenge assumptions, to test your ideas by placing them in a public forum. Similarly, the focus of conferences and journals are different. Some offer a peer review process, others do not. Some journals are prestigious, others are not. Some target academic researchers in the field, others are filled with good ideas to use in practice. Be aware of these distinctions when selecting where to send your work. Many journals publish their acceptance rates. It is not uncommon for journals to reject a significant percentage of papers.

Increasingly journal impact factors are an important consideration when selecting places for publishing your work, particularly under DEST’s Research Quality Framework (RQF), and if you are considering applying for promotion. Thomson’s ISI Web of Knowledge is widely used to determine impact factors for journals, authors and individual papers. For example, the journal citation reports: “Covers more than 7,500 of the world’s most highly cited, peer-reviewed journals in approximately 200 disciplines. [and] Offers access to citation statistics from 1997 onward” The journals in Appendix B have been scanned in the ISI data base and only a few of these journals have an ISI impact factor.

**Summary and conclusions**

Publishing scholarship in teaching and learning is demanding in terms of time and effort, but it has both extrinsic and intrinsic rewards. Extrinsic rewards include peer recognition, institutional recognition and enhanced networks. Intrinsic rewards include new and exciting ways to approach your own teaching and the security that comes with knowing that your teaching is underpinned by demonstrable scholarship.

**References**


### Appendix A. A sample of societies relating to higher education.

Many of these societies host conferences and have conference information available on their websites.

<table>
<thead>
<tr>
<th>Society</th>
<th>www</th>
<th>Country</th>
<th>Conference</th>
<th>Brief description from their website</th>
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</thead>
<tbody>
<tr>
<td>AARE: Australian Association for Research in Education</td>
<td><a href="http://www.aare.edu.au/index.htm">www.aare.edu.au/index.htm</a></td>
<td>Australia</td>
<td>annual</td>
<td>AARE facilitates contact between educational researchers and encourages and actively lobbies for development of all aspects of educational research.</td>
</tr>
<tr>
<td>ACE: Australian College of Educators</td>
<td><a href="http://www.austcol.edu.com.au/">www.austcol.edu.com.au/</a></td>
<td>Australia</td>
<td>no</td>
<td>The Australian College of Educators advances the education profession nationally across all sectors and levels for the individual and collective success of Australia’s educators. In advancing the education profession, ACE aims to: provide a strong national voice for the profession, promote professional standards of a high order, recognise excellence in professional practice, foster the professional learning of educators, enhance the status of the profession.</td>
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<tr>
<td>American Educational Research Association</td>
<td><a href="http://www.aera.net/">www.aera.net/</a></td>
<td>USA</td>
<td>annual</td>
<td>The American Educational Research Association (AERA) is concerned with improving the educational process by encouraging scholarly inquiry related to education and by promoting the dissemination and practical application of research results. AERA is the most prominent international professional organization with the primary goal of advancing educational research and its practical application. Its 20,000 members are educators; administrators; directors of research; testing or evaluation in federal, state and local agencies; counselors; evaluators; graduate students; and behavioral scientists. The broad range of disciplines represented by the membership includes education, psychology, statistics, sociology, history, economics, philosophy, anthropology, and political science.</td>
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<tr>
<td>Adult Learning Australia</td>
<td><a href="http://www.ala.asn.au/">www.ala.asn.au/</a></td>
<td>Australia</td>
<td>yes</td>
<td>Adult Learning Australia (ALA) is the national peak body representing organisations and individuals in the adult learning field. We are a not-for-profit entity with both organizational and individual members in all States and Territories who reflect the extraordinary diversity of adult learning. They include adult educators in universities, TAFE Colleges, Community Houses and adult community education providers (ACE), as well as community workers, librarians, individual tutors and trainers, volunteers and students. ALA also has input to the MCEETYA Taskforce and the Australian Quality Framework Advisory Board (AQFAB). The national office is based in Canberra. ALA has primarily been funded by a grant from the Australian National Training Authority (ANTA), membership dues, subscriptions and project revenues. As of 1ST July 2005, the Department of Education Science and Training (DEST) will resume the primary funding for ALA.</td>
</tr>
<tr>
<td>Carnegie Foundation for the Advancement of Teaching</td>
<td><a href="http://www.carnegiefoundation.org/">www.carnegiefoundation.org/</a></td>
<td>USA</td>
<td>no</td>
<td>The improvement of teaching and learning is central to all of the work of Carnegie. The Foundation seeks to be both an inspiration and catalyst as we work on issues across regions, disciplines and levels of the education system from kindergarten through the level of doctoral education. Carnegie programs focus on four key areas of engagement: undergraduate education, professional and graduate education, K-12 teacher education, knowledge sharing.</td>
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</table>
| **CAUCE:**
Canadian Association for University Continuing Education |
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<tr>
<td>The Canadian Association for University Continuing Education (CAUCE) is a professional association of deans, directors, senior administrative personnel and practitioners whose professional careers are in university continuing education in Canada. Membership in CAUCE is on an institutional basis with most benefits of membership also extended to professional and affiliate members. The mission of the association is to enlarge the scope and quality of educational opportunities for adults at the university level by enhancing the stature and expertise of those institutions and individuals devoted to providing those opportunities. Although our focus is on university continuing education, our publications, programs and services are of interest to all continuing educators.</td>
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| **HERDSA:**
Higher Education Research & Development Society of Australasia |
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<tr>
<td><a href="http://www.herdsha.org.au">www.herdsha.org.au</a></td>
<td>Australia</td>
<td>annual</td>
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<tr>
<td>The Higher Education Research and Development Society of Australasia is a scholarly society for people committed to the improvement of teaching and learning in higher and tertiary education. HERDSA works to: advance education in the higher and tertiary sector; facilitate the improvement of teaching and learning; encourage and disseminate research on teaching, learning, development, leadership and policy; recognise and reward outstanding contributions to higher and tertiary education</td>
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| **ICED:**
International Consortium for Educational Development |
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<tr>
<td><a href="http://www.csd.uwa.edu.au/iced/Iced_aims.html">www.csd.uwa.edu.au/iced/Iced_aims.html</a></td>
<td>International (Australia)</td>
<td>biennial</td>
</tr>
<tr>
<td>The aims of ICED are: To help partner organisations develop their capacity for educational development in higher education through the sharing of good practice, problems and solutions. To increase the number of partner organisations of ICED. To help educational developers in countries where no national network exists to form such a network. To support educational development in higher education in developing countries. To link with other national and international organisations.</td>
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| **INQAAHE:**
International Network for Quality Assurance Agencies in Higher Education |
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<tr>
<td><a href="http://www.inqaah.org/">www.inqaah.org/</a></td>
<td>International (Ireland)</td>
<td>biennial</td>
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<tr>
<td>The main purpose of the Network is to collect and disseminate information on current and developing theory and practice in the assessment, improvement and maintenance of quality in higher education.</td>
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| **IAU:**
International Association of Universities |
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<tr>
<td><a href="http://www.unesco.org/iau/">www.unesco.org/iau/</a></td>
<td>International</td>
<td>annual</td>
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<tr>
<td>IAU, founded in 1950, is the UNESCO-based worldwide association of universities. It brings together institutions and organisations from some 150 countries for reflection and action on common concerns and collaborates with various international, regional and national bodies active in higher education. Its services are available on the priority basis to members but also to organisations, institutions and authorities concerned with higher education, as well as to individual policy and decision-makers, specialists, administrators, teachers, researchers and students. The Association aims at giving expression to the obligation of universities as social institutions to promote, through teaching and research, the principles of freedom and justice, of human dignity and solidarity, and contributes, through international cooperation, to the development of material and moral assistance for the strengthening of higher education generally.</td>
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<tr>
<td>Organization</td>
<td>Website</td>
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<tr>
<td>IMA: International Mentoring Association</td>
<td><a href="http://www.mentoring-association.org">www.mentoring-association.org</a></td>
<td>USA</td>
</tr>
<tr>
<td>International Society for the Scholarship of Teaching &amp; Learning</td>
<td><a href="http://www.isssotl.indiana.edu/ISSOTL/index.htm">www.isssotl.indiana.edu/ISSOTL/index.htm</a></td>
<td>USA</td>
</tr>
<tr>
<td>SRHE: Society for Research into Higher Education</td>
<td><a href="http://www.srhe.ac.uk">www.srhe.ac.uk</a></td>
<td>UK</td>
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</table>
### Appendix B. A sample of journals that publish manuscripts regarding higher education

<table>
<thead>
<tr>
<th>Journal</th>
<th>Web address</th>
<th>Impact factor</th>
<th>Brief description from their website</th>
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<tbody>
<tr>
<td>Action Learning: Research and Practice</td>
<td><a href="http://www.tandf.co.uk/journals/titles/14767333.asp">www.tandf.co.uk/journals/titles/14767333.asp</a></td>
<td>-</td>
<td>Action Learning: Research &amp; Practice will publish articles which advance knowledge and assist the development of practice through the processes of action learning. Articles should aim to create empirically grounded theory, which widens understanding of action and learning in professional and organisational settings. Papers should encourage practitioners to gain new insights into their work and help them improve their effectiveness and contribution to their clients and the wider community. Action learning is grounded in the approach pioneered by Reg Revans which holds that there can be no learning without action and no knowing without the effort to practise and implement what is claimed as knowledge. Because action learning promotes the creative integration of thinking &amp; doing, theory &amp; practice, academic &amp; practitioner, contributors are asked to strive to hold these often diverse perspectives together. An important question in assessing papers will be: “Is this likely to help people in the further development of their practice in working with people, organisations and communities?” Articles which cross the conventional boundaries of professions, organisations and communities are particularly welcome.</td>
</tr>
<tr>
<td>Active Learning in Higher Education</td>
<td><a href="http://www.sagepub.com/journal.asp?pid=266">www.sagepub.com/journal.asp?pid=266</a></td>
<td>-</td>
<td>Active Learning in Higher Education is an international, refereed publication for all those who teach and support learning in Higher Education and those who undertake or use research into effective learning, teaching and assessment in universities and colleges. The journal has an objective of improving the status of teaching and learning support as professional activity and embraces academic practice across all curriculum areas in higher education.</td>
</tr>
<tr>
<td>Adult Education Quarterly</td>
<td><a href="http://www.sagepub.com/journal.asp?pid=22">www.sagepub.com/journal.asp?pid=22</a></td>
<td>0.310</td>
<td>Adult Education Quarterly is a scholarly refereed journal committed to advancing the understanding and practice of adult and continuing education. The journal strives to be inclusive in scope, addressing topics and issues of significance to scholars and practitioners concerned with diverse aspects of adult and continuing education. AEQ publishes research employs a variety of methods and encourages the submission of innovative and provocative scholarship informed by diverse orientations. AEQ aims to stimulate a problem-oriented, critical approach to research and practice, with an increasing emphasis on interdisciplinary and international perspectives.</td>
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<tr>
<td>American Educational Research Journal (AERJ)</td>
<td><a href="http://www.jstor.org/journals/00028312.html">www.jstor.org/journals/00028312.html</a></td>
<td>1.103</td>
<td>American Educational Research Journal (AERJ) has as its purpose to publish original empirical and theoretical studies and analyses in education. The editors seek to publish articles from a wide variety of academic disciplines and substantive fields. They are looking for contributions that are significant to the understanding and/or improvement of educational processes and outcomes.</td>
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<tr>
<td>Assessment &amp; Evaluation in Higher Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/02602938.asp">www.tandf.co.uk/journals/titles/02602938.asp</a></td>
<td>-</td>
<td>Assessment &amp; Evaluation in Higher Education is an established international peer-reviewed journal which publishes papers and reports on all aspects of assessment and evaluation within higher education. Its purpose is to advance understanding of assessment and evaluation practices and processes, particularly the contribution that these make to student learning and to course, staff and institutional development. Assessment &amp; Evaluation in Higher Education welcomes research-based, reflective or theoretical studies which help to illuminate the practice of assessment and evaluation in higher education. The journal is aimed at all higher education practitioners, irrespective of discipline. It sets out to provide readily accessible, up-to-date information about significant developments within the field, with a view to the sharing and extension of evaluated, innovative practice and the development of ideas. Suggestions for special issues are welcomed.</td>
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<tr>
<td>Australian Journal of Adult Learning</td>
<td><a href="http://www.ala.asn.au/pubs/AJAL/ajal.html">www.ala.asn.au/pubs/AJAL/ajal.html</a></td>
<td>-</td>
<td>AJAL is a dual refereed and non-refereed journal, and the Editor welcomes contributions from appropriate authors.</td>
</tr>
<tr>
<td>Canadian Journal of University Continuing Education</td>
<td><a href="http://www.extensio.usask.ca/cju">www.extensio.usask.ca/cju</a> ce/cjuce.html</td>
<td>-</td>
<td>The Canadian Journal of University Continuing Education is published by The Canadian Association for University Continuing Education (CAUCE), a professional association of deans, directors, senior administrative personnel and practitioners whose professional careers are in university continuing education in Canada. The Journal has two objectives. The first is to advance and disseminate knowledge by publishing analytical and research papers, reports, reviews, and commentaries of value to professional practice in continuing education in general, and university continuing education in particular. The second is to encourage dialogue about continuing education within and among relevant professional and academic communities.</td>
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<tr>
<td>Journal Name</td>
<td>URL</td>
<td>Description</td>
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<td><strong>Community College Journal of Research &amp; Practice</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/10668926.asp">www.tandf.co.uk/journals/titles/10668926.asp</a></td>
<td>The only two-year college journal that is international in scope and purpose. Community College Journal of Research and Practice is published ten times per year. The journal is a multidisciplinary forum for researchers and practitioners in higher education and the behavioral and social sciences. It promotes an increased awareness of community college issues by providing an exchange of ideas, research, and empirically tested educational innovations. The journal is sponsored by the Bill J. Priest Center for Community College Education in association with the Higher Education Program at the University of North Texas.</td>
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<tr>
<td><strong>Educational Researcher</strong></td>
<td><a href="http://www.jstor.org/journals/0013189x.html">www.jstor.org/journals/0013189x.html</a></td>
<td>Educational Researcher (ER) is published nine times per year and is received by all members of AERA. It contains scholarly articles of general significance to the educational research community from a wide range of disciplines. ER’s Features section publishes articles that report, synthesize, or analyze scholarly inquiry, focusing on manuscripts that examine the significance of research in education and developments important to the field of educational research.</td>
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<td><strong>Educational Gerontology</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/03601277.asp">www.tandf.co.uk/journals/titles/03601277.asp</a></td>
<td>This well-respected journal offers up-to-date original research in the fields of gerontology, adult education, and the social and behavioral sciences. Researchers from around the world will benefit from the exchange of ideas for both the study and practice of educational gerontology. Papers published in the journal will also serve as authoritative contributions to the growing literature in this burgeoning field. Educational Gerontology is the only international journal of its kind to publish ten issues per volume year.</td>
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<tr>
<td><strong>Equity &amp; Excellence in Education</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/10665684.asp">www.tandf.co.uk/journals/titles/10665684.asp</a></td>
<td>Equity &amp; Excellence in Education publishes articles based on scholarly research utilizing qualitative or quantitative methods, as well as essays that describe and assess practical efforts to achieve educational equity and are contextualized within an appropriate literature review. We consider manuscripts on a range of topics related to equity, equality and social justice in K-12 or postsecondary schooling, and that focus upon social justice issues in school systems, individual schools, classrooms, and/or the social justice factors that contribute to inequality in learning for students from diverse social group backgrounds. There have been and will continue to be many social justice efforts to transform educational systems as well as interpersonal interactions at all levels of schooling. Some are successful while others fall short of their goals. This journal provides a record of those important experiments and ventures.</td>
<td></td>
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<tr>
<td><strong>Higher Education</strong></td>
<td><a href="http://www.springeronline.com/sgw/cda/frontpage/0,11855,5-40406-70-35693048-0,00.html">www.springeronline.com/sgw/cda/frontpage/0,11855,5-40406-70-35693048-0,00.html</a></td>
<td>Higher Education is recognised as the leading international journal of Higher Education studies, publishing eight separate numbers each year. Since its establishment in 1972, Higher Education has followed educational developments throughout the world in universities, polytechnics, colleges, and vocational and education institutions. It has actively endeavoured to report on developments in both public and private Higher Education sectors. Contributions have come from leading scholars from different countries while articles have tackled the problems of teachers as well as students, and of planners as well as administrators. While each Higher Education system has its own distinctive features, common problems and issues are shared internationally by researchers, teachers and institutional leaders. Higher Education offers opportunities for exchange of research results, experience and insights, and provides a forum for ongoing discussion between experts. Higher Education publishes authoritative overview articles, comparative studies and analyses of particular problems or issues. All contributions are peer reviewed.</td>
<td></td>
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<tr>
<td><strong>Higher Education in Europe</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/03797724.asp">www.tandf.co.uk/journals/titles/03797724.asp</a></td>
<td>Higher Education in Europe is a quarterly review published on behalf of the European Centre for Higher Education (CEPES), UNESCO. It is a scholarly publication dealing with major problems and trends in contemporary higher education. It presents information, interpretations, and criticism in regard to current developments in the field. While focussing primarily on Europe and North America within the context of the other activities of the Centre, it regularly features contributions from other regions of the world as well.</td>
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<td><strong>Higher Education Policy</strong></td>
<td><a href="http://www.palgravejournals.com/hep/">www.palgravejournals.com/hep/</a></td>
<td>The aim of Higher Education Policy is to provide a peer-reviewed vehicle of the highest quality for institutional leadership, scholars, practitioners and administrators at all levels of higher education to have access to, keep abreast of, and contribute to, the most advanced analyses available in this domain.</td>
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<tr>
<td><strong>Higher Education Quarterly</strong></td>
<td><a href="http://www.blackwellsaving.co.uk/journal.asp?ref=0951-5224&amp;site=1">www.blackwellsaving.co.uk/journal.asp?ref=0951-5224&amp;site=1</a></td>
<td>Higher Education Quarterly publishes articles concerned with policy, strategic management and ideas in higher education. A substantial part of its contents is concerned with reporting research findings in ways that bring out their relevance to senior managers and policy makers at institutional and national levels, and to academics who are not necessarily specialists in the academic study of higher education. Higher Education Quarterly also publishes papers that are not based on empirical research but give thoughtful academic analyses of significant policy, management or academic issues.</td>
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<tr>
<td>Journal Title</td>
<td>Website</td>
<td>Online ISSN</td>
<td>Description</td>
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<tr>
<td>Higher Education Research and Development</td>
<td><a href="http://www.tandf.co.uk/journals/titlees/07294360.aasp">www.tandf.co.uk/journals/titlees/07294360.aasp</a></td>
<td>-</td>
<td>Higher Education Research and Development is a long established refereed international journal. It is the principal learned journal of the Higher Education Research and Development Society of Australasia. The journal combines traditional hard copy publication and expert reviewing with electronic publication of extended abstracts, which are open to peer comment. The aim is to further debate and provide opportunities for more immediate and wider comment. The journal aims to inform improvements in practice through reporting research and evaluations and promoting scholarly reflective articles on practice, policy and theory. The journal, is addressed to university and college faculty from all disciplines and to higher education administrators. Contributions come from around the globe and the topics addressed are of world wide concern.</td>
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<tr>
<td>Innovations in Education and Teaching International</td>
<td><a href="http://www.tandf.co.uk/journals/titlees/14703297.aasp">www.tandf.co.uk/journals/titlees/14703297.aasp</a></td>
<td>0.194</td>
<td>IETI is essential reading for all practitioners and decision makers who want to stay informed about the developments in education and training. It is the official journal of the Staff and Educational Development Association (<a href="http://www.seda.ac.uk).The">www.seda.ac.uk).The</a> content includes a range of perspectives, and important contributions on new developments in educational technology. IETI is a valuable resource for teaching staff, staff developers and managers in higher and further education, continuing education, and training organisations.</td>
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<td>International Journal of Academic Development</td>
<td><a href="http://www.csd.uwa.edu.au/iced/ced_ijad.html">www.csd.uwa.edu.au/iced/ced_ijad.html</a></td>
<td>-</td>
<td>The International Journal of Academic Development (IJAD) is the journal of the International Consortium for Educational Development. The journal enables academic staff and educational developers around the world to debate and extend the theory and practice of academic development, in support of the quality of higher education.</td>
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<tr>
<td>International Journal of Lifelong Education</td>
<td><a href="http://www.tandf.co.uk/journals/titlees/02601370.aasp">www.tandf.co.uk/journals/titlees/02601370.aasp</a></td>
<td>-</td>
<td>The International Journal of Lifelong Education provides a forum for debate on the principles and practice of lifelong, adult, continuing, recurrent and initial education and learning, whether in formal, institutional or informal settings. Common themes include social purpose in lifelong education, and sociological, policy and political studies of lifelong education. The journal recognises that research into lifelong learning needs to focus on the relationships between schooling, later learning, active citizenship and personal fulfilment, as well as the relationship between schooling, employability and economic development. With this in mind, the journal provides the context for an informed debate on the theory and practice of lifelong education in a variety of countries and settings. All papers are peer reviewed. Each issue carries a lively reviews section.</td>
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<tr>
<td>Journal of Education and Work</td>
<td><a href="http://www.tandf.co.uk/journals/titlees/13639080.aasp">www.tandf.co.uk/journals/titlees/13639080.aasp</a></td>
<td>-</td>
<td>The Journal of Education and Work is an international forum for academic research and policy analysis which focuses on the interplay of the education and economic systems. The journal examines how knowledge, skills, values and attitudes both about and for work and employment are developed within the education system. The journal also explores the various forms of industrial training and accreditation in the economic system, including changes in the economic and industrial infrastructure which influence the type of employees required. Work in the informal economy is also included. The Journal of Education and Work has a particular interest in comparative studies of skill formation and especially the transition from education to employment, how this process is structured and managed, and its effects on the young people, schools, colleges, universities and employers. The journal publishes interdisciplinary papers which reflect the multifaceted nature of the journal’s concerns. Articles are welcome from economists, psychologists, sociologists, educationalists, and policy analysts. The journal publishes case studies from practitioners which present innovation grounded in relevant literature and debate.</td>
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<tr>
<td>Journal of Higher Education Policy and Management</td>
<td><a href="http://www.tandf.co.uk/journals/titlees/1360080X.aasp">www.tandf.co.uk/journals/titlees/1360080X.aasp</a></td>
<td>-</td>
<td>The Journal of Higher Education Policy and Management is an international, peer-reviewed journal of professional experience and ideas in post-secondary education. It supports higher education managers by disseminating ideas, analyses and reports of professional experience relevant to colleagues internationally. The journal caters for practising managers and administrators of universities, colleges and vocational education and training institutes. It attracts the interest of, and contributions from, vice chancellors, presidents, vice presidents, directors, registrars, business managers and deans. It is also read by, and frequently publishes papers by, middle level managers and academic staff who seek to place their work and interests in a broad context. Journal of Higher Education Policy and Management is the journal of Association for Tertiary Education Management and is the leading journal in its field in Australasia.</td>
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<tr>
<td>Journal of Learning Design</td>
<td><a href="http://www.jld.qut.edu.au">www.jld.qut.edu.au</a></td>
<td>-</td>
<td>The Journal of Learning Design (JLD) is a bi-annual, refereed journal which is issued in February and July. It is a venue for the dissemination of valuable and significant works by educational and training practitioners that have resulted in enhanced learning outcomes for students. Manuscripts are refereed by at least two reviewers from the Editorial Board, Review Panel or International Reference Panel.</td>
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<tr>
<td>Journal of University Teaching and Learning Practice</td>
<td>jutlp.uow.edu.au/</td>
<td>-</td>
<td>The Journal of University Teaching and Learning Practice is a bi-annual, peer-reviewed journal publishing papers that add significantly to the body of knowledge describing effective and innovative teaching and learning practice in the higher education environment. The Journal aims to provide a forum for educational practitioners in a wide range of disciplines to communicate their teaching and learning outcomes in a scholarly way. Its purpose is to bridge the gap between journals covering purely academic research and more pragmatic articles and opinions published elsewhere.</td>
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<tr>
<td>Journal of Transformative Education</td>
<td><a href="http://www.sagepub.com/journal.asp?pid=9184">www.sagepub.com/journal.asp?pid=9184</a></td>
<td>-</td>
<td>The Journal of Transformative Education is a peer-reviewed, scholarly journal focused on advancing the understanding, practice, and experience of transformative education. Specific goals of the journal are to deliver high academic quality in an engaging, thought-provoking, participative, and reflexive scholarly discourse across the spectrum of issues which transformational education encompasses. Those issues include individual experience, educational and institutional process, formal and informal purposes and venues for such education, and cultural issues such as accessibility and social context for transformative education. The journal is global in scope and content and is diverse in its approaches and topics - drawing from theory, research, practice, individual experience, and retrospective insight from past major theorists.</td>
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<td>Mentoring &amp; Tutoring</td>
<td><a href="http://www.tandf.co.uk/journals/titles/13611267.asp">www.tandf.co.uk/journals/titles/13611267.asp</a></td>
<td>-</td>
<td>Mentoring &amp; Tutoring: Partnership in Learning is an international refereed journal which has quickly become the major resource to exchange information on mentoring and tutoring particularly in schools, further and higher education, hospitals, industry and the management professions. The journal publishes papers and reports on all aspects of mentoring, tutoring and partnership. It seeks to publish material in fields where mentoring, tutoring and partnership, either individually or interactively, are seen as contributing to professional development. Whilst recently this has often been in schools and universities, it is increasingly so in other professions such as nursing, the police force, and the social services as well as in business. Mentoring is also beginning to play an important role in burgeoning ‘distance learning’ programmes. The purpose of the journal is to help advance understanding of mentoring, tutoring and partnership in learning through a focus on papers reporting research and development activities. The journal welcomes contributions from the widening field of mentoring and tutoring including papers of a philosophical or socio-political nature. Comparative aspects of mentoring, tutoring and partnership are of special interest as the techniques are increasingly used on a worldwide basis. The criteria for acceptance of papers are that they are analytical/empirical and critical, add to scholarship in the field, and that the ideas being presented are of possible relevance to learning situations in other educational systems and cultures and are accessible to an international audience.</td>
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<td>Perspectives: Policy &amp; Practice in Higher Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/13603108.asp">www.tandf.co.uk/journals/titles/13603108.asp</a></td>
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<td>Perspectives: Policy &amp; Practice in Higher Education provides higher education managers and administrators with innovative material which analyses and informs their practice of management. The journal aims to: Disseminate ideas which enhance the practical aspects of higher education management and administration; Further managers’ knowledge and understanding of developments within the current higher education environment; Foster debate about the implications of major external influences on the system and key issues for institutional management; Provide for the exchange and internationalization of ideas in relation to the management of higher education systems and institutions.</td>
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<td>Quality in Higher Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/13538322.asp">www.tandf.co.uk/journals/titles/13538322.asp</a></td>
<td>-</td>
<td>Quality in Higher Education is an international refereed journal aimed at those interested in the theory, practice and policies relating to the control, management and improvement of quality in higher education. The editor especially wishes to encourage papers on: reported research results, especially where these assess the impact of quality assurance systems, procedures and methodologies; theoretical analyses of quality and quality initiatives in higher education; comparative evaluation and international aspects of practice and policy with a view to identifying transportable methods, systems and good practice. Quality in Higher Education is published in Association with the International Network for Quality Assurance Agencies in Higher Education (INQAAHE).</td>
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<td>Research in Higher Education</td>
<td><a href="http://www.springeronline.com/sowi/cda/frontpage/0,11855,5-40406-70-35746980-0,00.html">www.springeronline.com/sowi/cda/frontpage/0,11855,5-40406-70-35746980-0,00.html</a></td>
<td>0.525</td>
<td>Research in Higher Education is directed to those concerned with the functioning of the post-secondary education, including two-year and four-year colleges, universities, and graduate and professional schools. It is of primary interest to institutional researchers and planners, faculty, college and university administrators, student personnel specialists and behavioral scientists. Generally, empirical studies are sought which contribute to an increased understanding of an institution or allow comparison between institutions, which aid faculty and administrators in making more informed decisions about current or future operations, and which improve the efficiency or effectiveness of the institution. Of particular interest are topics such as: administration and faculty; curriculum and instruction; student characteristics;</td>
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<td><strong>Proceedings of the 2005 Charles Sturt University Learning and Teaching Conference</strong></td>
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<td><strong>Review of Educational Research</strong></td>
<td><a href="http://www.jstor.org/journals/00346543.html">www.jstor.org/journals/00346543.html</a></td>
<td>1.960</td>
<td>Review of Educational Research (RER) publishes critical, integrative reviews of research literature bearing on education. Such reviews should include conceptualizations, interpretations, and syntheses of literature and scholarly work in a field. RER encourages the submission of research relevant to education from any discipline, such as reviews of research in psychology, sociology, history, philosophy, political science, economics, computer science, statistics, anthropology, and biology, provided that the review bears on educational issues.</td>
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<td><strong>Studies in Continuing Education</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/0158037X.asp">www.tandf.co.uk/journals/titles/0158037X.asp</a></td>
<td>-</td>
<td>Studies in Continuing Education is a scholarly journal concerned with all aspects of continuing, professional and lifelong learning. It aims to be of special interest to those involved in: continuing professional education, in-service training, staff development, training and development, human resource development. Studies in Continuing Education publishes material which will contribute to improving practice in the field of continuing education and of bringing theory and practice into closer association. Contributions are sought on all aspects of the field. These include: accounts of new initiatives, discussions of key issues, review articles, reports of research and development, and reflections on theory and practice. Papers drawing upon any one or more perspectives on the field are welcome. Of particular interest are contributions from practitioners in any area who may wish to engage in critical reflection on their own practices. Book reviews and reviews of other published material are also included.</td>
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<td><strong>Studies in Higher Education</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/03075079.asp">www.tandf.co.uk/journals/titles/03075079.asp</a></td>
<td>0.818</td>
<td>Studies in Higher Education welcomes empirically based, reflective and synoptic articles dealing with any aspect of higher education, approached from any perspective or discipline. A key criterion for publication is that articles should be written in an accessible, but rigorous, style that is likely to engage those without a specialist interest in the topic being discussed. As Studies in Higher Education is an international journal, it is also important that authors engage with relevant literature from other countries, and explain, where appropriate, the national context for their research. Studies in Higher Education is published on behalf of the Society for Research into Higher Education.</td>
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<td><strong>Teaching in Higher Education</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/13562517.asp">www.tandf.co.uk/journals/titles/13562517.asp</a></td>
<td>-</td>
<td>Teaching in Higher Education is an international, peer-reviewed journal. The journal addresses the roles of teaching, learning and the curriculum in higher education in order to explore and clarify the intellectual challenges which they present. The journal is interdisciplinary and aims to open up discussion across subject areas by involving all those who share an enthusiasm for learning and teaching. In particular the journal: Critically examines the values and presuppositions underpinning teaching; Identifies new agendas for research; Introduces comparative perspectives and insights drawn from different cultures; Aims to apply and develop sustained reflection, investigation and critique to learning and teaching in higher education; Considers how teaching and research can be brought into closer relationship and how teaching in higher education can itself become a field of research.</td>
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<td><strong>Tertiary Education and Management</strong></td>
<td><a href="http://www.springeronline.com/servlet/article/GII/11855540-4040670-35669782-0,00.html">www.springeronline.com/servlet/article/GII/11855540-4040670-35669782-0,00.html</a></td>
<td>-</td>
<td>This Journal Tertiary Education and Management (TEAM) is intended for professionals in the area of higher education management, and for academics researching that area. These professionals and academics will be working in universities, polytechnics and other higher education institutions - primarily but not exclusively in Europe - either in university administration, or in academic departments with particular research interests in management issues. The Journal will also be of relevance to policy makers in government ministries and policy units. The Editor welcomes papers from academics, administrators and policy makers and also considers for publication papers presented at the annual EAIR forum. Of particular interest are papers which assess and analyse problems currently facing higher education institutions in Europe on an internationally comparative basis. All contributions to this journal are peer reviewed.</td>
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<td><strong>The International Journal for Academic Development</strong></td>
<td><a href="http://www.tandf.co.uk/journals/titles/1360144X.asp">www.tandf.co.uk/journals/titles/1360144X.asp</a></td>
<td>-</td>
<td>Development in higher education is a fast growing area. This journal reports on advances in theory and practice and includes discussions on the development of models and theories for supporting and leading improvements in teaching and learning, and debates current issues at the forefront of educational change. Educational development at all levels is covered, and the work of individual lecturers and courses to institutional and sectoral change is spanned. This journal will keep readers informed of best practice and current thinking worldwide.</td>
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<td>The Internet and Higher Education</td>
<td><a href="http://www.scis.nova.edu/ihe/RightFrame.htm">www.scis.nova.edu/ihe/RightFrame.htm</a></td>
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The Internet and Higher Education is a quarterly journal devoted to addressing contemporary issues and future developments related to online learning, teaching, and administration on the Internet in post-secondary settings. It is a peer-reviewed refereed journal intended to be a vehicle for scholarly presentation and dissemination of contributions, theoretical and applied, significantly addressing innovative deployments of Internet technology in instruction and reporting on research to demonstrate the effects of the Internet and information technology (IT) on instruction in various contexts in higher education. The journal is international and interdisciplinary, inviting contributions from across the globe and from various academic disciplines. The journal provides a venue for theory papers, research studies, critical essays, editorials, reviews, case studies, and social commentary contributions. Special issues are often devoted to specific topic areas with guest editors assisting in the editorial process.

The scope of the journal is broad in terms of the range of issues and trends to be addressed, for example, innovations or best practices in online teaching, learning, management, and administration. Other issues may include: Internet technology design and use; instructional models in online courses; online course development and instructional design; interaction in online courses; collaborative learning; usability and evaluation of online environments and portals; online communities of practice; institutional policies, standards and assessment; accessibility standards in online instruction; internationalization and cultural aspects of online classrooms; and issues and trends in synchronous, asynchronous, and hybrid online learning.
Appendix C. Journals in the study and teaching of different disciplines  
(adapted from EEL509 subject handbook)  
This list includes both refereed and non-refereed journals

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<tr>
<th>Subject area</th>
<th>Journal</th>
<th>Website</th>
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<td>CAL-laborate</td>
<td>science.uniserve.edu.au/pubs/callab/</td>
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<td></td>
<td>Cell Biology Education</td>
<td><a href="http://www.cellbiologyeducation.org/">www.cellbiologyeducation.org/</a></td>
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<td></td>
<td>Chemical Education International</td>
<td><a href="http://www.iupac.org/publications/cei/">www.iupac.org/publications/cei/</a></td>
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<td></td>
<td>Chemical Education Journal</td>
<td><a href="http://www.juen.ac.jp/scien/cssj/cejrnlE.html">www.juen.ac.jp/scien/cssj/cejrnlE.html</a></td>
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<td></td>
<td>Education in Chemistry</td>
<td><a href="http://www.rsc.org/Education/EiC/index.asp">www.rsc.org/Education/EiC/index.asp</a></td>
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<td></td>
<td>European Journal of Engineering Education</td>
<td><a href="http://www.materials.ac.uk/resources/fullrecord.asp?resourceid=611">www.materials.ac.uk/resources/fullrecord.asp?resourceid=611</a></td>
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<td></td>
<td>International Journal of Science Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/09500693.asp">www.tandf.co.uk/journals/titles/09500693.asp</a></td>
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<td></td>
<td>Journal of Biological Education</td>
<td><a href="http://www.ijob.org/?tree=000_006_002">www.ijob.org/?tree=000_006_002</a></td>
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<td></td>
<td>Journal of Chemical Education</td>
<td>jchemed.chem.wisc.edu/Journal/index.html</td>
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<td></td>
<td>Journal of Materials Education</td>
<td><a href="http://www.materials.ac.uk/resources/browse.asp?brwsid=175">www.materials.ac.uk/resources/browse.asp?brwsid=175</a></td>
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<td></td>
<td>Journal of Natural Resources and Life Sciences Education</td>
<td><a href="http://www.jnrise.org/">www.jnrise.org/</a></td>
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<td></td>
<td>Journal of Science Education and Technology</td>
<td><a href="http://www.springeronline.com/journal/10956/about">www.springeronline.com/journal/10956/about</a></td>
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<td></td>
<td>Journal of Physics Teacher Education Online</td>
<td><a href="http://www.phy.ilstu.edu/jpteo/">www.phy.ilstu.edu/jpteo/</a></td>
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<td></td>
<td>Research in Science and Technological Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/02635143.asp">www.tandf.co.uk/journals/titles/02635143.asp</a></td>
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<td>Health</td>
<td>Advances in Health Sciences Education</td>
<td><a href="http://www.springeronline.com/sgw/cda/frontpage/0,11855.5-40406-70-35542695-0.00.html">www.springeronline.com/sgw/cda/frontpage/0,11855.5-40406-70-35542695-0.00.html</a></td>
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<td></td>
<td>Australian Electronic Journal of Nursing Education</td>
<td><a href="http://www.scu.edu.au/schools/nhcep/aejne/">www.scu.edu.au/schools/nhcep/aejne/</a></td>
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<td>Drugs: Education, Prevention and Policy</td>
<td><a href="http://www.tandf.co.uk/journals/titles/09687637.asp">www.tandf.co.uk/journals/titles/09687637.asp</a></td>
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<td>Education for Health</td>
<td><a href="http://www.tandf.co.uk/journals/titles/13576283.asp">www.tandf.co.uk/journals/titles/13576283.asp</a></td>
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<td>Journal of Continuing Education in Nursing</td>
<td><a href="http://www.slackinc.com/allied/jcen/">www.slackinc.com/allied/jcen/</a></td>
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<td>Journal of Health Administration Education</td>
<td><a href="http://www.e-guana.net/organizations.php3?action=printContentItem&amp;grid=75&amp;typeID=507&amp;itemID=3755">www.e-guana.net/organizations.php3?action=printContentItem&amp;grid=75&amp;typeID=507&amp;itemID=3755</a></td>
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<td></td>
<td>Nurse Education Today</td>
<td><a href="http://www.harcourt-international.com/journals/nedt/">www.harcourt-international.com/journals/nedt/</a></td>
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<td></td>
<td>Nurse Educator</td>
<td><a href="http://www.lww.com/product/?0363-3624">www.lww.com/product/?0363-3624</a></td>
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<td>Pharmacy Education</td>
<td><a href="http://www.tandf.co.uk/journals/titles/15602214.asp">www.tandf.co.uk/journals/titles/15602214.asp</a></td>
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<td>The Clinical Teacher</td>
<td><a href="http://www.blackwellpublishing.com/journal.asp?ref=1743-4971&amp;site=1">www.blackwellpublishing.com/journal.asp?ref=1743-4971&amp;site=1</a></td>
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<td>The Medical Teacher</td>
<td><a href="http://www.tandf.co.uk/journals/titles/0142159x.asp">www.tandf.co.uk/journals/titles/0142159x.asp</a></td>
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<tr>
<td>Humanities &amp; Social Sciences</td>
<td>Arts and Humanities in Higher Education An International Journal of Theory, Research and Practice</td>
<td><a href="http://www.sagepub.com/journal.aspx?pid=298">www.sagepub.com/journal.aspx?pid=298</a></td>
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<td>Communication Education</td>
<td><a href="http://www.wsu.edu/~comedj/policy.html">www.wsu.edu/~comedj/policy.html</a></td>
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<td></td>
<td>Computers and Composition: An International Journal</td>
<td><a href="http://www.bgsu.edu/econline/">www.bgsu.edu/econline/</a></td>
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<td></td>
<td>Journal of Interactive Media in Education</td>
<td><a href="http://www.jime.open.ac.uk/">www.jime.open.ac.uk/</a></td>
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<tr>
<td>Education</td>
<td>Adult Education Quarterly</td>
<td><a href="http://www.aeq.sagepub.com/">www.aeq.sagepub.com/</a></td>
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<tr>
<td>Journal Title</td>
<td>URL</td>
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Using authentic assessment: A strategy to develop and enhance graduate capabilities

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Increasing scrutiny is being placed on the individual capabilities of graduates that universities produce. No longer is it merely sufficient to leave university with significant subject knowledge. What is demanded is an integration of disciplinary knowledge, skills, personal qualities and understanding that can be used appropriately and effectively in new and changing circumstances (Stephenson 2001).

In this paper we discuss ways in which authentic assessment can be used to develop and enhance a range of student capabilities. These include critical and creative thinking, working with incomplete information and limited resources, and understanding varied and competing interests in the workplace. We also highlight ways in which authentic assessment can be used to minimise opportunities for plagiarism. Finally we look in detail at one specific example of authentic assessment used in the Master of Marketing at CSU and discuss the learning outcomes that can be achieved.

Background

Universities are increasing being required to make explicit the desired educational outcomes of their graduates. Currently, many universities are developing graduate capability statements to address this expectation. Australian universities used a range of different terms to describe student outcomes. These include ‘graduate qualities’, ‘graduate outcomes’, ‘graduate attributes’ and ‘graduate capabilities’. Graduate attributes as defined by universities are qualities, skills and understandings a student is expected to develop throughout their degree. They can be broken down into disciplinary knowledge and generic capabilities. Generic capabilities include: critical thinking, information literacy, communication skills (oral and written), team skills, problem solving, a cross-cultural perspective, acting ethically and the capacity for lifelong learning.

Development of generic skills increases the capacity of graduates to transform their current knowledge to meet the workplace challenges of ill-defined problems and varying contexts. It is believed that specifying graduate attributes helps to inform students, the community and employers of the skills and values they can expect from the graduates of each university (DETYA, 2001).

While graduate attributes can be specified at the overall university level, it is only within the context of the disciplinary level that they become meaningful. It is all very well to specify the acquisition of generic skills (such as ‘critical thinking’ or ‘creative thinking’) but these concepts can only be fostered by aligning assessment tasks with desired learning outcomes including development of specific generic skills.

Looking specifically at the marketing discipline, we argue that marketing education can no longer be viewed from a transmission/acquisition model of education where students acquire a static body of marketing knowledge and then apply this in a range of generic marketing contexts. Central to distance learning about marketing at the postgraduate level, is engaging in marketing practice in specific local contexts. These can be enhanced by use of ‘authentic assessment’.

Using ‘authentic’ assessment

A significant trend in professional education is the increased legitimacy of workplace generated knowledge. ‘Authentic’ assessment tasks encourage students to apply and use relevant disciplinary knowledge in a familiar context, develop and enhance their generic skills and generate workplace
specific knowledge. Defining qualities of good assessment include testing for deep understanding of a subject, encouraging meaningful transferable learning, diagnosing gaps in student knowledge, building learner confidence and discovering innovative and creative answers (Christie and Stehlik 2002). Authentic assessment incorporates these desired qualities in a highly contextualised way.

Context is important because postgraduate students, in particular, are more likely to value assessment tasks that they perceive to be real and that present serious challenges in terms of their own workplace experience. Higher levels of engagement by students can be expected where tasks are relevant and shaped by students’ own choices and areas of interest.

Generic capabilities can also be developed as students engage more fully with the disciplinary knowledge, apply it in an authentic context and generate new knowledge in their workplace. Work-related assessment tasks allow students to develop and enhance graduate capabilities specifically related to their practice as professionals. Tennant (2000) argues that the skills and attitudes that can be developed as a result of the shift towards learning from experience in the workplace include the ability to: analyse workplace experience; learn from others; act without all the facts available; choose among multiple courses of action; learn about organisational culture; understand the competing and varied interests in the shaping of one’s work or professional identity. Exposing learners to ‘authentic’ activities and drawing attention to generic nature of skills being acquired is also likely to enhance learning transfer (Tennant 1999). These skills fostered through authentic assessment can form the basis of the ongoing informal learning in the workplace which will occur throughout a professional’s career.

In summary, use of ‘authentic’ assessment delivers five key benefits: (1) enhanced student engagement in tasks they perceive to be relevant; (2) development of a range of desirable graduate capabilities; (3) facilitating learning transfer; (4) drawing attention the fuzzy boundaries of professional practice (5) setting the stage for ongoing informal learning in the workplace.

In the following section, we focus on two specific capabilities – critical and creative skills. These skills are essential for confronting real-life tasks and challenges and their development is fostered by ‘authentic’ assessment tasks.

Development of critical and creative skills

The terms ‘critical thinking’ and ‘creative thinking’ are commonly used by educators but perhaps we don’t give enough thought to what we mean by these terms and how we can operationalise them in a disciplinary context. The following definition of critical thinking was developed by a working group of international experts.

“We understand critical thinking to be purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgement is based. CT [critical thinking] is essential as a tool of enquiry. As such, CT is a liberating force education and a powerful resource in one’s personal and civic life” (Facione, 1998 p.14).

Looking at this definition, the case emerges for developing critical thinking to empower students in both their studies and more generally in their lives. It should be noted that this definition embodies an ideal state and we need to work towards this in a way that recognises the starting points of our students. The ideal critical thinker is seen to be:

“habitually inquisitive, well-informed, trustful of reason, open minded, flexible, fair minded in evaluation, honest in facing personal biases, prudent in making judgements, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit” (Facione, 1998 p.14).
What emerges in this description is that the desirable development is reflected in the whole person not just the ‘student’. If as educators we focus on development of the whole person, we will encourage students to become intellectually adaptable and approach new tasks with the confidence to undertake analysis and make judgements relevant to that specific context.

While critical thinking is important, it needs to be combined with creative thinking which is “the kind of thinking that leads to new insight, novel approaches, fresh perspectives, whole new ways of understanding and conceiving of things” (Facione, 1998 p.10). The combination of critical and creative skills provides students with the capacity to develop and defend their own position. Apart from the benefits of adaptability, development of critical and creative can represent a significant way to address concerns about plagiarism. Where students develop skills and confidence issues with reproduction of others’ work become less of a problem.

However, there is no point in attempting to develop critical and creative thinking if assessment tasks don’t optimise the chances for students to develop and practice these skills. In the following section we discuss how these skills can be encouraged and rewarded through careful assessment design.

**Designing assessment tasks**

Assessment strategy plays a critical role in student learning. “Students can escape bad teaching: they can’t avoid bad assessment” (Boud 1994 in Brown 1999 p.4). Assessment can play a crucial part in facilitating development because “assessment methods and requirements probably have a greater influence on how and what students learn than any other single factor” (Boud, 1988 in Brown, 1999 p.4). Assessment tasks need to specify what students should be able to do as a result of their learning experiences (Miller, Imrie & Cox, 1998) and be designed to encourage and detect the higher-order learning outcomes that characterise university education (James, McInnes & Devlin, 2002).

There is a range of ways of conceptualising learning outcomes. One of these is Bloom’s taxonomy. Bloom proposed in 1956 that the quality of learning could be assessed at different cognitive levels (Miller, Imrie & Cox 1998). Inherent in the taxonomy is the notion that there is a hierarchy of learning outcomes and that assessment can be designed to promote student engagement at the desired level(s). Levels of learning outcomes are illustrated in Figure 1, along with the types of activities associated with each level. The lower three levels, knowledge, comprehension and application need to be mastered before learners can progress to the higher levels of analysis, synthesis and evaluation. Critical and creative thinking are essential for demonstrating these higher levels of learning outcomes.

Specific practices in designing assessment tasks can assist in encouraging critical and creative thinking and achieving the desired learning outcomes of analysis, synthesis and evaluation. To finish this session we will look at one specific example of authentic assessment used in the Master of Marketing at CSU.

**Authentic assessment in an introductory postgraduate marketing subject**

Students in the introductory marketing subject at postgraduate level at CSU vary in their academic background and work experience. Those studying for the Master of Marketing are generally in a marketing or sales position whereas students in the MBA program are often not employed in marketing positions. It is important, however, for all students to get an overall perspective of the role of marketing in organisations and understand how academics and practitioners view the discipline. Marketing practitioners, in common with many other professionals, deal with unstructured and ill-defined problems in a dynamic and complex environment. They need to adopt a multidisciplinary perspective because implementing marketing plans requires the support of all functions within the company. “Marketing cannot live an isolated life” (Gummesson 1991 p.65). Given that this is an introductory subject, the first assignment deals with foundational disciplinary knowledge and how this can be put ‘to work’ in each student’s workplace. The task can be undertaken in a wide range of
contexts: in large or small companies, profit or not-for-profit organisations, and with physical goods or services.

![Figure 1. Levels of Learning Outcomes](image)

In terms of the levels of learning identified in Figure 1, students begin with the *comprehension* level where they develop and demonstrate a comprehensive understanding of the market orientation literature. This is followed by *application* of this knowledge in their workplace. It is important that students then move beyond comprehension and application to the higher order outcomes of *analysis*, *evaluation* and *synthesis*. For example, *analytical* skills are required to move beyond description of ideas in various articles to an appreciation of the different conceptions of market orientation and different positions taken by a variety of authors on the topic. *Synthesis* is required for students to develop their own position in response to the literature. In *evaluating* their individual workplace in terms of market orientation, students have the opportunity to put this new knowledge ‘to work’ and evaluate its usefulness in their workplace. This part of the task also involves the development of skills in reflection and judgement.

Finally, in making recommendations to improve organisational implementation of market orientation in their workplace, students demonstrate their capacity for *synthesis* by making recommendations and
formulating plans for future action. In completing this task, they develop and refine their ability to act in an environment of imperfect information, to be sensitive to varied and possibly conflicting interests within the organisation and choose between alternative courses of action. They are effectively using their own workplaces as sites for generating knowledge.

In summary, the assessment task discussed above encourages a multifunctional perspective and is designed to give students an appreciation of the complex and dynamic nature of marketing practice. Work-related assessment tasks, drawing on a range of relevant literature and applied in a specific context, can provide a necessary counterbalance to the limited perspectives presented in marketing textbooks, as well as helping students appreciate the complexity of marketing work and competing agendas in organisations. Generic skills can also be developed as students engage more fully with the disciplinary knowledge, apply it in an authentic context and generate new knowledge in their workplace.

**Conclusion**

What we have attempted to demonstrate in this paper is that specific practices in assessment design can assist in developing and enhancing graduate capabilities such a critical and creative thinking and achieving the desired learning outcomes of analysis, synthesis and evaluation. Consideration of desired levels of learning outcomes can provide significant input in designing authentic assessment tasks. When combined with reflection about the skills and attitudes that we are trying to foster with particular assessment tasks –such as analysing workplace experience; acting without facts available; choosing between multiple options; understanding competing interests in organisations; - we have the basis for creating ‘authentic’ assignments that can generate and validate knowledge in the workplace. The benefit of this assessment strategy is graduating marketing students with the capacity and confidence to speak with their own voice and create their own marketing knowledge and confidently faces the tasks and challenges encountered by marketing practitioners.

**Acknowledgments**

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*Australia and New Zealand Academy of Management Conference, Fremantle, December 2003.*
*Academy of Marketing (UK) Conference, Gloucester, July 2004.*

**References**


Constructive alignment: A curriculum design approach in accounting education

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The view of university teaching as transmitting information is widely discussed in the literature, in particular the negative impacts of didactic approaches on the quality of student learning outcomes. Within the accounting discipline, researchers and practitioners alike criticise pedagogical approaches underpinned by directed instruction. They argue that such approaches do not adequately prepare graduate accountants for immersion into the profession, and that they reinforce students’ misguided perceptions about the profession (Albrecht & Sack, 2001; Mladenovic, 2000).

This paper discusses a teaching approach in accounting education underpinned by the theory of constructive alignment. The paper reports the study of first year accounting students’ responses to action-oriented learning tasks in a small group setting and discusses design strategies for formative assessment. It highlights the importance of aligning intended learning outcomes, teaching strategies and assessment to enable consistency and alignment in the learning process. The impact of policy constraints on curriculum issues are discussed, focusing on the limitations faced by tutors and their lack of involvement in curriculum development.

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 2001; Friedlan, 1995; Pincus, 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; Roush & Smith, 1997). Such approaches focus predominantly on 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 (Crandall & Phillips, 2002; Kern, 2002; Milne & McConnell, 2001). Students passively receive information, participating minimally in the learning process.

Commentators in accounting education argue 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; Still & Clayton, 2004; Sundem & Williams, 1992). Professionals and researchers alike assert that the emphasis ought to be given to the conceptual and user perspective rather than procedural and preparer’s perspective because the traditional model results in students being “trained” rather than “educated” (AECC, 1990; Albrecht & Sack 2001; Mathews, 1990; Williams, 1993). 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 (Borzi & Mills, 2001; Foster & Bolt-Lee, 2002; Herring & Izard, 1992). 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; Caldwell et al., 1996; Crumbley et al., 1998; Milne & McConnell, 2001; Ravenscroft et al., 1995). 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; McCoskey & Warren, 2003; Smith, 2001; Springer & Borthick, 2004). But do such approaches align with students’ perceptions about accounting and how they interact in the learning environment?
Students’ perceptions of accounting

Many students perceive accounting as a number-crunching activity, driven by procedures and rules, and performed by individuals working alone (Cory, 1992; Fisher & Murphy, 1995; Geiger & Ogiby, 2000; Inman et al., 1989; Mladenovic, 2000). 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 reports, ‘our first year students just knew accounting was as boring as watching paint dry’ (2004, p. 119 original emphasis). 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 Adam et al., 1994; Caldwell et al., 1996; Friedlan, 1995; Marriot & Marriot 2003), 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 initiative and refusing to participate in the learning process unless the activity forms part of graded assessment.

The study

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 as early career academic whose goal was to provide quality student learning outcomes. Biggs (2003) explains that to achieve quality student learning outcomes, 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 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 recognised with the problem of lack of student participation in tutorials (Biggs, 2003; Keddie & Trotter, 1998; Ramsden, 2003), would the students 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 purpose of the research was to explore a learning design aimed at facilitating deep approaches to learning. It 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 knowledge they construct, what helped them construct this knowledge and how. The research took place at the School of Accounting where the second author is a tutor in the subject, Accounting 1: Information for Business (ACC100) - a core subject for students studying for a business degree (or double degree such as Business/IT, Business/Human Movement). The first author, as educational designer, has a role to play in academic development and became the tutor’s mentor and ‘critical friend’ (after 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.

Method

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, ie ‘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.

The following section discusses the outcome of the first phrase of this research. At times, the discussion is descriptive – this is intentional as the purpose is to share a specific learning design which enabled active student participation in the subjects under study. In doing so, it is hoped that other practitioners will gain insights into facilitating active-learning strategies through formative assessment.

**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 world 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 Moet Hennessy, titled ‘Inside the world’s most profitably 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.

**Reflection and analysis**

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’, assert James and 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; Wilson & Ritter, 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 Ramsden, 1992; 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%.

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3 Due 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, Conference Proceeding, International Conference on Innovation in Accounting Teaching & Learning, University of Tasmania.
over the semester and those who attended the final tutorial. 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 the tutor’s belief that the role of the teacher is not about transmission of information but making learning possible (Ramsden, 2003). This was achieved by creating a learning context for students to construct meanings and discover knowledge for themselves. Indeed, the experience from this first cycle provided evidence 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. 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, eg learning definition 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 facts recall. 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 (after 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 below 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.

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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 that resulted in students’ deeper understanding of accounting concepts. 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 (Prosser & Trigwell, 1999; Ramsden 2003). However, this is an area that the authors recognised needs further study to take into account many other variables. Given that the aim of higher education is to develop functioning knowledge, ie 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.

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 is such that subject convenors, who are located in particular teaching schools that ‘owned’ the subjects, 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 (200) 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 (2000) study 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, (CPAA & ICAA, 2005). The Faculty 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?

Conclusion

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 a 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.

References


CPA Australia & The Institute of Chartered Accountants in Australia 2005, Accreditation guidelines for universities. CPAA & ICAA.


Interactive lectures

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The reason for greater student interaction in lectures can be justified on educational grounds with students constructing their own constructs and learning through discussion with others. However, how this can be done in a lecture needs to be explored. Lectures can be made interactive by using a number of techniques and tools. These techniques will be demonstrated during the presentation. The techniques include student preparation, starting with what students know, the effective organisation of group discussion, using investigation, sharing of students’ ideas, summarising the lecture and content coverage. Effective use of the tools of Powerpoint and paper for investigation and for group work will be illustrated. Similar techniques can be extended to workshops and tutorials especially with computer facilities so that students work in groups and put their group’s work on the forum for other groups to see.

Extending the use of Powerpoint to incorporate discussion

Powerpoint has been a major means of providing content for students. However, I have found it useful to drop down from slide show. At the start of a topic, it is a good way to find out what students already know or what they have read in the textbook. Later in a lecture, it could be a whole class or pair/group sharing points. I have my focus topic or question in the title of the slide but I fill in the results of student discussion below. Sometimes I use just one textbox of points but other times two side by side like columns depending on the nature of the work. If I am doing this during tutorials or I expect a considerable amount of discussion, I will duplicate the basic slide. I also have a following slide with the points I would raise just in case some do not come out in discussion. I am a fast touch typist which helps this process and it is certainly neater than my handwriting. After class I can put the powerpoint on the web for student access. One disadvantage of this procedure is that students cannot download in advance. To return to slide show use the computer screen icon usually on the left hand bottom of the screen.

The lecture discussions can be organised as think, pair, square, share or threes, share. Threes is handy in rows of seats but pairs can turn around and talk to the pair behind. Often I miss the think and square part. This is usually when I see blank faces when talking to the person next to them will generate immediate enthusiasm. Getting them back, may need a symbol such as when I move back to the front of the lecture room or use the microphone again.

In more flexible classrooms, I have also used the card allocation method. This is a good method when students always sit and work with their friends or get talkative off-topic with their friends. A set of cards is shuffled and one card given to each student. The class find their matches. I use only the numbers for the number of groups I want. Four in a group is easy so cards 1-6 are used for a tutorial-sized class of 24. If you have more than 52 students, use two packs and sort by colour as well as number (assuming a maximum of 104 in the group). Even if I call out the numbers, there will be chaos for a minute but a nice break in the middle of a lecture. They need to take their writing materials etc with them and sit with their new group. Sometimes discussions need bigger groups too. For example, when discussing ethical principles and responses, I found it good to have a group of six to eight students. During a recent class, one student said “why didn’t we do that earlier, our group were just stuck with the procedure but fresh input made a difference.” I move back to the Powerpoint for the groups to share their ideas. If I start with selecting a group at one side of the room to give some points, I start with another group next time they share. There is no need for me to repeat students’ comments as the written word reinforces the spoken if the student is speaking a little quietly. Students can also come to the front of the room and enter their group discussion into the computer and where we have wireless computers the group discussion can be placed on the forum for sharing or emailed to me for collating or dumping into the Powerpoint.
Using the lecturer’s computer during class investigations

During investigations, I sometimes give different groups different tasks. This is often due to a limitation on concrete materials that are used to facilitate the investigations. Sometimes these are set up as learning centres so that students can select their investigation and move on as they wish. During one of these sessions, one of the students asked if she could use the computer. This was a great idea as she did an internet search on the topic (tessellations) and found a number of interactive sites which she then added to the forum and also demonstrated to the class during the sharing time.

Using the computer laboratories for mathematics tutorials

Mathematics is a search for patterns and relationships. Extending the use of EXCEL for this purpose has been powerful. First we needed to introduce them to putting data into appropriate columns and entering a formula. We had a group activity to decide who was square. We measured heights and arm spans in centimetres (good discussion on careful measuring and we needed tape measures and rulers). This needed to be entered into the computer. Each group entered their information using the id numbers that I gave them (simply counted around the room) with a column for height and a column for arm span. The group emailed me their results and I collated them and put the table on the forum (time for the short break for them, not me). I also showed them how the computer would enter all the counting numbers by entering a few and dragging down the small square on the bottom left corner of the highlighted cells. Each student could then download the table and work on a few simple mathematical and statistical ideas.

First they decided how to convert to metres. We entered the simple formula clicking on the first height to convert. We filled down checking what was happening. Then we learnt to insert functions and simple “if” statements. using the >Insert>Function menu. For example, we found the maximum and minimum height, stood up in height order and checked, and revised the meaning of mean by thinking about what would happen if a child was added to the group. We rounded off to the nearest 1 decimal place and considered the median. Then we introduced the idea of “if”. If the height equals the arm span then “square” but else “rectangle.” We then prepared an activity for primary school students to check their knowledge of multiplication using “well done” and “try again” comments. An alternative is to use two sheets.

I gave them an attitude survey with items requiring a response of strongly disagree, disagree, unsure, agree, strongly agree. In groups, they entered their data into an EXCEL spreadsheet using 1 to 5 as code numbers for each response to each question. They emailed this to me and I was able to collate the data quickly and place it on the subject forum for them to continue to work on. Already they were beginning to collaborate in small groups and as a class. They helped each other with attaching emails and reading the forum—both skills we wanted them to achieve. After the practice of entering data, we (the students and I) used the “Countif” function to find out how many students responded 1 to 5 for the first question. We then dragged across the sheet to find frequencies for responses to all items. We then drew a column graph of the responses to a few items using the chart wizard of EXCEL. We had to find out how to get appropriate labels and axes. We also had a rank from 1 to 10 for overall feelings about mathematics. We used this to make a people graph, a picture graph (using post-its per person), and a computer column graph. We needed to discuss the frequency tables and graphs that they had made at school (some mature-aged students had not covered these at school) to try to make links with past experience and to give meaning to the word frequency. We briefly discussed that we were using ordered but not interval data so other kinds of graphs were not really appropriate.
We used the drag feature after entering the first five numbers and we used colours to highlight number families helping students to see and discuss number patterns.

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We used the drag feature after entering the first five numbers and we used colours to highlight number families helping students to see and discuss number patterns.
We also explored a number of problems that encouraged students to find number patterns. We started with concrete representations, wrote initial results on the board for discussion and predictions and “what if” questions. The problems included the handshake problem and adding consecutive numbers (begun by using Cuisenaire rod staircases, mats), triangular and square and other shape numbers (begun by using square counters). We listed results on the board as well as in . Many students were invited during our number pattern lessons to come to the front and give their findings. “Problems that involve looking for patterns always interest me. I love looking for the pattern and get quite excited when I can find one that is complex.” They were happy to have a go with sharing any patterns that they could see. We also discussed Pascal’s triangle and put this into the computer (using every second square), adding all rows was informative, but students were able to find many different patterns so that some of the less confident felt they had found patterns. We followed this up with a websearch which challenged the better students to work out other patterns.

**Erastothenes Sieve**

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**Triangular Numbers**

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Proceedings of the 2005 Charles Sturt University Learning and Teaching Conference

Square Numbers

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Pascal’s Triangle – highlighting the whole block beyond the edges and using $\sum$ gave them instant row totals to look for patterns of 11

Results

Mid-session, I asked students to answer some open-ended survey questions. The students could list advantages of using EXCEL like:

Analysing numbers, finding trends, making sense of statistics, doing calculations easily. It is a good tool to use for maths. Advantages include it works out the equations, help tool available, everything is visible after completed, things can be changed around. Disadvantages include could get confused and frustrated if you don’t know how to use the program. Great tool. Time saving, accuracy, recalculating when changing a variable. As a calculator … good for setting out work. Advantages: Easy to enter mathematical data, easy to work out sums, by adding a function allowing answers to be automatically answered for you, allows for quick and easy mathematical solving of problems. Disadvantages: there is a chance of failure and technical error, confusion could arise if a function is applied to an area that isn’t supposed to be.

I had a great deal of fun putting the project together. I enjoyed working on the charts and finding this new information out. Every time I go to the supermarket, my analysis is always in the back of my head.

Disadvantages were:
The complexity of functions and the possibility of using it in the wrong place and it takes a while to become familiar with everything.
Formulae knowledge needed, formatting skills needed.” “If you don’t know exactly how to do something there is a huge amount of fiddling and trail and error to get the desired results. (This comment referred to their community project for which they needed to represent results in a graph).

Many other types of problems were given to illustrate how they could use a variety of strategies to solve problems. We specifically discussed diagrams, patterns, working backwards, try and modify, asking questions, making it simpler and acting it out. Students were happy to share their incomplete ideas and to share their diversity of diagrams and so on. Many students would turn to the computer and start drawing and recording rather than work on paper. All these problems were given to pairs and the idea of working by themselves (each had their own computer) was soon gone. As one student commented:

I felt more at ease and started learning different strategies that I would never have thought before. It’s a way of looking at things from a different perspective.

The computer was a focal point for discussion. It was easy for students to look at other screens and see what others were trying. Students defined problem solving as:

- Working out a solution to a problem. Investigating the various solutions to a problem.
- Problem solving is when you investigate ways to solve the number problem.
- Analysis, deeper thought, broad thinking
- Working out how to approach a question in a fashion that sets you up to find an appropriate answer
- We should encourage students to look further into things and look for patterns and other interesting aspects

The computer facilitated these aspects as it was easy to have another try. It was also encouraging students to generalise the pattern in order to enter formulae.

As one student said during his/her evaluation, “it is great to see a lecturer using the ITC facilities to the full”. In addition to the computer uses, we also pause videotapes for discussions.

Conclusion

Integrating computer technology with discussions has increased students awareness and understanding of the mathematics and teaching strategies available to teachers. Noticing is an important aspect of learning (Mason, 2003; Owens et al., 1998; Pirie & Kieren, 1991). Powerpoints have minimal writing and diagrams that can help students to notice the key points of a topic. It is a visual medium. Discussion also helps students to pinpoint what they need to understand; it focuses on their thinking processes rather than fixed content knowledge, and the voice can assist students to attend to critical aspects of the learning environment. It is an aural medium. Feeding this discussion back in terms of the powerpoint summary confirms the students’ thinking for them.

References


Investigating students’ preferred learning styles, with the aim of developing context specific applications

Leonora Ritter, Tanya Covic
Social Sciences and Liberal Studies, Charles Sturt University

This paper looks at the need for tertiary teachers to increase awareness of students’ preferred learning styles. In doing this, it critiques the instruments that have been developed and the convergent nature of institutional formal education. It introduces a new instrument that avoids the worst effects of reductionism by being context specific and it poses some directions for future research.

Context

It is axiomatic that good teachers recognise ‘the needs of different participants’ and support them in their learning (HERDSA Fellowship Professional Recognition and Development Scheme). They know from experience that different students prefer learning from pictures or written words or spoken words. Some like to work with others; some like to work alone. Some like to start with the big picture and fill in the detail; some like to start with the detail and build the big picture. Some like to participate; some like to listen. Some move quickly and easily from one task or content area to another; some need transition time.

This knowledge is complemented by the research into differences in preferred learning style (Sternberg & Grigorenko, 2001; Riding & Raynor, 1999). Discovered differences have included how structured students want their instructional activities to be; preferred level of social interaction in the learning process; the extent to which they categorise things with labels; the way they fit parts together to make wholes; their tolerance for unrealistic experiences; the degree to which they seek to verify judgements; and preference for concrete or abstract organisation of space and sequential or random organisation of time. To this the taxonomy of psychological types would add extroversion v. introversion, intuitive v. empirical, thinking v. feeling, perceptive v. judging (Entwistle, McCune & Walker, 2001, 103; Renzulli & Dai, 2001, 35-36; Sternberg & Grigorenko, 2001,12-17).

The need to apply this experience and research to tertiary education has grown as increased access to university has led to larger classes and a greater variety of learner, requiring a more aware, flexible and individualised approach from university teachers (Smith, 2002, 63; Garton et al. , 1999, 11). The growth of distance education and the increased use of on-line pedagogy have also raised questions about whether there are significant differences in learning styles between distance education students and their on-campus counterparts (Diaz & Cartnal, 1999, 131) and how to create web systems that cater equally to all types of student (Graff, 2003, 410; Logan & Thomas 2002, ix).

The danger of reductionism

There is a danger that focussing on defining, labelling and measuring can become ‘instrument bound’ (Sternberg and Grigorenko, 2001, 3). The result is reductionist in that it denies the holistic, organic nature of the learning experience (Renzuli & Dai, 2001, 27), which ‘cannot be identified by direct observation’ (Koob & Funk, 2002, 304), that ‘all people are different’ (Riding & Raynor, 1999, 128) and ‘[t]he number of choices people can make about how to approach the world is extremely large’ (Sternberg, 2001, 251). Some studies have retained elements of variety and complexity (Riding and Cheema (1991) identified over 30 different labels and models of cognitive style) but ‘the need for scientific psychology of individuality’ has led to the rejection of models that are too large or too general (Tyler, 1978, 6). As different models have emerged, each model proclaims its own superiority and has its own fiercely partisan adherents; the ensuing rivalry between them has prevented the creation of a space in which they can co-exist or investigation of whether a combination of them might
give a more holistic picture of a student as a learner. The resulting lack of ‘any common conceptual framework and language for researchers to communicate either with each other or with psychologists at large’ has been aptly described by Sternberg as ‘a kind of balkanisation of research groups’ (Sternberg, 2001, 250).

Thus, although pluralism is evident in the proliferation of models and instruments (Logan & Thomas, 2002, ii; Renzulli & Dai, 2001, 34; Sadler–Smith, 2001, 213; Sternberg & Grigorenko, 2001, 2-4; Riding & Raynor, 1999, 8), rivalry between different models and tensions about what is being measured contribute to reductionism within each of the separate approaches (Koob & Funk, 2002, 304; Renzulli & Dai, 2001, 33, 35; Riding, 2001, 49; Sternberg & Grigorenko, 2001, 11; Riding & Raynor, 1999, 11, 186; Ferrari et al., 1996, 171; Furnham, 1992, 429, 437).

Furthermore, measurement is by its nature reductionist; it requires observable and graduated criteria sited in specific categories. This reductionism is exacerbated when models are based on axes, resulting in oppositional ‘types’ (Riding & Raynor, 1999, 186), artificially imposed bi-polar categories at each end of a single continuum, when people’s preferences will distribute along the whole continuum and may even vary between supposedly oppositional styles from time to time, depending on mood and circumstance (Sternberg & Grigorenko, 2001, 13, 16).

Because the drive towards wanting measurable scales is so strong, ‘the shortcomings of the instrumentation’, have not led to a rejection of the instrumentalist approach but to seeking to improve ‘the psychometric properties of the instruments’ (Ferrell, 1983, 39). This continuing development of instrumental measurement has been justified in terms of the belief that, ‘[a]s existing learning styles instruments are refined and new measures developed, teachers will benefit.’ (Lang et al., 1999, 25-6). This is not axiomatic. Ignoring context in pursuit of simple theoretical models risks creating ‘rhetoric without careful implementation in educational practices’ (Renzulli & Dai, 2001, 39).

**The obstacle of institutional convergence**

When it comes to implementation of understandings of preferred learning styles in educational practices, the context limits praxis. In the formal education process of the university, the dominant practice of verbal and linear forms of communication advantage assimilator, verbalising and introverted students in what is still an essentially unitrist and institutional model of formal education (Smith, 2002, 66; Renzulli & Dai, 2001, 35, 40; Trilling & Hood, 2001, 16; Riding and Raynor, 1999, 150; Philbin et al., 1995, 491; Furnham, 1992, 429). Even innovations that challenge dominant practice tend to carry the unitrist assumption that one model will suit all students. Thus, for example, the current trend towards group work favours ‘wholists [sic]’ over ‘analytics’ (Riding & Raynor, 1999, 92) and the shift from teacher directed teaching to ‘learning activities that require individual effort and study’ merely transfers the advantage from students ‘who prefer a field-dependent learning style’, to students ‘who prefer a field-independent style’ (Witkin, Moore, Goodenough et al., 1977 in Garton et al., 1999, 13).

Institutional trends towards conformity mean that appreciation of individual differences is often used to justify helping or pressuring students to accommodate the institution’s (or teacher’s) preferred styles, even if it is not their preferred style (Sternberg & Grigorenko, 2001, 4; Lang et al, 1999, 24). Mechanisms of modification include: requiring students to adapt to the learning environment (Renzulli & Dai, 2001, 36), requiring students to use different learning styles to manage different learning tasks (Riding & Raynor, 1999, 55), explicit teaching of different learning styles (Biggs, 2001, 80) and/or social reinforcement or reward (Renzulli & Dai, 2001, 36). This can be very authoritarian if it is based on ‘extensive use of an instructional procedure that elicits the style’ (Lang et al., 1999, 24). It also places the differential access to power firmly back with the teacher. It can destructively lead to blaming the student for failure to adapt, thereby placing great strains on a student.

Students having to develop ‘information processing strategies that are in conflict with their preferred cognitive styles’ can therefore end up in difficulties (Smith, 2002, 66), particularly if they ‘have been
educated in a less academic environment before entering higher education, … from lower socio-
economic groups, … outside the ‘mainstream’ white culture, women, and those with disabilities’ (Smith, 2002, 64). This matters less with the most able students, but it puts ‘those already most at risk of withdrawal or failure … in double jeopardy’ (Smith, 2002, 66) as ‘individuals of lower intelligence … will be more dependent on the material and the presentation matching their [preferred] style’ (Riding & Raynor, 1999, 108). Assessments favour ‘mainstream’ forms of motivation, behaviour and ways of using resources (Lang et al, 1999, 24) and successes and failures that are attributed to abilities may in fact be due to styles (Sternberg & Grigorenko, 2001, 4).

**Context specific application**

Our research explores students’ preferred learning styles and how well the measurement tools correspond to their theoretical prevenance. From this we have derived a new context specific instrument which we then tested it against a number of popular instruments. It originated from the observation that student behaviour in tutorials seemed to correlate with the outcomes of a DISC (Marston, 1928) instrument’s measurement of preferred relationship behaviours (direct, influencing, stabilising and conscientious) that was administered as part of a course experience. A follow-up survey elicited strong correlations between DISC scores and preferences about how tutorials operated. Areas where particular categories stood out from the others were:

<table>
<thead>
<tr>
<th>Type</th>
<th>Uniquely preferred tutorial attributes</th>
<th>Uniquely negligible tutorial attributes</th>
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<tbody>
<tr>
<td>Direct</td>
<td>- working in small groups</td>
<td>- topic was ‘interesting’</td>
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<td>- relevance to the subject/course</td>
<td>- handouts</td>
</tr>
<tr>
<td>Influencer</td>
<td>- student control with the tutor acting as more of a facilitator</td>
<td>- not being required to participate</td>
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<td></td>
<td>- lots of different ideas</td>
<td>- strong direction by the tutor</td>
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<tr>
<td>Stabiliser</td>
<td>- following interesting tangents</td>
<td>- working in small groups</td>
</tr>
<tr>
<td></td>
<td>- not forced to participate</td>
<td>- students in control</td>
</tr>
<tr>
<td></td>
<td>- handouts</td>
<td>- lots of debate and argument</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- everyone encouraged to participate</td>
</tr>
<tr>
<td>Conscientious</td>
<td>- strong direction by tutor</td>
<td>- interactive discussion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- obvious relevance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- handouts</td>
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This was useful in understanding and accommodating different behaviours of the different groups which had accidentally clustered in different DISC quadrants. A particularly passive group was dominated by ‘stabilisers’, a particularly uncontrollable group was dominated by ‘influencers’ and a particularly ‘good’ group was dominated by ‘direct’ people. From this pilot we derived a new scale, Tutorial Style Preferences (TSP), which we then tested against a number of instruments including Kolb’s Learning Styles Inventory (LSI) and Grasha-Reichmann’s Student Learning Style Scale (SLSS). We were also interested in whether there were gender, degree and university year differences across learning styles. We tested 306 university students with a mean age of 21:

- 71% first year
- 80% female
- 19% Psychology
- 31% Education
- 40% Psych/Education
- 9% All other

We selected the LSI and the SLSS because they are widely used, but their value is also hotly contested (Koob & Funk, 2002, 293; Garner, 2000, 347; Diaz & Cartnal, 1999, 131; Riding & Raynor, 1999, 71-2; Ferrari et al., 1996, 169). Both the LSI and the SLSS have the reductionist attributes of the psychological approach. The SLSS (1974) is based on 6 variables on 3 axes: participant/avoidant; collaborative/competitive; independent/dependent. Kolb’s LSI (1984) is even narrower, using only two axes: converging/diverging and assimilating/accommodating. In a previous comparison of the two
it was found that ‘preferred learning methods such as concrete experiential activity … correlate with students who would prefer to avoid interaction in the classroom’ (Riding & Raynor, 1999, 70), but we found poor results in relation to each other.

Results

In our test of the TSP instrument, four preferred styles emerged:
1. Authoritarian (wanting information to be presented)
2. Cognitive Stimulation (liking challenges and debates)
3. Enjoyable (a need for it to be entertaining)
4. Participation (preferring an interactive process)

Our aim to compare our new scale to the commonly used SLSS and TSP was unsuccessful because in our tests those scales did not retain the attributes that were claimed in the literature.

Our study includes a review of the effects of gender because the expectation that students should adapt to existing teaching environments and processes becomes less reasonable and, indeed, raises serious equity issues, if there are genetic/physiological imperatives that shape preferred style (Riding, 2001, 55; Riding & Raynor, 1999, 105). Support for this would be strengthened if gender correlated strongly with preferred learning style. The jury seems to be still out on this question, although some studies do suggest that gender has an impact on some measures of style (Logan & Thomas 2002, viii; Garton et al., 1999, 17; Philbin et al., 1995, 491). Our research found that in the TSP the Authoritarian style was more important to females than males.

Our study also looked at university year differences because changes across years would suggest that preferred learning styles are adaptable. We found that cognitive stimulation and participation were more important to first years than later years. This reinforces notions of institutionalized convergence and the driving power of assessment practices.

Discussion

While based on a context specific instrument, our findings reinforce research and experiential knowledge that different styles are preferred by different learners and that different people will be more or less suited by different educational experiences (Logan & Thomas, 2002, iii; Renzulli & Dai, 2001, 23; Furnham, 1992, 436). Our study has implications in a number of areas where awareness of individual differences has been seen as beneficial:

♦ Enhancing the effectiveness of the learning/teaching process (Logan & Thomas, 2002, iii; Briggs, 2000, 16; Furnham, 1992, 429)

The UK Government Green Paper, The Learning Age (Dept of Education and Employment, 1998), and Tomlinson report (1996) identify the value of ‘the teacher being aware of the learners’ styles, and adapting teaching styles and learning materials to meet their needs’ (Briggs, 2000, 17). In terms of our TSP research, the challenge is that different types seem diametrically opposed on what makes a tutorial an effective learning environment in certain crucial areas including the use of handouts, the role of the tutor and the participation of the students, including the value of small group work.

♦ Challenging assumptions

This is important, given that for both teachers and learners, ‘their only experience of thinking is of their own, and it is easy for them to assume that everyone else sees things and thinks in a similar way’ (Riding and Raynor, 1999, 128), and we know that ‘styles of teaching’ often ‘stem directly from the ways the teachers themselves prefer to learn’ (Entwistle, McCune & Walker, 2001, 123-4). An understanding of different learning styles can also induce understanding about how the same learning environment may be constructed differently by different individuals (e.g., empowering/threatening, challenging/overwhelming); it can further be used to explain differences between cohorts for the lecturer and to illuminate unpredictability as the preferences of single students and course groups
which will change from year to year (Briggs, 2000, 22). The TSP results seriously challenge assumptions underpinning assessments based on tutorial participation as such assessments may advantage some types of learner and disadvantage others. They also challenge academic assumptions about generic attributes of a good tutorial, as notions of what makes a ‘good’ tutorial seem to be learner-type specific.


There are three significant relationships which may be improved by matching the learning experience with preferred learning style: learner and learning environment, learner and task (Riding & Raynor, 1999, 11) and learner and significant others in the learning environment (Grasha, 1990 in Lang et al, 1999, 17). All these are better understood taking into account the outcomes of the TSP, which show that learners differed in whether they wanted a structured or unstructured tutorial environment, in whether they wanted a prescriptive or open ended tutorial task and whether they wanted a directed or participative relationship between themselves and tutors/peers.

♦ Helping students to effectively self-regulate their learning (Logan & Thomas, 2002, iii; Renzulli & Dai, 2001, 35).

Making students aware of how they approach learning tasks and helping them identify which learning styles they prefer and which they avoid, allows them to select learning approaches that best suit them and develop strategies for managing learning environments that do not suit them (Briggs, 2000, 22; Zhang & Sternberg, 2000, 486). The importance of this is illustrated in Martinez and Munday’s (1998) study of student drop-out rates in which they found that two of the factors for success were ‘the student’s awareness of his/her own learning process and the lecturer’s response to the varied learning needs of the group’ (Briggs, 2000, 17-18). Thus the degree to which tutorials allow students to diagnose and engage their preferred learning style will affect their level of satisfaction and possibly the quality of outcomes for the student.

There are a number ways to cater for differences in preferred learning styles. These include using the maximum number of approaches and flexibility with a group (Smith, 2002, 66; Trilling & Hood, 2001, 16) and maximising flexibility and variation in assessment techniques in a way that enhances rather than detracts from equity (Logan & Thomas, 2002, iii; Zhang & Sternberg, 2000, 486-7) so that what ends up being measured is not just the fit between style and learning environment. Thus, regardless of how learning styles are described or measured, ‘the wise teacher will offer a variety of teaching approaches during a course in order to allow all students to (/) learn through their preferred style’ (Lang et al., 1999, 25-6).

Whether it is also possible to ‘effectively strengthen other styles as well’ (Lang et al., 1999, 26) is more debateable. It is implied in the suggestion that differences can be accommodated by changing from teaching to ‘enabling students to learn’ (Briggs, 2000, 21), including identifying ‘appropriate strategies for [each] individual’ (Smith, 2002, 66). At best this involves a learner-focussed way to accommodate variation in learning by helping the learner to be strategic, to make choices and develop coping behaviours, including the learner translating learning material into their preferred mode (Sternberg and Grigorenko, 2001, 3; Riding & Raynor, 1999, 11, 79; Sadler-Smith 1999, 17). The teacher’s task then becomes not the adaptation of the teaching to match a variety of learning styles, but fostering the development of effective strategies for each individual (Riding & Raynor, 1999, 189). This shifts the onus of accommodating differences in learning style from the teacher to the student, and is still convergent in that priority is given to important to ‘the development of the learning skills and competence which students require to succeed on their coursework’ (Davies et al., 1998 in Briggs, 2000, 18) so that assessment drives the ways in which students choose to learn and think (Zhang & Sternberg, 2000, 486-7).

This approach is only justified if learning style is not innate and relatively fixed, but shaped by experiences and conscious choices and therefore mutable. This is contested ground (Logan & Thomas, 2002, ii; Renzulli & Dai, 2001, 34, 38; Sadler–Smith, 2001, 213; Sternberg, 2001, 2; Sternberg and
Grigorenko, 2001, 18; Zhang & Sternberg, 2000, 486; Riding & Raynor, 1999, 73), but if students’ learning strategies are changeable, then combining requiring them to adopt a particular style with diagnosis and prescription of required changes may give them ‘a repertoire of learning strategies – a cognitive tool kit’ (Riding & Raynor, 1999, 79). Thus increasing their ‘potential range of … competence’ (Biggs, 2001, 80).

If style is relatively fixed, however, the implications are that: optimum learning requires the learning environment and process to accommodate the style; attempts to force people to adapt to different styles from those that they prefer could disadvantage them; and valid measures of ‘cognitive, affective and psychological factors’ can assist teachers as ‘stable indicators of how a learner perceives, interacts with and responds to the learning environment’ (Keefe, 1989 in Logan & Thomas, 2002, iii).

Conclusion

While ‘the learning-centred approach’ can be attempted without understanding the psychology of learning and the nature of individual differences in cognitive style (Riding and Raynor, 1999, 78), more research is needed to enhance ‘the practical application of individual differences in style to the type of teaching and instructional presentation a student receives … [in order to] achieve authentic accommodation of individual differences in the classroom’ (Riding and Raynor, 1999, 162).

Our research challenges existing instruments that measure individual differences and aims to develop a functionally defined and context specific application of taxonomies of individual differences.

Key issues to think about with a view to further research include:
- ♦ The other variables, besides style, which affect learning performance (Riding & Raynor, 1999, 188-9).
- ♦ The way in which lecturers and teachers reflect their own style in the ways in which they teach (Riding & Raynor, 1999, 150).

References


Learning for success: Distance education students’ use of their learning materials

Andy Smith & Erica Smith
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2. School of Education, Charles Sturt University

This paper reports the results of a research project investigating the use that Distance Education (DE) students at university make of the learning materials that are supplied to them. The research is based on a survey of 998 DE students enrolled in ten undergraduate subjects spread across all five Faculties at Charles Sturt University (CSU) in New South Wales, Australia. CSU is Australia’s largest DE provider of higher education. The project addressed the following questions:

1. The extent to which DE undergraduate students use their learning materials;
2. The extent to which students undertake the learning activities that are often incorporated in learning materials;
3. The extent to which students obtain learning materials beyond the printed learning materials, especially their use of library facilities and the internet to research topics in their study programs;
4. The way in which DE undergraduate students approach their study and the study strategies that they adopt.

The paper reports the major conclusions from the survey. It was found that the majority of students read most or all of the learning materials that were sent to them. They relied heavily upon the prescribed textbooks, did some additional reading as recommended, to a limited extent carried out additional reading beyond that recommended, and worked through the provided learning materials in a methodical manner. They generally completed, in their minds if not always on paper, the study tasks embedded in the learning materials. Those students that read less and paid less attention to study tasks, however, tended to study in a way that was focused on passing assessment tasks. Overall the study provides a strong argument for the retention of traditional learning materials as students seem to work well with them. The paper concludes with suggestions for further analysis that might be carried out to differentiate between cohorts of students.

Introduction

While at some universities, including Charles Sturt University, the site of this study, a large proportion of students study by distance education, the mainstream higher education teaching and learning literature tends to assume a model of on-campus delivery. Increasingly also, attention is paid to on-line learning. Relatively little attention is paid to ‘traditional’ print-based distance education materials. Yet it is likely that print-based materials will remain widely used for the foreseeable future as demand for fully on-line learning remains low and problems of access and technology remain in many areas of the world.

Charles Sturt University (CSU), a university located on several campuses in regional New South Wales, is the largest provider of distance learning in Australia. It has a little over 25,000 students of a total of almost 34,000 students, ie almost three-quarters of all students, enrolled in this mode in 2003 (Charles Sturt University, 2003). Such students generally study two subjects per semester, and are required to attend residential schools for some subjects, but these are in the minority. Over the past fifteen years CSU has moved progressively into on-line support for teaching (for example with the provision of on-line subject outlines and subject electronic forums, which are heavily used), with also a small number of courses offered fully on-line. There are continual debates among the university teaching and learning support staff about the extent to which printed materials can be replaced by on-line materials. The study reported in this paper was funded under CSU’s Scholarship of Learning and teaching program in recognition of its importance for the future strategic direction of the nature of provision of learning materials for distance students.
Printed materials sent to students (known as ‘mail packages’ within the university) consist of several items:

- a subject outline which contains details of the subject aims and objectives, textbook details and lists of relevant journal, assessment information, and information about contact with lecturers, student support services and other relevant areas of the university

- learning materials that may be divided into a ‘study guide’ containing text written by the lecturer and a book of readings consisting of photocopied articles and/or book chapters, or two to three modules each containing a study guide and some readings. Typically each module corresponds to material relevant to each assignment, of which there are usually two or three (sometimes with an examination as well).

The study guides consist of 50 to 75 pages of text written by a lecturer, that generally incorporate study tasks which may require students to summarise material studied, find out extra information, reflect on relevance to the student’s workplace and so on. Within the university, educational designers assist with the layout of learning materials, and the university’s Learning Materials Centre produces, prints and mails the materials.

**Background**

While the literature on printed distance learning materials is relatively limited there are some studies, generally found in the specialist distance education literature, which provide a useful overview of the area. According to Moore (1993, in Peters, 1998) the key elements of distance education are structure (the materials), dialogue (the direct and indirect interaction between teachers and students) and autonomy (student motivation). Discussion of structure relates to, as Marland et al (1990: 71) put it, ‘devices which surround(ed) and infiltrate(d) the discourse, such as objectives, advance organisers, in-text questions, headings and assessment items’. Kin (1994) suggests that most students avoid in-text questions and activities; McDonald (1994) however points out that students will respond to well thought out activities. The move to on-line learning has led to discussion primarily of structure and dialogue (e.g., Albert & Thomas, 2000) while much other literature deals with motivation among distance education students in a more general sense, often from the perspective of support services that need to be offered (e.g., Nichols & Gardner, 2002).

It is not clear from the literature whether distance students have particular approaches to study as compared with on-campus students. Richardson (2000) suggests that approaches to learning do not vary significantly between on-campus and distance education students. He finds variations attributable to factors such as age, experience and discipline area. Naidhu (2001:297), in a review of Richardson’s book, suggests that there is a need to ‘focus attention on the specific uses of the delivery technology rather than the technology itself’. Using Moore’s (1993, in Peters, 1998) model, this approach focuses on the link between autonomy (student motivation) and structure (the nature of the materials) and forms the basis for the study reported in this paper.

An earlier study carried out at CSU (Relf & Geddes, 1992) administered the Biggs Study Process Questionnaire (SPQ) (Biggs, 1987, in Relf & Geddes, 1992: 2) and a questionnaire about distance students’ use of learning materials to 119 students, in a range of courses, who were attending residential schools. Relf & Geddes (1992) found some indications that ‘deep learners’ ( as identified by their responses to the Biggs SPQ used more elements of the study guide and read more widely, and had more strategies for making sense of their learning materials, than did ‘surface’ learners’. In another study carried out at a CSU predecessor institution, Roberts (1986) examined the study patterns of distance students, findings that most students spent less than the recommended time on studying and that 49% of students spent most of their study time on assignment-related activities.

The closest recent parallel to the current study appears to be a study by Carnwell (2000) in which twenty learners in a community nursing course in the UK were asked about their learning strategies...
and what they did with the learning materials. Carnwell proposes a typology of three types of DE students ‘systematic wader, speedy-focuser and global dipper’ (2000: 137) and attempts to link these types of learning theories. While useful her study is limited and is based on an assumption that distance students are women returners-to-learning. A more comprehensive, but now dated, study by Clyde et al (1983) also examined the ways in which students worked with the materials, focusing on habits such as skim-reading, attention paid to assessment tasks, and back-tracking.

Research method

The methodology employed for this project involved both quantitative and qualitative elements. An initial review of the literature on the use of learning materials by distance education students informed the development of a mailed survey questionnaire. The survey will be followed up with a series of focus groups with distance education students held in a number of different locations. However, this paper is concerned with reporting and analysing the results from the survey only. The survey contained 56 questions divided into four sections: About yourself, Studying at CSU, This subject, Your approach to study and Learning Materials in this subject.

The sample frame for the questionnaire was limited to undergraduate distance education students at Charles Sturt University. We decided to sample both new and more experienced students. In order to achieve a mix of new and experienced students we constructed the final sample frame from students studying first level (first year) subjects and students studying third level (final year) subjects in the Autumn semester of 2004. In general this sample frame allowed us to survey students who were brand new to their studies with CSU in the first level subjects and students who had been studying with CSU for more than 3 years. One first level and one third level subject were chosen from each of the five Faculties’ offerings in autumn semester of 2004. In total 998 students were identified in the sample, and questionnaires mailed out to them in August 2004, after the results from their studies in the autumn semester were known. A response rate of over 35 per cent was achieved with 351 useable returned questionnaires. The research team were satisfied with this relatively high rate of response to a single mailed questionnaire (Linsky, 1975). The survey results were entered in an Excel spreadsheet which allowed basic cross-tabulations of the results to be undertaken.

Characteristics of respondents

The ages of the respondents reflected the predominately adult profile of distance education students. Sixty-four per cent of the respondents were aged between 31 and 50 years. A further 26 per cent were aged between 21 and 30 years and 8.3 per cent were aged over 50. The response was heavily biased towards female students. Females constitute 55 per cent (CSU, 2003) of the DE student body at CSU but made up over 82 per cent of the respondents. This heavy bias towards female respondents needs to borne in mind when interpreting the results from the survey.

Over 85 per cent of the respondents were employed, underlining the fact that the majority of DE students combine work with study. Fifty-seven per cent of the respondents were employed full-time whilst almost 20 per cent were employed part-time. Slightly less than 9 per cent were employed on a casual basis. Just over 1 per cent of students were from an Aboriginal or Torres Strait Islander background reflecting the lower levels of participation by indigenous Australians (who form 1.8% of the Australian population) in higher education as a whole. About 9 per cent of respondents reported that English was not their first language reflecting the average participation rates of people from a non-English speaking background in higher education.

The most common qualifications that the DE students had completed before embarking on their studies at CSU were a Diploma (27.4 per cent), a school leaving certificate from Year 12 (19.9 per cent) and an Advanced Diploma (13.1 per cent). 10 per cent had already completed a Bachelor’s degree and so were continuing onto a second degree. The remainder of the respondents were scattered across other qualifications, predominantly Certificates III or IV from the vocational education and training (EVT) sector). However almost 18 per cent of the respondents already possessed an undergraduate or post-graduate qualification. The qualifications profile of the respondents reflects the
far broader educational background of students studying by distance compare with the traditional on-campus students who are most likely to possess only a school leaving certificate.

One of the most commonly reported issues with DE students is the very high level of attrition associated with studying at a distance. Often this is the result, not so much of the difficulties of distance learning as an educational method but of the factors which impinge on mature aged students that impede their progress. Table 1 shows the main factors that adversely affected their studies.

Table 1. Adverse factors affecting study

<table>
<thead>
<tr>
<th>Adverse factors</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caring for young children</td>
<td>86</td>
<td>16.3</td>
</tr>
<tr>
<td>Personal illness</td>
<td>75</td>
<td>14.2</td>
</tr>
<tr>
<td>Relationship issues</td>
<td>66</td>
<td>12.5</td>
</tr>
<tr>
<td>Shift work</td>
<td>66</td>
<td>12.5</td>
</tr>
<tr>
<td>Excessive travel</td>
<td>50</td>
<td>9.5</td>
</tr>
<tr>
<td>Caring for dependent relative</td>
<td>39</td>
<td>7.4</td>
</tr>
<tr>
<td>Bereavement</td>
<td>22</td>
<td>4.2</td>
</tr>
<tr>
<td>Other</td>
<td>125</td>
<td>23.6</td>
</tr>
</tbody>
</table>

Thus, personal and family issues rather than work issues form the overwhelming majority of problems for students in a DE program. This may reflect the large majority of female respondents in the survey but it also highlights the difficulties institutions may encounter in attempting to ameliorate attrition amongst DE students.

Communication

The increasing availability of on-line services and the use of on-line learning in distance education are predicated on optimistic forecasts of the availability of good internet connections to students. Table 2 shows the type and place of internet access available to the respondents.

Table 2. Whether students have access to the internet and, if so, where?

<table>
<thead>
<tr>
<th>Type and location of internet access</th>
<th>Number</th>
<th>% of all responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>At home (quick connection e.g. broadband)</td>
<td>94</td>
<td>17.6</td>
</tr>
<tr>
<td>At home slow connection</td>
<td>226</td>
<td>42.4</td>
</tr>
<tr>
<td>At work</td>
<td>189</td>
<td>35.5</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>4.1</td>
</tr>
<tr>
<td>No access</td>
<td>2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Note: Respondents could nominate more than one

This table shows that the majority of students have access to the internet at home, a total of 61 per cent, although nearly 40 per cent do not have access at home. About a third have access through work, although some of these also enjoy access at home. Only a very small number have no internet access. Nearly 18 per cent of students have quick connection (e.g., broadband access) at home, a figure that is compatible with media reports of the relatively slow uptake of broadband services in Australia and the difficulties of provision of broadband outside the metropolitan areas.

Contact and communication with academic staff is often cited as major factors in retaining students and lowering rates of attrition. Table 3 shows that the means of communication between distance education students and their lecturers has changed with the introduction of new technology.
Table 3. Frequency of communication with academics via email, telephone and electronic forum

<table>
<thead>
<tr>
<th>Frequency of communication</th>
<th>Email (%)</th>
<th>Telephone (%)</th>
<th>Electronic forum (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very often</td>
<td>0.6</td>
<td>0.3</td>
<td>35.4</td>
</tr>
<tr>
<td>Often</td>
<td>4.6</td>
<td>2.6</td>
<td>33.7</td>
</tr>
<tr>
<td>Occasionally</td>
<td>27.5</td>
<td>13.1</td>
<td>16.6</td>
</tr>
<tr>
<td>Seldom</td>
<td>27.2</td>
<td>18.3</td>
<td>5.4</td>
</tr>
<tr>
<td>Never</td>
<td>40.1</td>
<td>65.7</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Note: The electronic forum refers to a web based discussion group mechanism that is attached to every DE subject run by CSU and to which students have automatic access via the CSU website.

The results in Table 3 show how the use of the telephone, the traditional means of communication between academics and DE students has declined dramatically with fewer than 3 per cent of students reporting that they use this means of communication very often or often. Interestingly, email communication is also quite unusual with only just over 5 per cent of students reporting that they use this form of communication very often or often. But students are clearly using the electronic forum as the major means of communication with academics with nearly 70 per cent of students report that they access their forums often or very often. Taken together with the results on access to the internet, the figures in Table 3 suggest that students have actively switched to the internet as their main means of communication with the university and with academics regarding their study. Thus the web has already become a major teaching tool for universities for DE students and is likely to become even more important in the future as more students are able to access broadband internet access at home.

However, accessing the electronic forums does not mean that all students actively participate by posting messages. When asked about how they contribute to the forum once accessed, students divided fairly evenly between those who contributed occasionally (42 per cent) and those who looked but did not contribute (40 per cent).

Approach to study

In general, the students seem to have developed quite disciplined study habits. The majority of subject learning materials included a suggested schedule for study. These schedules usually specify the topics included in the subject and the order in which they should be studied and the number of weeks that students should devote to each topic. As Table 4 shows, most of the students stick to the schedule most of the time.

Table 4. Whether students adhered to the study schedule

<table>
<thead>
<tr>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, all the time</td>
<td>37</td>
</tr>
<tr>
<td>Yes, most of the time</td>
<td>120</td>
</tr>
<tr>
<td>Yes, some of the time</td>
<td>119</td>
</tr>
<tr>
<td>Not at all</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>341</td>
</tr>
</tbody>
</table>

Over 46 per cent of the students followed the study schedule all or most of the time. Students also reported that they studied their materials regularly with an overwhelming majority (83.5 per cent) reporting that they studied on a regular basis throughout the semester. In most cases also study patterns were continuous rather than sporadic. Nearly 65 per cent of respondents replied that they studied over a number of days in the week and only less than 20 per cent saying that they study only at weekends and even fewer (9.5 per cent) saying that they studies mostly on one weekday. The students seem to work hard. Most students (61.5 per cent) say that they put in between 3 and 9 hours of study time per subject per week with over 27 per cent of the respondents saying that they devoted more than 9 hours per week to each subject. Typical quotations from students on this issue underline the variety of study patterns used and the lengths they go to in order to study:
Anytime possible i.e. at work/home/relatives houses/doctors/ anywhere I would have to wait

(I studied) whenever I could. If I did a morning shift I studied at night until tired and if a night or afternoon shift, I studied in the morning or on a work break.

(I studied) on the train one and a half hours each way to and from work, as well as at night and weekends around assignments.

But the students enjoyed studying despite the long hours devoted to the activity. Nearly 80 per cent of the respondents said they enjoyed the activity of studying with only 20 percent saying they did not.

It appears that study also increased the level of student interest in their subjects. As Table 5 shows the number of students claiming that they were very interested in the subject rose after study whilst the numbers claiming only moderate interest fell.

**Table 5. Level of students interest in the subject before and after study**

<table>
<thead>
<tr>
<th>Level of interest</th>
<th>% before study</th>
<th>% after study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very interested</td>
<td>21.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Interested</td>
<td>39.9</td>
<td>38.7</td>
</tr>
<tr>
<td>Moderately interested</td>
<td>25.9</td>
<td>16.0</td>
</tr>
<tr>
<td>Not very interested</td>
<td>9.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Not interested at all</td>
<td>2.8</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Generally most students experienced some difficulty in studying with 42.3 per cent of students reporting that they found the subject difficult or very difficult and 52.3 per cent experienced average difficulty. Less than 1 per cent of students reported that they found the subject very easy.

**Use of learning materials**

A number of questions sought to identify exactly what students did with their materials. On first receipt of the materials, 91.7 per cent said they immediately opened up the materials, while 8.3 per cent said they put them aside until the semester started. They were then asked what they did when they opened the materials. Responses were as follows (Table 6):

**Table 6. Students’ actions when they first received their learning materials (one choice only allowed)**

<table>
<thead>
<tr>
<th>Action</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skimmed through the materials quickly</td>
<td>145</td>
<td>41.3</td>
</tr>
<tr>
<td>Looked at the assessment tasks first</td>
<td>74</td>
<td>21.1</td>
</tr>
<tr>
<td>Started to read the subject outline</td>
<td>68</td>
<td>19.4</td>
</tr>
<tr>
<td>Started to read all the materials systematically</td>
<td>26</td>
<td>7.4</td>
</tr>
<tr>
<td>Started with the readings provided</td>
<td>7</td>
<td>2.0</td>
</tr>
<tr>
<td>Checked for the prescribed text</td>
<td>28</td>
<td>8.0</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

The study guide (the text provided by the lecturer) was in most cases read systematically and in order (86.3 per cent responded in this way, while 7.3 per cent studied each topic but in a different order). 6.3 per cent of students did not study all of the topics. Of the two latter categories of students, almost half (46.8 per cent) tailored their reading primarily to the assessment tasks.

One of the most important questions related to the physical actions that students took with their materials. Table 7 shows student responses; they were asked for the action that they most frequently used.
Table 7. Students’ physical interactions with their learning materials (one choice only allowed)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made their own, separate, notes on the topics</td>
<td>131</td>
<td>37.6</td>
</tr>
<tr>
<td>Wrote notes on the learning materials</td>
<td>54</td>
<td>15.5</td>
</tr>
<tr>
<td>Highlighted some sections of importance</td>
<td>118</td>
<td>33.9</td>
</tr>
<tr>
<td>Physically re-arranged the topics</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Just read them through as they were</td>
<td>39</td>
<td>11.2</td>
</tr>
<tr>
<td>None of the above</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>1.4</td>
</tr>
</tbody>
</table>

These responses indicate that only just over half of the students made notes about or from the learning materials, either physically upon them or separately. Highlighting was the favoured activity of a third of the students.

Students’ use of in-text study activities, or study tasks, was a major focus of the research study. While only 15.8 per cent completed all of the study tasks, 32.1 per cent completed most and 38.7 per cent ‘some’. Only 11.2 per cent said they completed none. Of those who completed some, most or all of the tasks, 41.3 per cent wrote formal answers to them, 22.8 per cent said they thought deeply about the tasks but without writing responses, and 35.4 per cent paused for thought. Only 3 per cent (n= 9) discussed the tasks with other students. In qualitative responses, some students said that they responded differently to different activities. Some typical qualitative answers relating to use or non-use of the tasks were as follows:

<table>
<thead>
<tr>
<th>Reasons for completing study tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ I found making myself write an answer, although difficult, was a way to commit it to memory.</td>
</tr>
<tr>
<td>♦ Critically reflect—include own life experiences.</td>
</tr>
<tr>
<td>♦ It was the first time I had studied at University level and thought it might be relevant for the assessment tasks.</td>
</tr>
<tr>
<td>♦ Anything to deepen my knowledge and understanding is helpful.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reasons for not completing study tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Lack of time. Felt the activity was not necessary to increase understanding.</td>
</tr>
<tr>
<td>♦ Not compulsory.</td>
</tr>
<tr>
<td>♦ Because I didn’t enjoy the subject and wasn’t motivated.</td>
</tr>
<tr>
<td>♦ Couldn’t relate them to my work.</td>
</tr>
</tbody>
</table>

Use of the recommended textbook was high; four-fifths of students used the textbook all the time and 14.8 per cent used it occasionally. Most students used the textbook as recommended by the study guide (77.4 per cent) while 16.3 per cent read it from cover to cover. Only a small minority (5.1 per cent) read only parts that related directly to assessment tasks. A concern of lecturers is that students do not read the Readings that are provided with the study materials. However the study provided some reassuring findings, with 65.5 per cent of students claiming they read all of the Readings and 24.5 per cent saying they read most. Only 6.8 per cent said they read only a few or none at all. Of those who did not read all, the following reasons for given for selection of those that they did read (in descending order of popularity):

<table>
<thead>
<tr>
<th>Reasons for not reading the Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Only those that seemed to relate directly to the assessment tasks (57 per cent)</td>
</tr>
<tr>
<td>♦ Only those that were mentioned in those parts of the study guide that the student read (20.7 per cent)</td>
</tr>
<tr>
<td>♦ Only those that were printed, not on the web (Note that subjects allow the lecturers to add extra materials (the CSU term for this is ‘flexible publishing’) (10.7 per cent)</td>
</tr>
<tr>
<td>♦ Only those the student was most interested in; and only those that seemed easy to understand (5.8 per cent each)</td>
</tr>
</tbody>
</table>

Nearly all of the students (83.4 per cent) read the Readings in the order suggested by the Study Guide.

Over two-thirds of students did some further reading as well. 53.4 per cent read some of the suggestions for further reading and 8.0 per cent read most of them. 38.5 per cent did none of the
suggested extra reading. Additional reading that the students had found for themselves was also carried out. Students were given a choice of possible sources, and allowed to tick more than one. 760 responses were received (ie more than 2 responses per student on average) with TV and radio programs, books and web sites most often ticked. Students cited the following as most often used (they were asked to select one for this question):

- Books 38.0 per cent
- Relevant TV/radio programs 33.7 per cent
- Website 26.3 per cent

Only 8.2 per cent (n=62) read any additional journal articles with only 3 students saying that was the type of additional material that they used the most.

In general students were satisfied with the learning materials they received although less than half were ‘very satisfied’ (Table 8):

<table>
<thead>
<tr>
<th>Level of satisfaction</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>145</td>
<td>41.8</td>
</tr>
<tr>
<td>Satisfied</td>
<td>185</td>
<td>53.3</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>17</td>
<td>4.9</td>
</tr>
<tr>
<td>Total</td>
<td>347</td>
<td>100</td>
</tr>
</tbody>
</table>

Some typical suggestions for improving materials included:

- *It was a very big topic. Reducing the content might make it easier for students to assimilate some of it.*
- *More up to date Readings – many were over 10 years old*
- *Selecting materials that are easier to read and understand. Too much academic mumbo-jumbo.*
- *Give relevant websites*
- *Would have liked the study guide and textbook to be better integrated.*

Some questions related to quality of the materials – poor editing, poor photocopying, and so on. Some suggestions related to physical presentation of the materials such as ideas for blank pages for notes and colour-coding of subjects. Several students in one subject complained about the textbook being hard to understand (one student said rather plaintively, ‘Perhaps it’s just me!’)

**Differences between students**

The study also looked at the different ability levels of students and the impact these differences had upon their study habits and patterns. Students were asked to assess their own academic abilities compared to other university students. The students were also asked to give their final grade for the subject in which they had been enrolled. Table 9 summarises the results.

<table>
<thead>
<tr>
<th>Perception of academic ability</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>67</td>
<td>19.1</td>
</tr>
<tr>
<td>Average</td>
<td>251</td>
<td>71.7</td>
</tr>
<tr>
<td>Below average</td>
<td>32</td>
<td>9.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Distinction</td>
<td>14</td>
<td>4.0</td>
</tr>
<tr>
<td>Distinction</td>
<td>77</td>
<td>22.1</td>
</tr>
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<td>Credit</td>
<td>139</td>
<td>39.8</td>
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<td>Pass</td>
<td>114</td>
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<td>Fail</td>
<td>5</td>
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</table>
Differences between the students in both final grade achieved and their own perceptions of their academic ability yielded some interesting contrasts in answers – particularly in issues concerning their approaches to study. In general, those with a higher perception of their own academic ability (HAA) tended to have more regular study habits than those who felt their ability was lower than average (BAA). Those with higher perceptions of their academic ability tended to answer that they followed the prescribed study pattern in their learning materials all the time (22.7%). None of those with a lower perception answered that they stuck to the study schedule all the time. HAA respondents were more likely to make their own notes separately on the learning materials (52.3%) as opposed to BAA students (18.8%). BAA students were more likely to simply highlight sections of the materials for importance (46.9%). HAA students were more systematic in their use of study tasks contained in the learning materials. They were more likely to complete all the study tasks (28.4% compared to 15.6% of BAAs) and more likely to write formal answers to the tasks (53.2% compared to 29.6% of BAAs). HAA students were also slightly more likely than BAA students to use the prescribed textbook all the time. As a result, it appears that HAA students are more likely to get a high level of enjoyment from the activity of studying (22.4%) than BAA students (9.7%). However, although HAA students appear to take a more systematic approach to their study than BAA students, the results suggested that BAAs may compensate for their lack of structure in study by studying longer. BAA students are more likely to report that they devote 9 hours per week or more to the study of a subject (43.8%) than HAA students (31.3%) who seem to devote relatively fewer hours to study than their lower self-rated colleagues.

A similar picture emerges when comparing the responses of students with high and low grades in the subjects. Comparing students who reported achieving a higher distinction (HD) with those that achieved a pass grade (PS), it appears that HD students are more likely to take a structured and systematic approach to their study than PS students. HD students are more likely to study over a number of days in the week (92%) compared to PD students (60%) who are more likely to study on only one day of the week or at weekends only. HD students are more likely to put longer hours into studying with 57 per cent of this group studying between 6-9 hours per week per subject. Only 32 per cent of PS students responded that they studied between 6-9 hours per week. PS students were more likely to be studying between 1 and 6 hours per week per subject. Interestingly however, more or less the same proportion of HD students (29%) and PS students (25%) reported that they put in more than 9 hours of study per week per subject. It appears that very long hours of study do not necessarily guarantee the achievement of high grades in a subject. HD students are also more likely top take a highly systematic approach to their study with 100 per cent of HD students reporting that they study each of the topics in a subject systematically and in order compared to 83 per cent of PS students who are also more likely to report that they study the topics out of sequence (5%) or only study some of the topics in a subject (11%). HD students are far more likely to make written notes on topics in the learning materials (79%) than PS students (37%). HD students are more likely to complete all the study tasks in the learning materials (36%) than PS students (12%) and HD students tend to write formal answers to study tasks (62%) than PS students (37%). Finally HD students are more likely to read the readings in the learning materials (86%) than PS students (62%). As a result, HD students seem to be more engaged with and enjoy their studies than PS students. Fifty-eight per cent of HD students reported that they contribute frequently or occasionally to the electronic forum in the subject compared to 41 per cent of PS students. HD students are more likely to enjoy the activity of studying for a subject (50%) compared to PS students (24%) and are more likely to be very satisfied with the learning materials (43%) than PS students (29%).

Discussion and conclusion

A number of points emerge from the findings that are relevant to universities that offer distance education. Students seem to be satisfied with the traditional printed materials that are sent to them and, although they would like to be given more websites to refer to, do not express any wish to have their printed materials replaced by web-based learning materials. Of course, these students are enrolled in traditional distance courses and so might be expected to hold such preferences; however the findings are a powerful message to university administrators that a change to web-based delivery could alienate
much of their current student base. On the other hand, the students in this research expressed their strong preference for web-based communication (email and particularly e-forums) in their interactions with lecturing staff and other students.

Students appeared to be more focused and more disciplined in their approaches to study than might be expected. On the whole they seemed to adopt regular study patterns rather than studying only at times when assignments were due. Over a quarter of the responding students spent more time than that recommended by CSU (eight hours per week per subject) on their studies. Most students worked quite methodically through their study materials and were not particularly driven by assessment tasks in their reading (although those that read less were primarily driven in their selection by assessment tasks). While the study did not negate earlier studies by Carnwell (2000) and Clyde et al (1983) that found that students used different approaches to their study materials, it suggests that the majority fall into the methodical or ‘systematic wader’ category proposed by Carnwell (2000). However the finding that only one-half of students made notes from their learning materials, suggests that half are not using strategies that will aid retention of the material. Relf & Geddes (1992) found that ‘surface learners’ (according to the Biggs typology of deep and surface learners) avoid making notes, preferring to highlight relevant sections.

One interesting finding from this study was the heavy reliance that students place upon the prescribed textbook, with students generally reading all parts of the textbook that were suggested in their study guides, and in some cases (16.3%) reading every word of the book. This finding suggests that the choice of textbook is one of the most important teaching tasks that can be undertaken by lecturers, as suggested by Dominowski (2002). In their use of additional materials that were self-located, books featured heavily, as did television and radio programs, with web sites less popular and journal articles rarely used. These findings have important implications for libraries in universities that have large numbers of distance students. Some additional questions are begged by the results, such as how students chose which of the recommended further reading they should undertake and whether lecturers would be best advised to recommend books rather than journal articles.

There are clear differences between higher and lower achieving students, measured either by their own assessment or by the grade they achieved in a subject. This is especially true in relation to students’ approaches to study. In general, higher achieving students are more likely to take a more structured and disciplined approach to their study than lower achieving students. Higher achieving students are more likely to:

♦ Follow the study schedule suggested in the learning materials
♦ Make written notes on the topics in the learning materials
♦ Complete all the study tasks in the materials
♦ Write formal answers to study tasks
♦ Read all the readings provided with the learning materials
♦ Study for more hours per week
♦ Study over a number of days per week.

Thus, higher achieving students work harder and work more systematically than their lower achieving counterparts. Higher achieving students take a “deep learning” approach to their study displaying many of the habits of deep learning described by Biggs (1999). Working hard and working systematically are clearly important messages that universities should be reinforcing with all their DE students to ensure success.

The findings of the study are clearly affected by the preponderance of female respondents. It is normal to receive a higher response rate from women than men to surveys. However this study is particularly hampered by the high percentage of females; as the activities of completing and returning a survey are quite similar in their nature to distance study, it might be expected that male responses may differ quite considerably from women’s. For reasons of space, however, it is not possible to report on
responses by gender. Similarly, further analysis by year of study, perception of academic ability, and actual grades received needs to be carried out, and will increase the utility of the study’s findings for those responsible for preparing learning materials for distance students.

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Edge of reality: Situated learning and cognitive apprenticeship in a communication degree

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Partnerships between industry stakeholders and educators have become a critical element in the design of courses in the ‘new world’ of tertiary education. One such example is the relationship established between the School of Communication at Charles Sturt University and the commercial radio industry body Commercial Radio Australia. The partnership has cultivated an undergraduate degree program designed to specifically provide the industry with appropriately skilled graduates. This paper discusses the curriculum ‘makeover’ given to this industry-based course, which was underpinned by the teaching principles of ‘situated cognition’ and ‘situated learning’. The paper also documents the model adopted by the course architects highlighting the practice of ‘legitimate peripheral participation’ within that model and the immediate graduate results of the unique curriculum.

Background

Partnerships between industry stakeholders and educators have become a critical element in the design of courses in the ‘new world’ of tertiary education. This development of effective industry and educator partnerships was reverberated in a Business/Higher Education Round Table Position Paper from 2002 which urged:

University and business leaders need to seek new strategic partnerships and forms of involvement. This should lead to a higher level of interaction and seamlessness between business and higher education. (Business/Higher Education Roundtable, 2002)

These aspiring attributes of interaction and seamlessness are the focus of this paper, which case studies a program that has made the transition from the world of tertiary education to that of profession, a seamless experience for students. This seamless transition has occurred through the application of the principles of ‘situated learning’ and ‘legitimate peripheral participation’ in the course curriculum.

The program is the BA Communication – Commercial Radio. The title itself is not totally descriptive of the course’s content except to place it in the genre of Communication degrees.

The course is a three-year undergraduate program designed to educate and train students who want to make a career in the promotional/ business communication areas of commercial radio. Its role is to prepare the future sales reps, promotions managers and copywriters of the industry (this specialisation is also unique). The program was developed and is delivered in partnership with the industry body Commercial Radio Australia (CRA). It is the involvement and interaction of the industry body that provides the program’s effectiveness and the opportunity to apply the pedagogical instruments critical to situated cognition. The role and success of these instruments is the focus of this paper - Industry/institutional partnerships.

It is not commonplace for commercial radio stations and networks to look to higher education institutions for new talent in the business side of their operations. Sales people and copywriters traditionally come from anywhere and specialist promotions people are a recent phenomenon. So it was not surprising that in the industry’s push for growth that education became a key issue, as Southern Cross Broadcasting Director of Innovation and Learning, Alexandra Lyall states:

“We were employing a lot of people who were not ‘degree’ people and we saw that if we were going to keep growing as an industry we had to start employing a higher calibre of people” (Lyall, 2004)
This attempt to upgrade the quality of entry level employees into the industry was first exercised in 1999 when the Federation of Australian Radio Broadcasters (the industry body of the day) identified the need to adopt a strategy that would improve the quality of people coming into the industry’s “management” stream. A degree program developed in partnership with a higher education provider (in this case Charles Sturt University) was the tactic.

This tactic was prompted by a definite change in the sector with increased competition between radio and other media vying for consumer mindspace and advertising dollars. Networks adopted a stronger strategic orientation to their operations, which meant stronger positioning and branding, more aggressive personal and impersonal marketing.

The BA Communication in Commercial Radio Management was set up to address this need for ‘degreed’ people, but unfortunately it wasn’t a winner.

The program adopted the traditional university management program curriculum model, which produced graduates with reasonable Management, Marketing and Communication theory behind them but no practical skills – the basic ingredient for a first job. The second failing was the fact that there wasn’t a true partnership occurring between the two stakeholders.

The result was a poor graduate record of under 20 per cent of graduates being employed in the commercial radio industry – a poor return on the financial investment made by the industry. The industry reacted by re-considering their investment.

A new objective and a new strategy

A new approach to the task of preparing young people for a career in this area of perceived industry need had to be adopted.

“The majority of management to date has come out of the sales area, so sales managers traditionally take up that role. Also that’s where the greatest need for recruitment is.” (Lyall, 2004)

So the new objective for the course was to identify the ‘true’ training opportunity and to establish a curriculum model that would provide seamlessness and industry relevance. An effective model needed to, firstly, truly involve the industry a ‘partner’ in the program and secondly, to apply the curriculum principles of “situated cognition” to graduate students with usable skills as well as broader theoretical knowledge.

Situated cognition the key to success

The basic premise of situated cognition is that ‘learning and doing are inseparable and that learning is a process of enculturation’ (Hendricks, 2001) and that cognitive skills are developed and acquired through ongoing participation within a community (Brown, Collins & Duguid., 1989; Lave & Wenger, 1991). The basic tenet being that students should learn in a context – a real environment.

This approach to education is not a new one. For example Swinburne University has been applying this orientation to higher education since the early 60s with its IBL programs where students spend part of their time in the traditional classroom and part of their time in the field. Swinburne Director of Industry Liaison Judy Kay puts the success of this approach into perspective with these comments:

“students put theory into practice, making their learning real in a structured and supportive way…they are ahead of the pack when they come out and they are highly employable” (in Robbins, 2003)
This approach produced graduates that had usable skills from day one. A clearly desirable outcome for both stakeholders. This desired graduate output was identified in two research activities conducted in business/marketing environments:

Scott & Frontczak (1996) identified a strong preference of employers for new graduates with some hands-on work experience in an industry-related field. Whilst similarly in Australia Kerr & Moran (2002) observed that:

“Employers would like to see more applied skills emerge from university so there is less on the job training”

Our new curriculum model needed to produce the same outcomes.

The New Model

Our new curriculum model had to focus on areas of perceived industry need, and that was identified as sales, promotions and creative. This was determined by three sources of data; industry interviews, job ads trends analysis, and industry internal research (CRA)

Our curriculum objectives were to develop:

♦ Generic and foundation skills - basic intelligence, research, problem-solving and analytical skills
♦ Professional skills - discipline specific knowledge
♦ Organisational and ‘community skills’- workplace skills, teamwork skills, job specific skills and understanding of organisational operations.

The Generic and Professional skills were easily attainable outcomes for university curriculum but the organisational and ‘community’ skills really required ‘interaction’ with industry to be achieved.

The key was the ‘cognitive apprenticeship’ model where the learning occurs with master and the apprentice interacting ‘in situ’. Brown et al (1989) refer to this approach as a learning environment that…

“attempts to enculturate students into authentic practices through activity and social interaction in a way similar to that evident in craft apprenticeships”.

These ‘authentic practices’ are adopted in both classroom and field situations.

This approach is theorized by Lave and Wenger (1991) as the learning situation in which the context of the learning acts as the “cognitive master”. This learning situation is expressed in terms of a ‘community of practice’, a term closely associated with the collective work of Lave & Wenger (see Lave & Wenger, 1991) and primarily (although not exclusively) seen as a professional community in which true learning occurs.

In a community of practice, shared inquiry and learning center around issues, dilemmas, and ambiguity that emerge from actual situations in authentic practice settings as opposed to formal coursework that is content-driven (Buysse, Sparkman & Wesley, 2003)

This learning community provides the opportunity for interaction and participation in a meaningful learning community. This community of practice has become a critical element in the new curriculum model established for the BA Communication - Commercial Radio degree.

Community of practice the core theoretical driver

The structure of the new model required the students to experience this community of practice but to experience it gradually, this approach is in line with Lave and Wenger’s notion of “legitimate peripheral participation”
“Initially people have to join communities and learn at the periphery. As they become more competent they move more the center of the particular community. Learning is thus, not seen as the acquisition of knowledge by individuals so much as a process of social participation” (Smith, M.K. 2003)

From the first year of the course students engage with their ‘community of practice’ on successively deeper levels. These levels could be described as observation, cooperation and participation.

Observation - at this level 1st year students visit stations as observers, they create a diary of their observations. At 2nd year level they return to the station and spend an allocated number of hours in separate departments of the station and begin to act under supervision. Here they inducted into their Community of Practice (CoP)

Cooperation – At the second year level students work in cooperation or partnership with the radio station on a specific project (the current situation is the development of programming and sales content for the regional Tourist Radio services). This represents a deeper engagement with their CoP.

Participation – In the final semester of their course students are allocated a radio station to complete their degree in the field as an intern. This is an extended period in that community of practice of three months. By this time the students are well and truly enculturated into their community of practice.

This pyramid demonstrates how we graduate the student through the skill zones throughout the course, from conceptual and theoretical to practical, and how we gradually move the student from the protected environment of the traditional classroom along with a shallow engagement with their ‘community of practice’ into the more challenging and deeper engagement with ‘community of practice’ in their internship phase of the program. At this stage the foundational, specific and professional skill development can be realized in the field, whilst also acquiring the ‘organisational’ skills that can’t be learned in the classroom.

This model follows the basic ideology of Lave and Wenger’s (1991) community of practice, where participation in such a community is at first legitimately peripheral but increases gradually in engagement and complexity.
This could not be achieved without an “interaction” with the industry partner who provide the “communities of practice”. From figure 2 you can see the cooperative nature of the industry/educator partnership, each stakeholder making a contribution to the delivery of the curriculum.

That contribution is more than just a place in a radio station, it involved significant work by the industry body to provide workplace orientation and internship coordination and management as well as projects and other ‘authentic activities’.

In practical terms the final phase of the course – the three month industry sponsored internship has been the key element. Its role in providing a seamless phase between student and practitioner was invaluable.

It was unbelievable, the past 12 weeks in the industry have solidified for me the fact that everything we did at CSU had its benefits” (Tim Millgate, Southern Broadcasting, 2004)

“We have treated (Dani) like a new employee, for us that means you are here and you are responsible for everything we give you. So as far we are concerned we make no concession that she is an intern and is treated like a new employee for the company” (Coral Davidson, Administration Manager, ARN, 2004)

“The best thing about this internship is that they don’t sugar-coat it, you’re thrown in the deep end and you’ve just got to do what you can. By having the course behind me I come with some really good skills and have been able to utilize them” (Danielle Johns, ARN, 2004)

The Evaluation

“You realise these people are smart, educated and have a lot to offer and once you get to know them you can entrust them with a high level of responsibility” (Paul Bowde, Marketing and Sponsorship Manager, 2UE, 2004)
That last comment from Paule Bowde highlights the significant turnaround in the program. Whilst in the field the students clearly demonstrate the intelligence, professional knowledge and job specific skills developed throughout the course. These skills come to life in the ‘deeper engagement’ phases of the ‘community of practice’ activities of the program.

“There is a world of difference between the classroom and the workplace in any industry and its that giant leap into wow this is what its really like and they actually grow very quickly”
(Alexandra Lyall, Director of Innovation and Learning at Southern Cross Broadcasting, 2004)

The results of the new model were dramatic. In the first year of implementation we achieved a 100 per cent graduate employment record, a more than significant increase on the 20 per cent from previous years.

The success of the program is down to two key factors:
♦ Greater involvement and interaction between industry and higher education
♦ Application of the tried and tested principles of situated learning and cognitive apprenticeship

These combined with pedagogical practices already established in communications teaching have produced ‘industry-ready’ graduates with demonstrated skills and knowledge that have been clearly articulated as ‘needed’ by the commercial radio industry. The resulting high level of graduate placement from the program testifies to the successful integration of industry involvement and ‘situated learning’ practices in producing relevant learning outcomes. By placing students on the ‘edge of reality’ where learning can prosper through ‘legitimate peripheral participation’ and meaningful social engagement all stakeholders in the education process can claim victory.

References

Clinical placement in rural health professional education: Addressing the theory practice gap in nursing

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Understanding the theory practice gap in nursing is important to university-based teaching practices. This paper discusses viewpoints held by the nursing profession and a new model to address these issues. Twenty-six registered nurses with responsibilities for precepting students on clinical placement responded to a questionnaire, designed to identify concerns regarding a theory-practice gap. The principle findings were the perceived existence of such a gap (88%) and its impact on clinical practice (100%). Academics should engage in contemporary clinical practice (80%) and that the type of clinical placement was important (88%). Our placement model addresses concerns highlighted by the registered nurses and emphasising problem-based learning with nursing academics providing clinical assistance. Sixteen nursing students participated in our university diabetes screening programme to augment clinical assessment skills and to provide a diverse perspective of current health care. Students found the clinic challenging and offering new learning experiences outside of perceived health professional boundaries.

Introduction

The transfer of nurse education from hospitals to higher education institutions began in 1984 (CDHSH, 1994). Since this time disquiet remains within the profession as to the clinical competence of graduates. This perception of a failure by universities to provide undergraduate students with appropriate clinical skills is the essence of the ‘theory practice gap’ and must be resolved if we are to move forward with confidence as a profession (Massarweh, 1999). Health care providers see the theory practice gap as a real problem and, with or without justification blame universities for inadequate preparation of undergraduates for clinical practice (Fealy, 1999). Higher education providers certainly experience difficulties in acquiring appropriate clinical placement opportunities for their students, which is exacerbated in rural Australia due the decreased availability of clinical places. However, the extensive nature of a university education, which not only emphasis skill development, is often overlooked by the profession. Clinical placement is principally about acquiring skills. Yet facilitating the growth of our students towards lifelong, reflective learners who are prepared for complex and changing work environments is also one of the outcomes of a university education (McLeod, McAllister, Clark, Wilson, & Thompson, 2000). With respect to clinical placement, an effective, supportive and appropriately developed clinical experience will have an impact on the student’s clinical aptitude, their attitudes to future students, as well as impact on retention of post graduates to the profession (Chang & Daly, 2001; Duffin, 2002). Universities must be vigilant in their response to community and health provider concerns about the skills and knowledge of undergraduate nurses. The principle objective of the first part of our research was thus; to shed some light on the issue of the theory practice gap and provide the basis for collaborative strategies to address pertinent placement concerns.

The second part of our research recognises that both universities and health care providers need to examine how students learn and apply theory to practice. This latter aim was addressed by providing student placement as part of the diabetes complications screening programme at Charles Sturt University, School of Community Health. This screening programme is an additional health care facility on the NSW-Victorian border that is multidisciplinary and provides screening, referral and feedback as well as limited intervention. Being part of a university provides a strong research culture with several postgraduate students and visiting academics being involved. As such students are introduced to an extensive health care model that has high relevance to not only rural community health nursing but promotes opportunities for acute and chronic nursing care. Students gain communication, assessment and diagnostic skills, as well as technical expertise in cardiac, pediatric and ophthalmic nursing.
**Methods**

*Investigation of attitudes of registered nurses to theory practice gap*

To investigate attitudes of registered nurses with respect to the theory practice gap, a 10 question questionnaire was developed using a Likert Scale format to quantify strengths of feeling and attitudes towards issues raised within the literature (see Table 1). A group of 30 registered nurse clinicians (division 1 in Victoria) who work in acute medical surgical hospitals in the local area were selected using a non–probability, purposive sampling technique (Beanland, Schneider, LoBiondo - Wood, & Haber, 1999). Participants in the first part of our research had to be registered for at least two years and exposed to student nurses on placement. Participants were selected from the three acute medical surgical hospitals. Each participant received a package including consent form, information sheet and questionnaire. Included in the self addressed A3 envelope was an A4 envelope for consent forms that had to be returned separately from the questionnaire, in order to assure anonymity of respondents. We identified five major areas of investigation within the questionnaire. These were: 1. Existence of the theory practice gap; Reason for the theory practice gap; 3. Impact of student placement; 4. Attitudes of registered nurses to student placement; and 5. Attitudes of registered nurses to their profession. Ethical approval for this research was gained through the department of education, Charles Sturt University and was conducted as part of a minor thesis for a masters degree of education, conducted by Paul Warner.

*Student evaluation of placement experience*

For the second part of the study we developed a simple questionnaire for students on a one day placement to determine their attitudes to this type of placement and what they perceived as having learned from the experience. The main criteria for the placement in the diabetes complications screening programme were to develop skills in physical and ECG assessment. All students were allocated to the three-lead ECG stations where they had to address a number of aspects associated with clinical practice such as communication, identifying patient concerns, understand the patient file and make decisions whether the test could or should be carried out. Finally, students were asked to identify any anomalies they observed in the rhythm strip and discuss these with the clinical educators available. The questions were:

1. Have you had any professional health care experience before starting your university course? If yes above, what did you do?
2. Describe the most interesting/relevant experience you gained during your placement with the diabetes complications screening.
3. Has your participation in the diabetes complications clinic helped you clarify your understanding of the role of your profession within diabetes health care? If yes above, elaborate please.
4. Describe the most irrelevant experience you gained during your placement at the diabetes complications screening?
5. Did you have an opportunity to participate in other tests apart from those pertaining to your course? If yes, describe your experience and if you think this is useful for your professional development.

Ethics approval for this research was provided by the Ethics Committee, Charles Sturt University

**Results**

Of the original cohort of registered nurses selected, 26 returned their questionnaires, a response rate of 86.7%. Or results strongly identified with the presence of a theory practice gap in nursing and 100% of informants thought the presence of such a gap effected patient care. More than half of the participants thought that universities were to blame for the presence of a theory practice gap and only 8% thought that university lecturers should not have to undertake clinical practice as part of their work. Participants generally agreed that the more clinical placement students received the better, with 88% believing that the type of placement that a student undertook impacted on their clinical skill development.
All 16 students responded to the questionnaire. Previous health care experience was reported by 44%, with enrolled nurses being the most common. 69% had opportunity to participate in the 12-lead ECG screening (n=11), the reminder reported being too busy with the 3-lead ECG screening or concentrated on podiatry (n=2), eye (n=2) or blood pressure (n=1) screening. The placement experience clarified the role of health professionals in diabetes health care as well as diabetes as a chronic illness for 63% of respondents. The remainder reported that they were not rotated enough during the placement (n=1), obtained this experience in their current employment (n=1) or did not respond to the question. Responses were overall positive, with the main concern to be addressed being the waiting time between patients. The most significant results were that students perceived that the clinic emphasised material dealt with in lectures and provided a novel clinical setting that required communication and diagnostic skills as well as technical expertise.

Discussion

The theory practice gap
Our responses to attitudes of placement and the theory practice gap were obtained primarily from acute care registered nurses. The high return rate of questionnaires may well be attributed to the concern these nurses felt as to the clinical preparation of students by universities. Clinical placements are designed to help student nurses incorporate theory into practice. These placements need to match theory taught in the classroom and consequently placement opportunities need to be diverse, incorporating acute medical surgical, mental health, child and family health, aged care, disabilities and community health. In response to an identified gap between the expectations of academia and the profession, some commentators propose that academics should be obligated to work both as a clinician and academics, the argument being that academics with clinical responsibility will have a greater understanding of the needs of their students (Colley, 2003; Fealy, 1999). Certainly at CSU-Albury, the nursing academics maintain clinical contact and in addition some of the subjects are taught in part by visiting registered nurses with expertise in defined areas that are currently clinically engaged. This model provides up-to-date feedback from clinicians in terms of course content and requirements in the field. Clinical placement opportunities is another widely discussed issue in the academic literature, with authors engaging in commentary about both the availability, quality and cost of facilitating clinical placement for undergraduate nursing students (Chang & Daly, 2001). Providing the diabetes complications screening allows for an additional placement and also control over quality and content. The clinic is staffed by academics as well as nurses currently practicing and includes a diabetes educator and cardiac nurse specialist. In addition the clinic also incorporated health care professionals from podiatry and occupational therapy. Graduate nurses do not just work in hospitals, they do not need to have an extensive knowledge of a particular pathophysiology, but rather need the skills and inclination to be life long learners with the ability to interrogate data bases, research new and evolving health care priorities and generic assessment skills that ensure patients in their care are safe.

In an attempt to address the issue of clinical preparation for undergraduate student nurses and the ongoing problem of securing high value clinical experiences for our students we are currently trialing the incorporation of second and third year nursing students in a research project being undertaken by the community of scholars at Charles Sturt University in rural New South Wales (NSW). This research involves the collection of both demographic and clinical data from both diabetic and non-diabetic community members and the nurses are used in both data acquisition (clinical assessment) and data interpretation. It is hoped by investigating innovative clinical practice for undergraduate student nurses we may better prepare them for clinical practice in diverse health care facilities, including acute clinical placement and go some way to alleviate the anxiety of our clinician colleagues (Kalischuk & Thorpe, 2002).

Student feedback
Providing student placement in a large multidisciplinary screening programme provides unique opportunities for students to develop diverse clinical skills. As our clinic also has a large research component incorporated, students become aware of research questions as they relate to the nursing
profession. More importantly the presence of graduate research students allowed students on placement to discuss issues at a peer level, that generated not only interest in the research topic but provided a basis for understanding the nexus between good nursing practice and research. The main draw back of the current placement programme is the time between patients. This is an organisational issue related to the format of the screening programme, which at the moment has four screening sessions per year, rather than weekly sessions with fewer patients per day. This latter change in the format will allow nursing students to follow individual patients through the screening. The majority of students found the placement experience informative, and one that provided opportunities to develop existing skills as well as learn new ones.

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References

Are you “teaching active”? If not, why not?

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As academics we are required to prove to our Heads of Schools that we are teaching active in order not to lose a percentage of recurrent funding. For Schools, the target for teaching performance is that 50% of permanent academic staff meet the University’s criteria for continuing professional development in teaching. If this target is met, then the 7.5% funding available in relation to teaching will be made available to the School. It may seem incongruous that only 50% of academics with teaching responsibilities are required in any School to meet the target – and the question arises: What are the other 50% doing? This project will examine academics’ perception of the teaching active model and propose recommendations to improve the method by which we ensure the quality of our teaching and learning.

In 2004 the University implemented Performance Based Funding (PBF) based on teaching active criteria which are designed to enhance the quality of teaching within the University. The criteria academics can use to satisfy the model are surveys of teaching, the teaching portfolio, university learning and teaching courses, classroom design and critique, peer review, learning media laboratory projects, successful scholarship in teaching fund applications and being in the role of chair of a teaching development committee.

When examining the effectiveness of the types of criteria being used by staff it is important, for quality assurance, to ensure they achieve the desired outcome of improved teaching. However there is limited literature available on the actual improvements to teaching as a result of these types of activities. There is a great wealth of literature available on Student Evaluations of Teaching (SET) but this research concentrates on the reliability and variability of evaluations (e.g., Marsh 1987; Centra 2003; Harrison et al. 2004) and how they can used for summative evaluation (Braskamp and Ory, 1994). Literature relating to how they actually improve teaching is scarce. There is some research on the process of using student ratings to improve teaching (Wilkerson and Irby, 1998; Theall, 1991) but again this does not evaluate the SET themselves as a mechanism for improving teaching.

Similarly, while much information on portfolio development (e.g., Seldin, 1991; Reece et al., 2001), and to a lesser extent portfolio peer review (Quinlan 2002; Centra 2000) exists, apart from one study by Centra (1994) there is little research on a portfolio’s effectiveness on improving teaching (Burns 2000). The disparity between research on process and effectiveness is also seen in the literature on peer review where most of the research is focused on process (e.g., Morehead 1997) although some research on the perception of academics on peer review was completed by Keig (2000). However Keig (2000) investigated the perceptions of academics to a proposed peer review process, not the perceptions of an existing process such as will be the case at CSU.

The literature that does exist on the effect of teaching activities is limited to that by Marsh (1987), Brinko (1993) and Marsh and Roche (1997) who found SET questionnaires can have an effect on academic performance but that improvement is only evident when augmented by relevant consultation about how to use the SET (Marsh 1987). This is particularly relevant to CSU as there is currently no requirement for academics to seek assistance when interpreting SET. Despite these few investigations,
overall the effectiveness of such methods has not been systematically evaluated and much of the evidence is anecdotal, impressionistic or speculative rather than empirical (Lucal, 2003).

Of the remaining criteria included in the PBF model (i.e. university learning and teaching courses, classroom design and critique, learning media laboratory projects, successful scholarship in teaching fund applications and being in the role of chair of a teaching development committee) there is almost no research on either how academics perceive these as effective or their actual effectiveness in the classroom, or why they choose involvement in some criteria but not others. Further, with the exception of one study on the effectiveness of workshops on teaching effectiveness of graduate teachers (Shannon et al. 1998), there is no research on how these improve teaching in higher education.

In addition, the research on the perception of academics to the effectiveness of such activities on their own teaching is limited to reports by Schmelkin (1997) and Casey (1997) on SETs. The perception of academics of such activities is important because the extent to which academics participate is heavily dependent on whether academics view the activity as solely for summative (promotion, probation, funding etc) or formative purposes (reflective improvement) (Schmelkin, 1997). Here, we evaluated whether academics are undertaking the new activities as a result of a genuine desire to improve their teaching or as a result of a desire just to qualify as teaching active.

Therefore, the research described here is an evaluation of the success of the model by determining academics’ perceptions of the activities they choose to participate in, and whether, as a result of the model, they feel that they are more able to undertake teaching and learning scholarship. Through a series of focus group discussions and questionnaires, academics from a wide range of disciplines and level of experience in the scholarship of teaching and learning presented their views of the model, and those of teaching and learning scholarship.

References


