

MAKING ENDS MEET? POSSIBILITIES FOR TEACHER EDUCATION

Angela M. Hill and Gail Mackay

James Cook University, Australia

During the first part of 2000, two newly appointed lecturers at James Cook University Queensland, Australia, designed and delivered a subject Managing Teaching and Learning using problem-based learning. This paper discusses the reality of developing problem-based learning with limited funding, limited contact time with students, and large classes. It describes the interaction between experiential learning and mass teaching sessions based on authentic scenarios to assist students to move from practice to theory and reviews the usefulness of interactive internet software - Webboard - to support students' learning. The paper concludes with the major issues and learning from the implementation and evaluation of the subject.

INTRODUCTION

James Cook University is a small regional Australian university of approximately 12,000 students with campuses in the Queensland cities of Townsville, Cairns and Mackay. The problem-based learning project described in this paper developed on the Townsville campus. Townsville and its twin city of Thuringowa have a population of approximately 140,000. However, the campus also draws students from rural towns within a 200km radius, as well as a small number of more remote centres, including major mining towns. The area is distinguished by its relatively low participation rate in tertiary education (approximately 22% compared to the national average of around 30%). Almost 5% of the student population are indigenous Australians who, in common with a relatively high percentage of students, come from families where they are the first to experience university education. The University also attracts international students.

James Cook is a relatively young university and is still developing some of the traditional areas, for example, a medical school opened in 2000. This has important implications for the resources available to the School of Education, given the relative funding model introduced in the early 1990's to fund universities in Australia. The model calculates the relative cost for the delivery of courses across disciplines and across degree levels. This was a one-off adjustment to what was seen as an inequitable situation where the relative funding base of institutions varied by up to 35%. All disciplines were "banded" and given a weighting of

costs relative to the lowest band using a teaching component and a research component. Together the two components were used to calculate the relative weightings. Undergraduate courses in Arts, Commerce, etc. were placed in Band 1; more expensive courses and levels of study in Bands 2 & 3, with higher weightings. The higher bands were for disciplines such as Science, Dentistry, Medicine, etc. In addition, weightings were added for the type of degree from undergraduate through to postgraduate coursework, and finally postgraduate research degrees. The model was designed to be used at the highest level of funding, that is, to distribute funds across the entire higher education sector. However, most institutions in Australia have developed hybrid versions to distribute their operating grants internally.

The application of the model has caused several problems for the School of Education at James Cook University. It should be emphasised that the model made a 'one-off' adjustment to funding in 1990. Since the inception of the model, the general profile of students at James Cook University has changed. In the early 90's there was a high proportion of students in Level 1 disciplines such as Arts/Education. However the balance of the profile has now shifted towards the "expensive" Science/Medicine/Pharmacy students. From an overall point of view, the average weighting for JCU has risen from about 1.5 to approximate 1.7. This has meant that, with no increase in funding coming into the University, there has been a diversion of funding away from Education with the net result of larger classes, higher teaching load and reduced resources generally. For Education to receive a larger slice of the University's funding, there has to be either an increase in the total student load or the weightings for the discipline have to be increased. The latter is problematic, as it has to be achieved in the competitive climate of University budgeting and at the expense of other faculties. The former exacerbates the problem of large classes, increased teaching load and scarce resources.

PROBLEM-BASED LEARNING PROJECT

It is in this context of restricted funding that the problem-based learning project was developed in the School of Education as part of a new subject, *Managing Teaching and Learning*. The subject was introduced as a compulsory subject in a revised four-year degree program, which prepares teachers for all sectors of schooling - early childhood, primary and secondary.

Managing Teaching and Learning has been included in response to a review of the program and concerns that the nexus between theory and practice was not apparent to students or to practising teachers. It was determined that this nexus could be best explored using a problem-based approach to move from practice to theory rather than the traditional method of studying theory and then looking at its application in practice. In addition, the introduction of a new subject provided a more suitable seed bed for a new approach than trying to embed it in an existing subject. This approach was also congruent with the philosophies of the two lecturers appointed to teach the subject. The result has been one year of exploration of possibilities, some successes and considerable learning.

Two lecturers, each part-time, teach the subject *Managing Teaching and Learning* to over 250 students. The demographics of the student population can be summarised as follows:

- 80% are completing their first undergraduate degree, and are around 19-20 years of age
- 10% are completing their second degree, and most are aged between 25-30

- 10% are mature students (mostly women) completing their first degree
- 1% of the students are Indigenous
- 1% are students from non-English speaking backgrounds
- 25% men and 75% women
- 0.5% are students with disabilities

Many of the students are supporting themselves through university or have other commitments, for example, family responsibilities. Most of the students have a history of traditional models of teaching and learning. Some students have access to computer technology at home but a large number rely on the relatively scarce university facilities. The contact time available for this subject comprised two hours of lectures and one hour of tutorials. No assistance is provided to the lecturers aside from some technical assistance with the technology used.

TEACHER EDUCATION AND PROBLEM-BASED LEARNING

Within the Australian higher education environment, there is increasing pressure to focus on the development of 'generic' lifelong learning skills (Burns, 1995). While the background and emphasis on the development of these skills is embedded in deficit discourses of graduates' preparedness for the world of work, education processes that emphasise higher order thinking and team work are increasingly valued, and explicit within a problem solving approach (Woods, 1994).

Many traditional teacher education programs, however, continue to reflect the 'application of theory model' (Korthagen & Kessels, 1999). Providing often fragmented slices of well-worn knowledge in both psychology and sociology, the pedagogy of many teacher education programs reflects the era of 'teacher as expert knower' transmitting to student teachers with occasional relationship to similarly fragmented experiences in professional settings (Hoban, 1999; Ben-Peretz, 1995).

Given the emphasis and dominance in recent years of theories of 'constructivism' in the education field (Maddux & Cummings, 1999), it remains paradoxical that teacher education programs continue to utilize frameworks of teaching and learning most quickly equated with 'transmission' methods. Most often, teacher education programs begin with theory and move to practice (Carlson, 1999) often leaving the graduate feeling underprepared for the life of classrooms and unclear as to how to apply their university-acquired knowledge to their professional life (Kiggins & Ferry, 1999).

In many countries this negative experience has led to the decline in institutional-based teacher education courses and a trend towards school-based programs (Korthagen & Kessels, 1999). However, in Australia, teacher education continues to be based in universities. Australian examples of context and problem-based pedagogies are apparent across a range of university courses, particularly in the health area, with notable examples in Medicine and Architecture at Newcastle University. Teacher education programs with a central focus on problem-based learning are few. In 1999, the University of Wollongong embarked on a pilot program for 22 students, designed around a 'knowledge-based community' approach involving school-based learning, community learning and problem-based learning (Kiggins & Ferry, 1999).

With large student numbers and low relative funding, it may be argued that teacher education programmes are more difficult to translate to problem-based learning or other more context based forms of learning. However, if the aim is to explore how to better integrate theory and practice, opportunities for at least some component of problem-based learning are apparent. Given the review of graduates' anxieties in the early years of their careers (MACQT, 1998) there appears to be sufficient imperative.

The development of a social constructivist approach grounded in the 'world of practice' (Carlson, 1999) creates opportunities for dialogue among students, and the development of problem solving strands becomes a real possibility. Focusing on authentic scenarios and real world problems, however, requires a substantial shift in course organisation. As Gordon (1998) indicates, "real world problems, by their nature, are messy- involving uncertainty, complexity and judgement" and they "don't often mesh well withtextbooks". Authentic scenarios contain interconnected and integrated knowledge and skills, and as such place significant demands on the work of instructors and students.

Gordon (1998) describes a series of teaching phases to guide the participants through authentic scenarios. By using an 'experiential learning cycle' of inquiry, reflection and question generation, and the careful design and scaffolding of authentic scenarios, students are encouraged to be active constructors of experiences. Gradually the role of the teacher diminishes as students become more self directed and generative of their own questions and patterns of exploration. The problem-based learning project attempted in the subject *Managing Teaching and Learning* explores the possibility of a reflective framework grounded in the experiences of students in schools and authentic case studies.

Subject Overview

Managing Teaching and Learning incorporates problem-solving processes throughout the subject, occurring in parallel with experience-based learning within the practical component. An overview of the subject components is provided below.

The subject aims to assist students to develop a theoretical framework to guide and link to their initial teaching practice. It is designed to facilitate the transfer of theoretical knowledge to practice and explores authentic scenarios of classroom teaching practice to unpack theoretical underpinnings, focusing on the understanding of behaviourist, constructivist, and multiple intelligence frameworks. Such an approach requires an emphasis on active learning in general and on discussion in particular. This is at odds with the large group size and limited contact time with which the authors were confronted.

To assist discussion amongst students and lecturers, the authors promote the use of an interactive technology, WEBBOARD. This internet-based software enables student groups to have wide-ranging discussions in virtual or real time, and post messages to each other. The software is also used by the subject coordinators to post lecture notes and messages to the students and by students in ongoing evaluations and across-subject discussions. The use of WEBBOARD also fulfills a commitment to develop student skills in information technology.

Managing Teaching and Learning consists of a number of integrated components as described in Table 1.

Table 1
Subject Components

Component	Group size	Time allocation per week	Problem-Based Learning %
Lectures	250	2 hours	50%
Tutorials	22	1 hour	50%
Practicum in school setting	4 (approx.)	3 hours per week	Variable
Group project, including accessing webboard	5-8	2-6 hours per week	100%
Individual lesson plan assignment	1		100%
End of subject exam			50%

Subject Outcomes:

On completion of the subject it is expected that students will be able to:

- Identify tensions and challenges in simultaneously addressing the needs of individual learners, the school and the education system
- Plan, develop and critically evaluate learning experiences, drawing on both theoretical perspectives and observation of practice
- Identify a range of strategies for developing and managing appropriate learning environments, including the use of information technologies
- Identify a range of school and community resources to support learners/ needs
- Work cooperatively with peers to plan, develop and review the success of learning and teaching programs
- Present information in the appropriate genre with particular attention to audience and presentation style
- Demonstrate developing beliefs about teaching and learning

The syllabus is designed to promote active engagement with theories of effective teaching and learning and also to involve students in exploration of some of the problems, which they would probably confront during their school experience. A key consideration is the need to stretch students and move them out of their comfort zones so that they question concepts which they had developed through past experiences.

Although the syllabus was designed around five strands (learners, the planning process, teacher/student role, the learning environment, ensuring learning) students are continually confronted with the 'messiness' of teaching and the ways in which the strands influence and reinforce each other. They are also encouraged to consider multiple realities and multiple solutions to the problems posed.

The first two weeks of the subject are designed to provide an introduction to problem-based learning. This is completed by providing an overview of the process and by lecturers modelling the PBL process in action using authentic classroom video scenarios or short case

studies. This introductory phase developed with the knowledge that students had participated actively in group processes in previous subjects, and had developed skills in group work, if not in problem solving processes.

The syllabus is developed to introduce students to micro exchanges in the classroom, gradually moving to macro issues of unit planning and school policy documents. During the introductory phase, the students are also encouraged to develop their observation skills, the first key step in the problem-based learning model adopted. Tutorials are utilised to allow students to continue to explore the scenarios from lectures, trial cooperative learning strategies as well as explore their experiences within the practicum component of the subject.

REVIEWING POSSIBILITIES

In the first semester of the subject's delivery, a number of issues were highlighted through evaluation processes. The processes included a formal University review of the lecturers' performance (James Cook University Evaluation of Teaching-JCET), a student focus group review of the subject, review of the school experience by the school-based teacher educators and an examination of WEBBOARD exchanges.

A summary of key indicators related to the problem solving process from the JCET evaluation is provided below in Table 2.

Table 2
Key Indicators from JCET Evaluation
(Scale 1-6)

Indicator	Score	Range
Workload	4.809	1(low) -6 (too high)
Students challenged to think	4.597	1 (very little)-6(a great deal)
Integration of subject components	3.952	1(very poorly)-6(very well)
Relevance of subject material	5.014	1(very irrelevant)-6(very relevant)

Contact Time

Despite the use of the interactive software, WEBBOARD, many students indicated the need to meet extensively face to face in order to complete the requirements of the group project. While the interactive software was used regularly by students for the duration of the program, issues of access to technology were critical to the success of the problem-based learning process. The combination of limited laboratory access within the University, and the complex reality of students' lives, revealed tensions within small group and whole subject processes.

The lecturers had established 'closed' conferences for each group project, allowing group members extensive exchanges in preparation for their project. The support these exchanges provided to the problem solving process varied across groups, depending on both their experience with group processes and their access and comfort level with the technology.

As with many problems-based learning experiences, students noted the demanding workload, as they juggled lecture and tutorial times, weekly school experiences and the requirements of group and individual assessment incorporating problem solving processes. The 'workload' indicator from the JCET evaluation highlighted this pressure, with a mean of 4.808.

Interaction With Experiential Learning

'Open' conferences for all students were established to enable students to provide continual feedback on the learning processes, including exploration of their practical experience within a school setting. These conferences were used extensively by students (often there were more than 80 students logged on at any one time) to review practical experiences as well as lecture material. There were many substantial conversations between students in relation to their school experiences, and as the subject progressed, the conversations developed to reveal more interest in theoretical frameworks to interpret school experiences, and more respectful and collegial interactions. In addition, the evaluations conducted indicated that students had attempted to explore a range of possibilities in the school setting as they planned lessons for various learners. However, limited tutorial time and contact with lecturers allowed very limited real support for students as they progressed through their school experiences. A major recommendation following this first semester of delivery is the extension of tutorial time, to allow the meaningful exploration of school experiences within a problem-based learning framework.

Large Groups

The large group lecture encounters were an area of constant concern to lecturers. Utilising active learning strategies consistent with a problem-based learning approach, lecturers trialed a range of strategies to engage student with the scenarios presented. These strategies included students pairing and generating questions to present to the rest of the lecture; students creating dialogues in response to the scenarios developed; and ranking exercises.

In general, the response to these active learning strategies was more positive than expected. Given the previous learning experiences of most of the students, the transition to more active and constructivist forms of teaching required considerable adaptation. A constant tension for the lecturers was juggling the amount of imposed versus constructed knowledge within the lecture setting. Formal evaluation revealed students felt they were "challenged to think" - a key aim in problem-based learning programs, but allowing a large group to take more initiative in the learning process is a stressful exercise in a large group setting, especially for the lecturers. This will be a key skill for the lecturers to develop in future subject delivery.

CONCLUSION

The problem-based learning project attempted in *Managing Teaching and Learning* confirmed Korthagen and Kessels' (1999) contention that learning 'theory' within a problem-based learning framework requires a reconceptualisation of the practice/theory nexus. The project has revealed some possibilities, particularly for the use of technology in increasing contact and conversations in large group settings where regimes of restricted funding are unlikely to change. It has led to experimentation with a range of teaching approaches and to the possibility of the development of a CD of authentic teaching scenarios appropriate to the North Queensland context. Conversely, it has exposed the difficulty of exploring a different

approach to learning within one subject in a four-year course and of challenging students' preconceived ideas of what constitutes 'good' university teaching and suitable expectations of students, both in workload and performance. However, the growth of students observed as the subject progressed and incipient conversations within the School of Education about the possibilities of problem-based learning have strengthened the resolve of the lecturers to continue to explore ways of developing the approach within the constraints imposed by large groups and limited funding.

REFERENCES

- Ben-Peretz, M.(1995). Curriculum of teacher education programs. In L. Anderson (Ed.), *International Encyclopedia Of Teaching And Teacher Education*. Oxford: Elsevier Science.
- Burns, R. (1995). *The Adult Learner at Work: a comprehensive guide to the context, psychology and methods of learning for the workplace*. Chatswood: Business and Professional Publishing,.
- Carlson, H. (1999). From Practice to Theory: a social constructivist approach to teacher education. *Teachers and Teaching: theory and practice*, 5 (2), 203-218.
- Gordon, R. (1998). Balancing Real-World Problems with Real-World Results. *Phi Delta Kappan*, 79 (5), 390-393.
- Hoban, G. (1999). Using a meta-cognitive framework to guide experiential learning in teacher education classes. *Journal of Experiential Education*, in press.
- Kiggins, J., & Ferry, J. (1999). *Towards authentic context based learning in teacher education: the Knowledge Building Community Project*. www.hersda.org.au/vic/cornerstones/abstracts.
- Korthagen, F., & Kessels, J. (1999). Linking Theory and Practice: Changing the Pedagogy of Teacher Education. *Educational Researcher*, May, 4-17.
- MACQT (1998). *Teacher preparation for student management: Responses and Directions. Report by Ministerial Advisory Council on the Quality of Teaching*, NSW Department of Education and Training, Sydney.
- Maddux, C., & Cummings. (1999). Constructivism: Has the Term Outlived Its Usefulness. *Computers in the Schools*, 15, (3/4), 5-20.
- Woods, D. (1994). *Problem-Based Learning. Helping your students gain the most from PBL*. Buffalo: Waterdown.