From online enhanced to wholly online: Reflections on e-learning developments in teaching psychology

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Deakin University has determined that every undergraduate student enrolled from 2004 will undertake at least one unit wholly online, without the usual face to face teaching that is a major component in on campus study. In response to this policy, *Research methods in psychology* has been developed as a wholly online unit and offered in 2004 as one of the first wholly online units to be run in the University. The design of the unit builds on the development and use of digital media and online technologies in teaching first and second year units. This paper outlines the antecedents of the unit's design and operation, along with its current wholly online teaching and learning environment. The relationship between the use of digital resources and online features is mapped against key concepts and skills to be mastered in the unit. Distinctive student attributes to be developed in relation to the subject being offered wholly online are considered. The move to new e-learning territories of wholly online environments raises important research questions. An approach to researching wholly online teaching and learning environments in the discipline of psychology is detailed as a response to illuminating key dimensions of a significant development in e-learning in higher education.

Key words: Wholly online, psychology, e-learning, education design, learning management systems, life long learning, graduate attributes

Introduction

A watershed has been reached at Deakin University in relation to organisational commitment to major new developments in online teaching and learning. Beyond the requirement for a basic online presence for every undergraduate unit offered by the University in a new learning management system, ambitious plans have been determined relating to more elaborate use of digital media and online technologies in what have been called extended and wholly online environments. With every undergraduate student enrolled in the University required to take a wholly online unit to enhance their lifelong learning capacities, a raft of new wholly online units have been designated for offer over 2004-2006.

The rationale for this move relates to one of Deakin University's three core commitments informing its strategic positioning within the higher education sector, that is continuing education and life long learning (see Strategic Plan: Taking Deakin University Forward 2004). This commitment in turn relates to one of the graduate attributes shaping curriculum development at the undergraduate level within the University: a capacity for lifelong learning and an appreciation of its necessity. Information literacy, information technology literacy and personal management skills can be seen, for example, as constituent capacities underlying the development of lifelong learning capabilities. In an increasingly virtual, networked, global world of work, being able to contribute productively and learn perpetually become crucial, with much of this learning taking place collaboratively in online professional development and training environments. Hence, the commitment to offering wholly online units is premised on a concomitant commitment to providing distinctive virtual teaching and learning environments that are designed and operated to foster lifelong learning capacities in undergraduate students, including those studying on campus. These capacities also involve the ability to articulate and reflect on the experiences of learning online. The gradual progress of academic teaching staff and other support parties towards the use of basic and extended online environments, has now been accelerated for some by the need for selecting, developing and operating wholly online units as part of their overall course and major offerings. The idea of replacing

face to face contact with digital and online interaction presents significant challenges for staff and students in their approaches to teaching and learning.

This paper is a case study of the design and delivery of one of the first wholly online units in action at Deakin University. The design foundations of this unit, *Research Methods in Psychology*, were laid in previous work in developing online enhanced Resource Based Learning (RBL) in first year psychology. This antecedent work is outlined and related to the new wholly online unit development. The relationships between curriculum, pedagogy, assessment and the new digital media/online technology mix are described for the *Research Methods in Psychology* unit along with the contentious debate about the distinctive nature of a wholly online learning experience. The paper concludes by proposing an approach to permit a better understanding of the realities of the online learning experience as it relates to disciplinary concerns by drawing on recent work undertaken by the United Kingdom, Teaching and Learning Research Programme Enhancing Teaching Learning Environments in Undergraduate Courses initiative.

Contemporary learning environments in higher education

Nationally and internationally, learning environments in higher education institutions are being increasingly challenged by the uptake of e-learning opportunities. The United Kingdom e-Learning Centre's *Guide to e-Learning* identifies three ways of implementing technology in higher education courses: "using the technology to support or supplement a traditional course", "integrating technology into a traditional course" or "delivering a course completely online"(See website, 1-2-1). The latter entails managing and supporting students throughout the semester as they engage with content and communicate online. However, even with this model the e-Learning Centre recommended that "the course should ideally not be 100% online - there should also be some face to face activities - for example an initial, induction period, or study weekends"(See website, 1-2-4).

Institutions are at various points on the continuum of implementing more contemporary learning environments incorporating e-learning. For example, Souleles (2004) studied trends in higher education institutions in the United Kingdom. He noted that most institutions are in the early stages of implementing virtual learning environments and teaching methods have not changed significantly with their introduction. In Briefing Paper 34 from the European Commission, Frutos (2000) discussed the *emergent* nature of virtual campuses and noted that virtual learning environments tend to be used in conjunction with other forms of study rather than as stand alone offerings.

Studying online is more advanced in some institutions. In particular, well established distance education (DE) institutions have been incorporating online learning in their offerings for many years. (e.g. Open University, UK; Athabasca University, Canada; Deakin University, University of New England, University of Southern Queensland, University of South Australia, Murdoch University, Australia.) DE institutions and others have contributed significantly to the body of knowledge about distance and online learning. Athabasca University for instance has produced the widely used, comprehensive book, *Theory and Practice of Online Learning*. Taylor (2001, p. 21) pointed to the need for a new delivery model called the Intelligent Flexible Learning Model which includes not only flexibility of time, place and pace, but also "highly refined materials", "advanced interactive delivery" and "institutional variable costs approaching zero".

At some institutions, it is possible to study whole degree courses fully online, or complete postgraduate training programs online. It is also possible to complete selected degree units wholly online, but these are more likely to be undertaken by students studying off campus. Such units may or may not be supplemented with print materials. As Caplan (2004) points out, definitions of what constitutes an online course vary from text based online enhanced courses to "open, distributed, dynamic, globally accessible, filtered, interactive" courses (p.178). Opportunities for on campus students to study online are available, but are generally part of a blended environment that includes face to face classes. Many recent conference and journal publications report work that focuses on these types of learning environments. (See for example Dalgarno & Harper, 2004; Herrington, Oliver & Reeves, 2003; Lefoe, Gunn & Hedberg, 2002; Oliver & McLoughlin, 2001; Peat, Franklin & Sims, 2002.) The point of difference in respect to Deakin is that studying a unit wholly online is mandated for all students at some time.

Segrave and Holt (2003) explored the changing nature of contemporary teaching and learning environments for excellence in professional education in higher education. Moves towards teaching and learning online are examined critically in this light. Segrave and Holt (2003, p.9) see contemporary learning environments as, "highly integrative, giving attention not only to integrating all of the needed/selected online functions (available in a learning management system, for example), but also to the integration of such virtual and physical aspects of the environment". In reporting research conducted on online enhanced Resource Based Learning (RBL) in first year psychology, Armatas, Holt and Rice (2003) cite the most recent review of higher education in Australia and its observations about the changing nature of the student population and concomitantly the changing nature of learning environments best able to support quality learning in the changing circumstances (see Issues Paper, Striving for quality: learning, teaching and scholarship, *Higher Education at the Crossroads: A Review of Australian Higher Education*, 2002, p.5). In this light, wholly online units in the Deakin context, with their absence of any form of face to face teaching, represent a new development in the emergence of contemporary learning environments in higher education nationally and internationally. (See Dodds, 2004.) The comforts of designing blended environments combining face to face teaching with digital and online enhancements are removed for on campus student cohorts. Similarly, the comfort of providing highly refined sets of printed study and reading materials for off campus students is also removed with demands for more of such material to be delivered digitally. Wholly online units have all of the attendant issues of the best ways for academic teachers to approach the design and operation of such environments. The move from blended to selected wholly online learning environments is arguably one of the leading edge, albeit not necessarily unproblematic, developments in contemporary learning experiences for on campus students in higher education.

Discomforts of moving from online enhanced to wholly online teaching and learning

The antecedents to the development of the wholly online unit, *Research Methods in Psychology* lie, first, in the development of a virtual multimedia laboratory environment in first year psychology between 1996-2000, and, second, in the adoption of an online enhanced Resource Based Learning (RBL) environment using a learning management system again in first year psychology between 2000-2002. These developments are reported in Armatas (2001), Holt, Rice and Armatas (2002), Holt, Rice and Armatas (2003) and Armatas, Holt and Rice (2003). In line with work by Holt and Segrave (2003) identifying areas of potential enduring teaching and learning value in the use of new e-learning technologies, first year psychology online developments provided benefits in:

- sharing a broader array of digital learning resources;
- providing an environment for forms of multimedia based laboratory simulations;
- opening up learning environments to the contributions of parties beyond those staff directly involved in teaching the unit;
- creating opportunities for students to interact with each other and teaching staff within a broader notion of a community of learners;
- offering options for the customisation and personalisation of learning experiences;
- applying action research to the design and delivery of the online learning environments in response to ongoing development, review and prototyping of such an environment based on various sources of feedback.

Central to the benefits of working with more responsive online teaching and learning environments has been the potential re-assertion of academic teacher agency in working with and developing these environments. Academics can have more control over development processes and more flexibility in the timing of delivery compared with traditional ways of developing off campus materials. As will be discussed below, this becomes more critical when designing and operating *wholly* online environments.

Creating wholly online units challenges traditional notions of the various "categories" of learning from the on campus, lecture/tutorial/seminar/laboratory based experience to the on campus e-moderated, digital media on demand experience. In thinking about the design of wholly online environments, there is a need to invoke a new vocabulary for a new era of contemporary learning environment development. This new vocabulary can assist teaching staff to design and work within online environments that are inclusive of

the different modes of learning and which convey something of the new sense of the e-teaching and e-learning community.

The University's directions in e-learning are set out in the "Deakin Online" Management Plan 2003-2007. (See Deakin University, 2003.) In the plan, a wholly online unit is defined as follows:

- These units will have all teaching resources and undertake all teaching online including: All content (either commercial print based text books or e-texts may be used as supplementary material), all communication and interaction with students, and all assignment submission and feedback.
- Examinations will move online when the university is administratively ready
- Each unit will have at least ONE session of interactive communication (synchronous/asynchronous, or both) between teacher and students online at least weekly or as established at the beginning of the course. Such interactive sessions will have an assessable component where appropriate.
- To ensure access for all students until bandwidth issues in Australia are addressed, additional resources such as video and audio will be provided on CD ROMS for off campus students where appropriate (This will be reviewed annually) (p.9)

It should be noted that exemptions to the requirement to study a unit wholly online may be given by the Chair of Academic Board in special cases where physical location, disability or particular enrolment circumstances make it impossible to meet the requirement.

At this stage, up to 30 units are being planned for wholly online development across all faculties. For most staff currently wrestling with the design and management of more elaborate uses of digital media and online environments, which in many cases are related to various forms of in person classroom teaching, the additional challenge of considering almost wholly online based environments has created much debate and discomfort. This debate includes the most appropriate types of existing units to offer online, and where none are readily apparent, what new types of units might be developed. For example, new units in wholly online form, are being developed in Arts: *Sex, Crime and Social Justice in the Electronic Age*, and *Advertising: Designing Desires* both with an Internet focus. There has been much soul searching about the efficacy of offering wholly online units to first year students, given the multiple demands on them to negotiate the transition to tertiary education, and the placement and rationale of such units in the overall context of course level curriculum design. Some of the existing comfort and confidence about the best ways of working with basic and extended online environments has given way to new critical design challenges. These include issues to do with potentially large numbers of students, irrespective of primary mode of study and location, undertaking most of their learning with digital resources and in online environments, without more traditional forms of teaching. Designing and operating wholly online learning environments requires a recognition of the changing role of the academic teacher in higher education, who now becomes not only a designer of the learning environment and facilitator of its use, but an evaluator of its impacts and an innovator in its ongoing development. This wider role inevitably places staff beyond their comfort zone. In this role, relationships with students and others critical in the educational experience; and with discipline knowledge and know how, are essential to the educational enterprise.

## Mapping the wholly online learning environment

Research Methods in Psychology is a second year unit offered by the School of Psychology, Faculty of Health and Behavioural Sciences at Deakin University. It is a compulsory subject for students who wish to major in psychology for the purposes of gaining registration with the Australian Psychological Society (APS). The unit aims to introduce students to important research methods and statistical techniques used in the scientific study of psychology. A two pronged teaching strategy is used to achieve this aim. First, students are provided with an introduction to the methods used in psychology (e.g., observational methods, and experimental methods) and the statistical techniques used to analyse the data gathered using these techniques. Second, by way of practical/laboratory sessions, the unit gives students first hand experience in conducting research and analysing and reporting findings of this research.

The unit is a challenging one; the workload is heavy and many students find the subject matter (research methods and statistics) difficult. It assumes and builds on knowledge of statistical techniques studied in first year psychology. One of the key requirements is for students to use the computer package called

SPSS (the Statistical Package for the Social Sciences) for statistical analyses. The main challenges of learning and teaching the unit are outlined by Armatas (2003) in a case study of her work as a Deakin University Online Teaching and Learning Fellow during 2003:

> It's taught in both on and off-campus modes… runs off-campus in semester one, then both on- and off-campus students in semester two…it is a challenging unit… mainly because many of them …don't come into university with strong maths skills, so they find the learning of statistics quite challenging… they not only have to deal with mastering complex statistical tests and concepts about experimental design and ethics, but they also have to learn to use a computer package for statistical analyses. So what tends to happen is that…you have students learning about the statistical tests then they learn the package…they don't see how the two things relate, and you get this disassociation between…the tools and the methods which is not ideal.

The key learning resources and online features of the unit are illustrated in Figure 1.
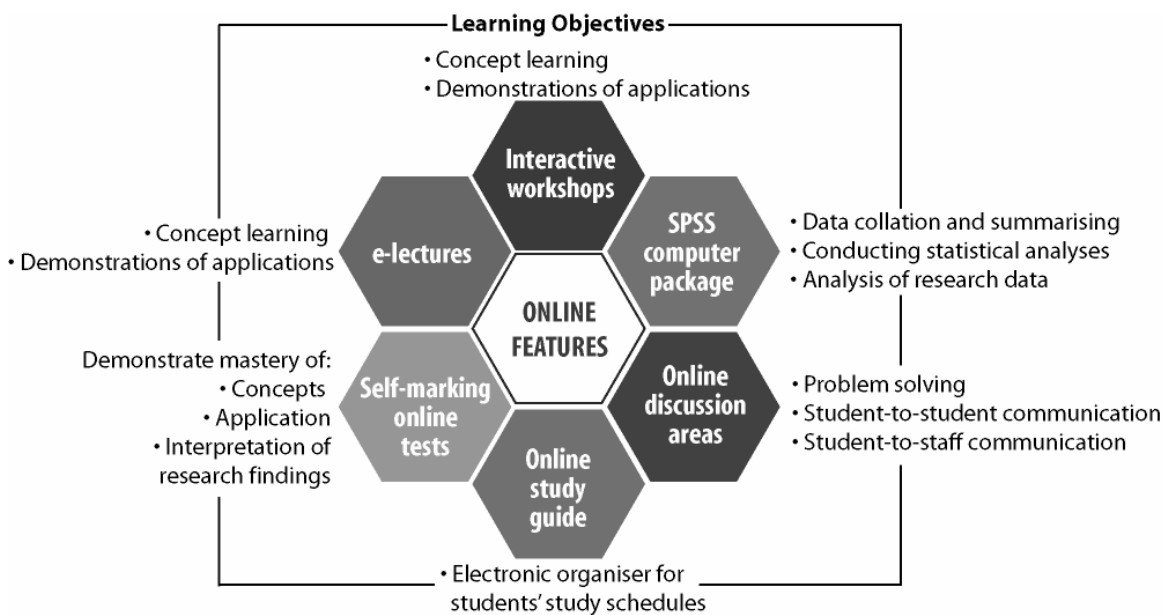
Figure 1: Relationship between teaching strategies, media learning resources and online features.

There are several major areas of digital and online development for the unit:

- Provision of an online study guide;
- Development of lecture materials in various formats including text based lecture notes online accompanying Microsoft PowerPoint presentations and audio visual e-lectures;
- Use of e-readings and other online learning resources, including interactive workshops developed and hosted by the textbook publisher's website;
- Problem sets assessing statistical knowledge and computer tutorials on the use of SPSS for data analysis;
- Online assessment for mastery testing of pre-requisite and ongoing core knowledge;
- Participation in an online data collection exercise for a written laboratory report that forms the assignment component of assessment in the unit;
- Use of assignment online submission of a Psychology Report;
- Incorporation of discussion spaces for student to student and staff to student interactions around learning activities and objectives for the unit.

The online study guide is used as an organiser for students. For each topic the weekly activities that students are required to complete are listed in the study guide. Optional learning activities are also detailed. A typical set of learning resources for a topic include:

- readings from the textbook or electronic readings;
- e-lectures, online tutorials in dedicated asynchronous discussion spaces and interactive workshops;
- problems sets and SPSS tutorials so students can demonstrate application of the tools they have learnt.

Hyperlinks are provided within the study guide that link directly to electronic resources. Weekly topics are organised into themes with each theme having a self marking online test that allows students to demonstrate mastery of concepts across the semester. Discussion spaces provide students with the opportunity to post questions, collaborate and interact. In contrast to the usual face to face experience, the unit's online learning environment is available 24 hours a day, seven days a week. The electronic resources can be accessed as often as required and students are able to choose the pace of their learning. They can also study topics in greater detail by accessing optional learning resources. All this is provided in one area - the unit website. The unit website is in turn housed within the University's learning management system, referred to as Deakin Studies Online.

Creating a distinctive learning experience wholly online

Is there something qualitatively different about the experiences of teaching and learning in wholly online units compared with other combinations of classroom, traditional media and online environments? This question has occupied the minds of key staff within our University, particularly in relation to the possibly unique or at least distinctive ways that the wholly online experience might contribute to the development of lifelong learning skills. Deakin, like many other universities, has committed in policy to the development and assessment of a set of graduate attributes in its course design and (re)-accreditation processes (see Deakin University (2002) *Attributes of a Deakin Graduate Policy*). Could it be argued that there are certain graduate attributes not dealt with in the University's current policy that might well be unique to learning in a wholly online environment? Closer examination of this proposition has led the University to the tentative position that this is not the case – that the University's current list of Graduate Attributes has been based on extensive work, including consideration of the literature on adult and lifelong learning. What has been recognised is the need to develop a clear view of the types of knowledge, skills and attitudes that constitute a capacity for lifelong learning and an appreciation of its necessity. This has required analysis of the Deakin lifelong learning attribute with other associated attributes in the University Graduate Attribute Policy. It has been argued in this respect that a wholly online unit should allow students to:

- acquire and practice a range of technical skills needed to work effectively in online environments;
- develop an understanding of issues and learn to act in an ethical and responsible manner in virtual environments;
- develop skills in online communication;
- develop a capacity for online teamwork, collaboration and negotiation;
- learn to assess and evaluate the quality of online information; and
- develop the organisational and personal management skills necessary to sustain motivation and study effectively and successfully without regular face to face contact with teachers and other students.

Relevant literature notes that certain skills in information literacy and information technology literacy underpin lifelong learning capacities. (e.g., Boud & Garrick, 1999; Candy, Crebert, & O'Leary, 1994.) The list of attributes above recognises these connections. It could be argued that these skills in turn develop special capacities in critical thinking, analysis and problem solving as enacted through virtual environments. Discrete listing of attributes in university policies can be reductionist and therefore distorting in regard to the interrelationships between them that ultimately constitute what might be described as the professional educated person in the making, i.e. the whole person not merely as the sum of a number of desired attributes. This professional as whole in the making transcends lists of attributes and focuses attention on capacities for purposes. The student professional in the making therefore is:

- developing the confidence to keep growing as an expert in the field and exploring it further;
- recognising that learning is dynamic and that one needs to maintain professional reading, to keep developing knowledge and to update approaches;
- taking personal responsibility for improving skills and developing new skills;

- recognising the need to continually develop and expand personal and professional knowledge bases to create new opportunities;
- demonstrating an awareness of their personal learning style, recognition of what constitutes good learning and the ability to develop a learning agenda;
- actively seeking new learning opportunities (See Deakin University, 2002: The Deakin Advantage Guidelines for developing the attributes of a Deakin graduate, p.12).

How distinctive these attributes might or should be to wholly online environments (with no face to face teaching and learning) compared to other extended online units that may incorporate aspects of classroom teaching where appropriate, is a moot point. It can be argued that such skills should be developed across a large number of units in various ways, at various levels and to various degrees, and in both extended and wholly online learning environments, rather than being seen as the sole or primary preserve of just one of a small number of wholly online units taken over a course of study. Moreover, how wholly online units might be designed and operated will be different and dependent on the nature of the subject, discipline/ professional field, and school and faculty culture. There are major issues here relating to curriculum design at the course, unit and year levels based in turn on views about how students should develop as learners and professionals over a full course of study. At this stage, it is premature to draw conclusions on things generic and applicable to all wholly online units, although institutional debate on the matter is contributing to the creative conception of the educational purposes of these environments, which we argue has been overall a positive influence on developments to date.

Prototyping towards new comfort zones in the wholly online environment

Responding to the challenge of creating a wholly online unit has required thoughtful consideration of lessons learnt previously along with commitments to the ongoing process of incremental development and prototyping. The conception of the design of the unit wholly online was part of the 2003 Deakin University Online Teaching and Learning Fellowship work. The Fellowship provided a link between previous digital and online developments in first year psychology and the new demand for the School and Faculty to offer an appropriate unit wholly online to meet the policy imperative. Many lessons were learnt from previous work as reported by Holt et al. (2002), Holt et al. (2003) and Armatas (2003), namely that:

- on campus and younger students might have different attitudes to computers compared to off campus, mature aged students with implications for the design and operation of online environments;
- online environments must be easy to access, navigate around and locate learning resources;
- an appropriate mix of digital media resources in both CD ROM and online form is needed;
- students require appropriate orientation to the learning environment, i.e. the various learning resources, their educational purposes, relationships to the subject matter and formal assessment requirements;
- students require guidance and support in working through key learning resources, learning activities and assessment requirements in a timely and effective fashion;
- online communication and collaborative spaces must be moderated by academic teaching staff using cost effective approaches drawing on students' capacities to self and peer assess their contributions.

The commitment to offering an innovative unit online progressed through the 2003 Fellowship, with the construction of the environment's learning resources and communication spaces developed over its initial 2004 offerings and articulated through continued engagement with the scholarly literature on e-learning, active contribution to that literature by researching teaching and learning online, active experimentation with various resources, tools and features, the collection of student and peer feedback, and the initiation of new research on the student online learning phenomenon as discussed below.

Researching the wholly online learning experience

The unit has been offered in semester 1, 2004 in developmental form, and is to be offered in its fully elaborated wholly online form in semester 2, 2004. Student feedback about the course was obtained from discussion postings and student emails. Based on feedback from a group of approximately 50 students who were enrolled in the unit's first offering, the following conclusions have been drawn around student learning and studying in a wholly online unit:

- for off campus students, fully online units offer considerable advantages over traditional delivery methods, particularly because of the opportunities for peer interaction through discussion spaces;
- the flexibility and convenience of online learning can disadvantage students who normally study on campus if appropriate structure and guidance are not provided in completing the course of study;
- while problems with computer literacy and connectivity have improved considerably, some students still experience difficulties when trying to access the online environment.

In semester 1, 2004 approximately 80 students were enrolled in the unit. Of these, over three quarters sat the final exam and submitted the written assignment for the unit. During the semester, students and staff posted almost 600 messages regarding the written assignment alone. The context of these postings was not limited to just providing information about the assignment. Rather, students engaged in critical discussion of issues, provided definitions and references, and interpreted and discussed the results.

Reflecting on the use of asynchronous discussion and the possibility of using synchronous chat from the 2003 offering of the unit, Armatas (2003) observed in her case interview:

> …with the discussion board, the plan was to … post…critical or key questions…that tried to get them to come to grips with some of the conceptually difficult things with … these tests, because they make basic misunderstandings about the tests…they haven't quite gone from the conceptual to the actual application, and they just need a little bit of help getting over that. (Armatas, 2003)

> We originally started off with discussion spaces…dedicated to particular topics, so…if a student wasn't doing a weekly timetable, they could still come in and read discussion… maybe make contributions, even though they were perhaps three weeks behind... I didn't want them to have to read through everything…to get some benefit from what was there, so we started up one of these discussion areas on one of the early topics, and then I invited them to engage in some real time chat…I set up a little test where they could…actually check what time and date they would like to be involved in this. Nobody answered. Not one student wanted to be involved in real time discussion. So after a few more attempts and a negative response I thought well, perhaps this is not the way to go, and it soon became clear that these students had particular patterns of working in the environment. (Armatas, 2003)

Amongst the postings for the Semester 1 offering in 2004, there was also considerable discussion relating to the coursework, particularly around the time of the exam. Feedback from these postings about the course indicates that the general feeling amongst students is that although the unit was challenging and the online format new and sometimes confusing, successfully completing the unit gave them a sense of mastery and achievement. They also learnt new skills or applied/refined existing skills in a new context.

Although this informal feedback is encouraging, the unit team wishes to pursue more rigorous research into the experiences of learning wholly online. With this in mind, a research project has been designed and approved for conduct on the second semester 2004 offering of the unit. It is grounded in recent work by Biggs (2003) and Ramsden (2003), which focuses on conceptions, approaches and outcomes to teaching and learning in higher education. This body of work has been further developed through the United Kingdom Economic and Social Research Council (ESRC). The ESRC Teaching and Learning Research Program, *Enhancing Teaching-Learning Environments in Undergraduate Courses* is a nation wide initiative to provide a stronger research base to help academic teaching staff enhance their undergraduate teaching. In reporting on the research program, Entwistle, McCune and Hounsell (2003) outline their conception of the nature of teaching and learning environments as relevant to undergraduate higher education. Their conceptual map of the "inner" teaching and learning environment covers course contexts, teaching and assessing content, staff student relationships and students and student cultures as focussed on specific institutional and disciplinary contexts. These components are the key points of intervention and change to enhance the teaching learning environment and hence enable quality learning. Their conceptual map is presented as a generic framework which appears to be premised on such environments being predominantly on campus, classroom based, with information and communications technologies forming part of the mix but not a key focus of research attention per se. In respect to contemporary higher education, their framework can be elaborated by having a greater focus on online learning environments. Our University's move into wholly online teaching and learning environments raises issues to do with the

phenomena of both teachers' and learners' conceptions, approaches and outcomes in the strongly online mediated educational exchange. An understanding of these issues will make a major contribution to enhancing undergraduate education.

As part of our proposed research, we plan to use two surveys developed by the UK Research Programme. They are designed to gauge students' experiences of learning in enhanced teaching learning environments:

- *Learning and Studying Questionnaire* covering students' expectations of experiences of higher education, their reasons for taking a particular unit and their approaches to learning and studying.
- *Experiences of Teaching & Learning Questionnaire* covering approaches to studying and experiences of teaching and learning in a unit in the areas of organisation and structure, teaching and learning, students and teachers, assessments and other set work, demands made by the unit, what was learnt from the unit and how well students are progressing.

In addition, we intend using the *Computer Attitudes Scales* (CAS) (Loyd & Gressard 1984) to assess each student's computer confidence, liking, and anxiety and the extent to which they perceive computers are useful. CAS was used in the first year psychology research cited earlier in the paper (Armatas et al., 2003). It is being administered both before and at the end of the wholly online learning experience in the *Research Methods in Psychology* unit to assess whether there is any change in students' attitudes as a result of their experience. All three of the questionnaires are being run online.

In addition to the administration of the surveys, audit trails of students' usage of the resources will be examined to investigate patterns of use as a function of learning approaches, experience and expectations and computer attitudes. By measuring these characteristics in the student population using the online learning environment it will be possible to better understand characteristics that students bring to the learning environment that may influence their learning experience and learning outcomes. This in turn could assist educators to improve the quality of the on line learning experience and outcomes for their students.

Conclusion

The emergence of new information technologies has created unique opportunities and challenges for educators. Not only have they afforded new means for delivering education, but also at the same time their increasing use has generated intense debate and demanded critical re-appraisal of the nature of teaching and learning environments in undergraduate higher education. These new methods require new approaches to investigate their impact and determine how to use them best. The development of the online unit discussed in this paper has illuminated some of the unsettling issues associated with moving from blended to wholly online learning environments. The approach to researching wholly online teaching and learning environments described in the paper is a direct response to the need to understand the implications of using e-learning in higher education. It is the product of research and experience with other online units in the field of psychology. It will also serve as a vehicle for gathering data to inform development of future unit offerings and as a possible approach to institutional research in the area.

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