GOOD PRACTICE REPORT: BLENDED LEARNING

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Overview

In early 2011, the Australian Learning and Teaching Council Ltd (ALTC) commissioned a series of Good Practice Reports on completed ALTC projects and fellowships. This report will:

- Provide a summative evaluation of the good practices and key outcomes for teaching and learning from completed ALTC projects and fellowships relating to blended learning
- Include a literature review of the good practices and key outcomes for teaching and learning from national and international research
- Identify areas in which further work or development are appropriate.

The literature abounds with definitions; it can be argued that the various definitions incorporate different perspectives, but there is no single, collectively accepted definition. Blended learning courses in higher education can be placed somewhere on a continuum, between fully online and fully face-to-face courses. Consideration must therefore be given to the different definitions for blended learning presented in the literature and by users and stakeholders. The application of this term in these various projects and fellowships is dependent on the particular focus of the team and the conditions and situations under investigation. One of the key challenges for projects wishing to develop good practice in blended learning is the lack of a universally accepted definition.

The findings from these projects and fellowships reveal the potential of blended learning programs to improve both student outcomes and levels of satisfaction. It is clear that this environment can help teaching and learning engage students more effectively and allow greater participation than traditional models. Just as there are many definitions, there are many models and frameworks that can be successfully applied to the design and implementation of such courses. Each academic discipline has different learning objectives and in consequence there can’t be only one correct approach. This is illustrated by the diversity of definitions and applications in the ALTC funded projects and fellowships.

A review of the literature found no universally accepted guidelines for good practice in higher education. To inform this evaluation and literature review, the Seven Principles for Good Practice in Undergraduate Education, as outlined by Chickering and Gamson (1987), were adopted:

1. encourages contacts between students and faculty
2. develops reciprocity and cooperation among students
3. uses active learning techniques
4. gives prompt feedback
5. emphasises time on task
6. communicates high expectations
7. respects diverse talents and ways of learning.

These blended learning projects have produced a wide range of resources that can be used in many and varied settings. These resources include: books, DVDs, online repositories, pedagogical frameworks, teaching modules. In addition there is valuable information contained in the published research data and literature reviews that inform good practice and can assist in the development of courses that can enrich and improve teaching and learning.
Aim and Scope

The aim of this literature review is to inform a good practice report on blended learning. It starts by exploring and establishing definitions of both blended learning and good practice, examines the benefits and challenges of blended learning, discusses a range of models and frameworks and notes implications for teaching and learning. Literature from 2006 onwards has been reviewed in an attempt to frame a definition as existing literature does not provide a universal definition of good practice or blended learning. An environmental scan of the literature clearly showed that focusing on specific tools was inappropriate because of the rapidly changing technologies. Therefore, this report has adopted the approach of Chew et al. (2010, p. 7) that “the concept of blended learning is not restricted to consideration of a specific technology, as it is meant to enable the appropriate use of current technologies in higher education.”

Literature Search Methodology

A comprehensive literature search was conducted, in order to determine relevant search terms. Keywords searched were: blended learning, hybrid learning, online instruction, networked learning, distributed learning, and e-learning. Initial searches yielded many thousands of results, so the search strategy was refined. References from the articles were also examined in order to identify key texts and other potentially relevant articles. Searches through other literature (unpublished manuscripts, theses, the internet) were not exhaustive due to the volume of material already retrieved.

Definitions

Blended learning

Blended learning is a flexible term, used to describe any and all varieties of teaching where there is integration of both face-to-face and online delivery methods. Although in existence for over ten years, Chew (2010, p. 2), citing earlier work, found that “researchers and practitioners consider that blended learning is currently embryonic in its development”. Debate about the meaning of the term is still ongoing.

Within the literature, a variety of attempts to define the term have been made. These include, but are not limited to:

- “a learning program where more than one delivery mode is being used with the objective of optimizing the learning outcome and cost of program delivery” (Singh and Reed, 2001, p. 1)
- blended learning can be viewed as:
  - a combination of modes of web-based technology
  - a combination of various pedagogical approaches (e.g., constructivism, behaviourism, cognitivism)
  - a combination of any form of instructional technology with face-to-face instructor-led training
  - a combination of instructional technology with actual job tasks in order to create a harmonious effect of learning and working (Driscoll, 2002)
blended learning refers to the mix of different:
  o “didactical methods (expository presentations, discovery learning, cooperative learning, etc); and
  o delivery formats (personal communication, publishing, broadcasting, etc).” (Kerres and De Witt, 2003, p. 103)
  
- the term "blended learning" refers to courses that combine face-to-face classroom instruction with online learning and reduced classroom contact hours (reduced seat time).’ (Dziuban, Hartman, and Moskal, 2004, p. 2)
- "Blended learning systems combine face-to-face instruction with computer-mediated instruction." This enables blends across four different dimensions: space, time, fidelity, and humanness. (Graham, 2006, p. 5)
- "blended courses and programs, are defined as having between 30 percent and 79 percent of the course content delivered online" (Allen, Seaman, and Garrett, 2007, p. 5)
- "Blended learning is the thoughtful fusion of face-to-face and online learning experiences. The basic principle is that face-to-face oral communication and online written communication are optimally integrated such that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose." (Garrison and Vaughan, 2008, p. 5)

These definitions range from the broadly generic to the very specific; they consider blended learning from a number of perspectives. As MacDonald (2008, p. 1) states: "[t]he word ‘blended’ is not particularly scientific, or even academic. In fact, you might feel that it sounds rather more like an entry from a recipe book." Oliver and Trigwell (2005, p. 18) are critical of the breadth of interpretations and their lack of clarity, stating that “almost anything can be seen as blended learning.” Sharpe, Benfield, Roberts and Francis, however, believe that there are advantages to the poor definition, suggesting that it “allows staff to negotiate their own meaning” (Sharpe, Benfield, Roberts, and Francis, 2006, p. 4).

The literature abounds with definitions; it can be argued that the various definitions incorporate different perspectives, but there is no single, collectively accepted definition. Blended learning courses in higher education can be placed somewhere on a continuum, between fully online and fully face-to-face courses. This broad definition has been adopted for the purposes of this report and is consistent with the approach taken by the ALTC.

**Good Practice**

In 1987 the American Association of Higher Education developed *Seven Principles for Good Practice in Undergraduate Education*. The principles state that good practice in undergraduate education:

1. encourages contacts between students and faculty
2. develops reciprocity and cooperation among students
3. uses active learning techniques
4. gives prompt feedback
5. emphasises time on task
6. communicates high expectations
7. respects diverse talents and ways of learning. (Chickering and Gamson, 1987, para. 4)

Although originally developed for traditional classroom environments the principles have been shown to be equally effective guides in the implementation of online
instruction (Chickering and Ehrmann, 1996; Newlin and A. Wang, 2002). Charles Graham and his colleagues from Indiana University’s Center for Research on Learning and Technology used these principles to evaluate a number of online courses at a large Midwestern university. Although the study was limited in scope, their evaluations resulted in a list of “lessons learned” for online instruction. The use of new technologies meant that these principles needed adaptation to meet the changing student needs. They acknowledge a need for different types of feedback, clear deadlines, changes in curriculum to incorporate diverse views and the development of well-designed discussion assignments to facilitate meaningful cooperation among students (Graham, Cagiltay, Lim, Craner, and Duffy, 2001).

Bailey and Card (2009) interviewed 15 experienced, award-winning e-learning instructors; from the analysis of the data effective pedagogical practices for effective online teaching emerged. These practices acknowledge that for good practice in online learning flexibility is a dimension that also needs to be considered.

A review of the published good practice guidelines from Macquarie University (2009) and Griffith University (Krause, 2008) indicates that the seven principles developed by Chickering and Gamson are foundational. These good practice guidelines are more detailed, to inform and support the development of blended learning courses. These seven principles are still informing research today (Manning, 2010, p. 24). The concepts for web-assisted courses identified by Manning (2010, p. 132) are similar to other guidelines, but the terminology used reflects the delivery modes of the courses.

Comparing and contrasting the examples of, and guidelines for, good practice discussed in the literature it is evident that those seven principles identified in 1987 still remain valid and can be used as a benchmark to inform future research in this field.

Benefits

There is a range of benefits, drivers and rationales for moving to blended learning noted in the literature. These can be categorised into three main groups: institutional, personal and pedagogical.

Institutional

One physical benefit of blended learning is improving the efficiency of classroom space. The University of Central Florida had such a shortage of classrooms that they were reduced to renting out a nearby multiplex theatre for day classes and a local high school for night. Now offering over 100 blended courses, the university has reduced its need to rent extra space (Young, 2002).

Posting course resources online instead of photocopying, and creating re-usable learning objects provides savings in terms of both time and cost (Sharma and Barrett, 2007). Institutions can also benefit from “reducing on-campus traffic and the associated need for parking spaces” (Dziuban et al., 2004, p. 3). Additionally, student retention is increased (De George-Walker and Keeffe, 2010; Dukes, Waring, and Koorland, 2006; Dziuban et al., 2004; P. Jones, A. Jones, Packham, Thomas, and Miller, 2007).
Personal

The flexibility and convenience of blended learning is of benefit to both faculty and students. Both Welker and Berardino (2005) and De George-Walker and Keeffe (2010) noted that students appreciated the ability to work at a time and place that suited them, to work at their own pace and accommodate their busy lives. At the same time, savings in time and travel contributed to cost savings. Academic staff also benefited from less travel to satellite sites. There is considerable agreement in the literature regarding the increased flexibility in both teaching and learning (Allan, 2007; Gosper, Woo, Muir, Dudley, and Nakazawa, 2007; Graham, 2006; Vaughan, 2007).

Pedagogical

Young (2002, p. 33) states that "most proponents of hybrid courses say their main motivation is to improve the educational experience for students". Allan (2007, p. 9) agrees, mentioning that one of the main rationales for using blended learning is that "it will enhance the engagement of learners by providing a rich mixture of learning opportunities". Osguthorpe and Graham (2003) refer to this opportunity afforded faculty to increase the level of pedagogical richness in their courses. The associated increase in student engagement is an oft-cited benefit of blended learning (Dukes et al., 2006; Ellem and McLaughlin, 2005; P. Jones et al., 2007; Sharma and Barrett, 2007; Vaughan, 2007).

Another benefit is that of improved student outcomes. Instructors at the University of Wisconsin reported that "students wrote better papers, performed better on exams, produced higher quality projects, and were capable of more meaningful discussions on course material" (Garnham and Kaleta, 2002, para. 8). Twigg (2003, p. 30) reports results of a study across thirty higher education institutions which shows "improved student learning in twenty of the thirty projects, with the remaining ten showing no significant difference". The University of Central Florida has also reported increased student learning outcomes (Dziuban et al., 2004).

Challenges

The literature reports a plethora of challenges associated with blended learning, concerning students, faculty and institutions. Additionally, there is a range of ethical issues that require consideration.

Vaughan (2007, p. 85) lists a number of common issues faced by students: “the expectation that fewer classes meant less work, inadequate time management skills, problems with accepting responsibility for personal learning, and difficulty with more sophisticated technologies”. These are echoed by Gerbic and Stacey (2009). Blended courses require a degree of self-motivation and independent learning which can be unfamiliar to students who have only experienced traditional face-to-face formats (MacDonald, 2008, p. 115).

From a faculty perspective, a major concern is the increased time commitment involved (Kearsley and Blomeyer, 2004; Vaughan, 2007; Welker and Berardino, 2005); blended courses take longer to prepare and administer than their traditional counterparts. Faculty support and resources for course redesign, along with the development of new teaching and technology skills are also important factors in delivering successful blended courses (Gerbic and Stacey, 2009). Bailey and Card (2009) found that many educators who shift towards online teaching agree that their institutions provide the technical support and training, but that advice and assistance
relating to pedagogical and instructional support was limited or lacking. Orr, Williams and Pennington (2009) and Kearsley and Blomeyer (2004) found there was a greater need for specialists who could advise and assist with pedagogical issues or support when integrating online components or technologies into the course. Over time the focus has shifted to how to enhance student learning more effectively rather than how to use the technology.

Vaughan (2007, p. 88) also lists major risk factors which have been identified by faculty who have taught blended courses: “fear of losing control over the course, lower student evaluations, and an uneasiness about how this type of learning model fits into the culture of teaching, research, and service”.

A number of administrative and development issues are identified by Garrison and Kanuka (2004): the need for a more formal approach to developing policies and operations to support blended learning approaches; ensuring both strategic and operational planning are undertaken, in particular the identification of costs and infrastructure requirements; making a careful assessment of the resources required (financial, human and technical); applying considerable thought to the scheduling of courses; and providing effective support for both students and teaching faculty. Vaughan (2007) also examines institutional challenges noted in the literature: aligning blended learning with institutional goals and priorities; resistance to organisational change; the lack of a collaborative organisational structure and internal partnerships. Garrison and Vaughan (2008) further indicate a need for the professional development of academics to be ongoing, rather than intermittent.

Littlejohn and Pegler (2007) discuss a number of ethical issues related to blended learning: privacy and confidentiality is essential in order to maintain security for online resources and communications; concerns about copyright need to be addressed, especially when considering the ease with which material can be published online; there are health and safety implications related to the use of technology; having a clear code of conduct that is understood by all participants can address trust issues; there are issues of accessibility for the disabled; and, the importance of initiatives designed to overcome the digital divide.

Models and Frameworks

To inform good practice in blended learning, models and frameworks for pedagogical practice have been developed. All aim to provide guides and tools for academics developing blended learning programs. The corporate training world introduced the concept of blended learning and developed models which have informed approaches being developed in higher education.

Marc Rosenberg, cited in Barbian (2002, p. 2), states: "The question is not if we should blend," he says. "Rather, the question is what are the ingredients?". As the effectiveness of any blended learning program is contingent upon good design, the literature is filled with examples of academics trying to answer the question ‘what is a good blend?’ (Carmen, 2002; Verkroost, Meijerink, Lintsen, and Veen, 2008). A survey of the literature reveals a number of conceptual frameworks and models including, but not limited to, the following examples.

One of the earliest models is the Community of Inquiry (CoI) Framework, developed by Garrison, Anderson and Archer (2000). The framework assumes that learning takes place within a community through the interaction of three core elements: social presence, cognitive presence and teaching presence. This framework has recently been the subject of a critical review (Rourke and Kanuka, 2009, p. 43) in
which the authors argue that “deep and meaningful learning does not arise in CoI”. In response, Akyol et al. (2009, p. 124) argued that this was “a serious misrepresentation of the CoI model as it is first and foremost a process model”. The original developers of this model welcome the debate, taking the view that “such discussions provide clarity and direction for research using the CoI framework” (Garrison, Anderson, and Archer, 2010, p. 8).

A number of studies have provided validation of the CoI framework (Arbaugh et al., 2008; Garrison and Arbaugh, 2007). The framework has been shown to be reasonably robust. Work continues on further developing and testing the framework, but there is little evidence that it has been widely adopted by institutions to guide the transition from traditional to blended learning programs.

Kerres and De Witt (2003) have devised a framework that consists of three didactical components and choosing an appropriate delivery system based on relative component weightings. The 3C-model incorporates content, communication and the construction of learning tasks with different degrees of complexity. This study is often cited, but the framework has not been widely adopted.

Alonso et al. (2005, p. 222) describe a model based on “the systematic development of instruction and learning”. There are seven phases, beginning with what to teach and finishing with a review process that uses the evaluation results to refine the learning process. Littlejohn and Pegler (2007, p. 82) developed an integrated planning tool called LD_lite, the central idea being that it allows tutors to “document learning activities for reuse and re-implementation by others”. The tool integrates three types of frameworks that view a lesson from different perspectives: teaching and learning ‘patterns’, individual learning activities and learning activity sequences. Capturing course details at these different levels, the components are able to either be created and reused independently, or used as a multi-stage planning process. The key elements focused on are tutor role, student roles, content resources, services resources (such as online discussion tools), and feedback.

These two frameworks focus on different aspects of pedagogy. They acknowledge the complexity of teaching and learning by devising multi-faceted planning processes to guide the development of pedagogies for blended learning. The concept of re-usable learning objects described by Littlejohn and Pegler (2007) is one that appears in other frameworks. The concept of repositories of re-usable learning objects is replicated in other models.

Verkroost et al. (2008) outline a four-dimensional model that builds on the work of Singh and Reed (2001) and Troha (2002), which was developed for the corporate training environment. Verkroost et al. used aspects from these models to review delivering content in a structured or unstructured format, in an individual or group situation, face-to-face or long distance and self-directed versus teacher-directed learning for an academic setting.

Picciano (2009) proposed a multimodal conceptual model designed to meet the needs of a variety of learners. His approach focused on the fact that learners represent different generations, personality types and learning styles and suggested that teachers and instructional designers use a range of modalities to meet this wide range of needs. The model presents six basic pedagogical objectives and activities and suggests suitable methods for achieving them. He cautions that “[t]he pedagogical objectives of a course should drive the activities and hence the approaches” (Picciano, 2009, p. 16). These six objectives outlined also begin with content and finish with evaluation.
Many models have focused on curriculum frameworks and how to construct, deliver and assess the content to ensure student outcomes are not compromised when transitioning to a blended learning model. Critical to curriculum-focused models is the concept that the academic goals and objectives drive the pedagogical approaches and technologies used. How teachers and students use technology in conjunction with student learning styles informs the approach taken.

A review of the literature indicates that there are many models and frameworks available to assist in creating ‘a good blend’. Graham (2006) notes, however, that there are three categories of blended learning systems:

- Enabling blends – these types of blends address issues of access and convenience, using technologies in a way that resembles the familiar face-to-face modality.
- Enhancing blends – allow incremental changes to the pedagogy without radically changing the way teaching and learning occur.
- Transforming blends – allow a radical transformation of the pedagogy thus enabling intellectual activity that was not practically possible without the technology.

Other frameworks such as: the Blended Synchronous Learning Model (Hastie, Hung, N.-S. Chen, and Kinshuk, 2010) which consists of five basic elements; the cyber classroom, the physical classroom, the teacher, the student, and the number of classrooms or participants; and a Community of Practice Model (Yukawa, 2010), which focuses on four dualities that shape community learning: negotiating meaning, practice, expertise, and identity/leadership have recently been developed.

These frameworks focus on the mode or the context of delivery in contrast to previous models that focus on teaching and learning strategies to construct their models. This shift in emphasis reflects a ‘facilitating’ rather than ‘instructing’ approach to education and the result is a greater emphasis on the impact and use of the technologies.

There is also growing agreement in the literature that there is not a single approach to designing a blended course that will meet all learner needs. As Littlejohn and Pegler note: “[t]here is no one perfect blend for a specific context, just as there is no one perfect blend of coffee for a particular occasion. Successful blending requires careful thinking through of the ways in which each of the individual components affect[sic] one another.” (2007, p. 71) This is evidenced by the many different models and frameworks that have been published. There are several philosophical approaches reflected in these frameworks and there is no identifiable consensus about the efficacy of the outcomes resulting from the implementation of these frameworks. No model has been widely tested in a range of situations, relying on a significant data sample, to show whether one model is more successful or more relevant. As there is no one ‘learner outcome’ there cannot be only one model or framework that meets all requirements.

As Carmen (2002, p. 1) comments:

Instructional design can be a volatile topic, often characterised by competing theories and differing philosophies. But in practice, value can be drawn from many instructional theories, and in the case of blended learning, different theories apply to different situations. In fact, this author would argue that some of the best-designed learning experiences draw on a blend of learning theories and philosophies.
Implications for Teaching and Learning

Blended learning is clearly here to stay and, as a consequence, the ramifications for teaching and learning need to be carefully considered. When successfully implemented, blended learning can be a transformative process (Garrison and Kanuka, 2004; Niemiec and Otte, 2010; Sharpe et al., 2006; Vaughan, 2010), altering the nature of teaching and learning by thoughtfully integrating face-to-face and online learning, fundamentally rethinking course designs in order to optimise student engagement, and redefining traditional class contact hours. (Garrison and Vaughan, 2008, p. 5)

Bleed (2001, p. 18) was concerned that blended learning be considered as not simply “bolting” technology onto a traditional course, but as an opportunity to completely redesign course development through a combination of “bricks and clicks”. This transformative potential has been recognised by a number of authors. Garrison and Kanuka (2004, p. 103) hoped that institutions would realise that "blended learning is not a technological fad. It is an approach and strategy that can be built upon in a progressive, systematic, and thoughtful manner, and over time, will transform the institution in a manner congruent with our highest ideals." Niemic and Otte echo this sentiment, claiming that "blended learning is, at least potentially, the most transformative and pervasive initiative as institution can undertake" (Niemiec and Otte, 2010, p. 118). Vaughan (2010) agrees, but stresses the importance of systematic and sustained support of a professional development community in harnessing this potential.

A consequence of blended learning is the changing role of the teacher from a source of knowledge to a facilitator (Chen 2003), or as Dykman and Davis (2008, p. 12) put it, there is a shift in emphasis from the "sage on the stage" approach to a "guide at the side". Xu and Wang (2010, p. 295) note that both teachers and learners are putting on new “hats”: teachers as “facilitators, expert learners, monitors, entertainers and researchers” and students as “topic contributors, meaning makers and negotiators, information providers and strategic communicators.”

Concurrent with this shift in the role of the educator is a shift from passive teaching and learning approaches, where the lecture is a dominant format, to more interactive and collaborative learning experiences (Garrison and Vaughan, 2008, p. 4). This can often require faculty to acquire new teaching and technology skills (Garnham and Kaleta, 2002).

Morris and Finnegan (2008-2009) conducted a study which generated a range of best practices for both teaching and learning. For faculty, the following points were noted:

- A comprehensive orientation at the beginning of the semester may reduce confusion about the course layout and expectations.
- An explicit and repeated online discussion about the course goals and procedures may be useful in the first weeks even when these are clearly stated in the course syllabus and on the Website.
- The instructor’s enactment of social and managerial roles may be more important to some students than pedagogical feedback.
- Early in the semester faculty should maintain consistent contact with all students and encourage them to build their self-reliance and group reliance (perhaps affecting their locus of control orientation).
Faculty may also need to act as a liaison to technology assistance for the students in order to limit dropouts and encourage persistence. Basic rules of good Web design should be followed in online courses.

Discussions are important and should be considered carefully as tools for retaining students (p. 60).

Providing multiple pathways through a course and its content is vital, according to Brown (2009, p. 63), since “learning styles are not the same for everyone”. That student learning styles need to be considered when developing a blended course finds general agreement in the literature (Akkoyunlu and Soylu, 2008; El Mansour and Mupinga, 2007; Olapiriyakul and Scher, 2006). Akkoyunlu and Soylu, however, state that further research is still required on this issue.

Ultimately, regardless of the blend:

Good teaching matters. Clear objectives, good structuring of learning materials, relevance to learners' needs, etc, apply to the use of any technology for teaching, and if these principles are ignored, then the teaching will fail, even if the unique characteristics of the medium are stylishly exploited. Good teaching may overcome a poor choice in the use of technology, but technology will never save bad teaching; usually it makes it worse. Bates, as cited in Bates and Poole (2003, p. 45).

Areas for Future Research

Research methodologies used to investigate blended learning have been categorised by Blinc, Goodyear and Ellis (2007) as: case-studies with a specific research focus (ie when one or more specific dimensions are explored); survey-type studies with a focus on a range of specific dimensions and links between them; comparative studies with a focus on specific dimensions in different contexts (eg online versus blended learning, face-to-face versus blended learning, etc); and comparatively more holistic studies which examine how the different components of blended learning relate to student learning.

Early research in this field concerned itself with defining blended learning and considering its benefits and challenges. As blended learning became more established, the focus began to shift to the theoretical frameworks and models that could be used to design a successful course. Now that the field is more mature, current research is beginning to focus on aspects of quality assurance and evaluation (Arbaugh et al., 2008; Laumakis, Graham, and Dziuban, 2009; Lorenzetti, 2004). The application of these various assessment tools is one area on which future research can focus.

Akkoyunlu and Soylu (2008) discuss potential avenues for research into learning styles: their contributions to students' experiences and levels of engagement; the long-term effects of blended learning; and, the effects of instructors' teaching styles on students' achievement. Arbaugh et al. (2009) agree that research on how instructors impact online learning would be beneficial.

More substantial studies of learning in Community of Inquiry frameworks also need to be undertaken. "If we can identify situations in which students are and are not engaged in deep and meaningful learning, we can make evidence-based suggestions about the types and quantities of teaching presence, social presence, and cognitive presence that are related to learning." (Rourke and Kanuka, 2007, p. 44).
Conclusion

Blended learning is both a simple and complex issue; it is simple in concept, but more complex in practical application (Garrison and Vaughan, 2008, p. 5) and a range of definitions, from broad to narrow, exists. It is not an education overlay, but a fundamental restructure that can, if well implemented, transform the nature of teaching and learning. Getting the design right has been the subject of much research and a variety of frameworks and models have been devised to assist in the development of a 'good blend'. Tools to aid in the evaluation and quality assurance of blended courses are now available and will support good practice.

Ultimately, the time will come when use of the adjective 'blended' will disappear as the majority of courses will be offered in this format (Garrison and Vaughan, 2008; Graham, 2009). The focus will shift from whether blending is occurring, to how best to design and deliver, while ensuring the quality and sustainability of the blend (Graham, 2009; Wiesenber and Stacey, 2009).

As Brown (2009, p. 63) states:

  Our business, now and into the future, needs to be about learning and technology — "in that order".
<table>
<thead>
<tr>
<th>Project/Fellowship</th>
<th>Key Outcomes</th>
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<tr>
<td><strong>Education</strong></td>
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<tr>
<td>Strategies and approaches to teaching and learning cross cultures (CG7-494)</td>
<td>Developed strategies and a set of guidelines for lecturers, students, and education managers to enhance the quality of teaching and learning for international students. This project looked at a blend of pedagogical approaches rather than technological blend (see summary p.17).</td>
</tr>
<tr>
<td>Science for early childhood teacher education students (ECTES): collaboration between teacher educators, scientists and engineers (CG8-724)</td>
<td>This project developed resources to increase science content knowledge and raise the awareness of teaching science in the early childhood sector. A resource book, Planting the Seeds of Science, was developed and published.</td>
</tr>
<tr>
<td><strong>Engineering and related technologies</strong></td>
<td></td>
</tr>
<tr>
<td>Assessing and improving spatial ability for design-based disciplines utilizing online systems (CG7-524)*</td>
<td>Developed a psychometrically developed test of spatial ability designed specifically for design-based disciplines; and a series of online interactive 3D learning tasks designed to improve spatial skills available online</td>
</tr>
<tr>
<td>A pro-active approach to addressing student learning diversity in engineering mechanics (CG8-695)*</td>
<td>The project developed a website which contains a variety of learning resources for students and lecturers in engineering mechanics. There is also a directory of publicly available learning resources for engineering mechanics and a guide to their application (a ‘toolbox’).</td>
</tr>
<tr>
<td><strong>Engineering and related technologies; and natural and physical sciences</strong></td>
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<tr>
<td>IS-IT learning? Online interdisciplinary scenario-inquiry tasks for active learning in large, first year STEM courses (CG9-1112)*</td>
<td>The project produced a handbook of 27 contemporary scenarios, an evaluation framework for collaborative learning tasks, guidelines for large class courses and a template for implementing collaborative active learning tasks in a STEM course.</td>
</tr>
<tr>
<td><strong>Health</strong></td>
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<tr>
<td>Virtual microscopy for enhancing learning and teaching (CG7-398)</td>
<td>An online repository for use by medical and science students was developed. Development of the specimen slides allowed the study of Australian specimens, decreased reliance on microscopes, afforded opportunities for international collaboration, and found application in broader educational sectors. Accessibility and equity for students was improved.</td>
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<tr>
<td>Project/Fellowship</td>
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<tr>
<td>Leading for effective partnering in clinical contexts (LE6-14)</td>
<td>The aim of the project was to develop an effective partnering model between universities and nursing clinical setting to improve clinical education. The focus was to enact leadership through better communication. Learning circles are used to explore the issues of sharing, dialogue and discussion between academic institutions and health care organisations.</td>
</tr>
<tr>
<td>Curriculum renewal in exercise science (PP8-793)*</td>
<td>The project developed a draft accreditation framework to address critical areas of exercise science curriculum and graduate skills. Barriers faced by accredited exercise physiologists in clinical settings were identified and solutions to improve the learning and teaching environment were devised.</td>
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<tr>
<td>Management and commerce</td>
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<tr>
<td>Promoting classroom experiments in undergraduate economics teaching, Professor Ross Guest (2008 ALTC Teaching Fellow)</td>
<td>An online resource was developed as a portal to a wealth of resources for improving undergraduate student learning experiences in economics. A student-centred approach to teaching and learning is explored by using classroom experiments and a new evaluation instrument. Teaching models, a handbook of economic and game theoretical principles and other educational material can be accessed online.</td>
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<tr>
<td>Natural and physical sciences</td>
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<tr>
<td>Physclips II – waves and sound: an integrated set of multi-level media resources and laboratory experiments (CG8-644)*</td>
<td>The project produced a variety of high quality multi-media learning and teaching materials including experimental exercises, virtual experimental devices, tutorials, film slips, animations and supporting materials available online. There is ongoing technical advice for the public through an ancillary website.</td>
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<tr>
<td>Non-disciplinary</td>
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<tr>
<td>The impact of web-based lecture technologies on current and future practice in learning and teaching (CG6-22)</td>
<td>A review of a web-based learning technology was conducted, resulting in: a register of issues relating to the use of web-based lecture technologies for teaching and learning; a list of suggested strategies to deal with these issues; examples of how web-based learning technologies can be used effectively. Implications for policy development in relation to academic practice, quality learning and teaching and curriculum development were considered.</td>
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<td>Project/Fellowship</td>
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<tr>
<td>Remotely accessible laboratories – enhancing learning outcomes (CG6-40)</td>
<td>The project considered how the remote laboratory experience affects student learning outcomes, how to design effective remote laboratory experiences, considered the impact of group dynamics on typical laboratory experiences and how to translate this to a remote situation. A set of resources associated with existing remote laboratory implementations was developed. Key resources related to the pedagogy of, and effective utilisation of, remote laboratories were developed.</td>
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<tr>
<td>Project EnRoLE: encouraging role-based learning environments (CG6-39)</td>
<td>This project developed a framework about peer review, partnerships, fellowships and leadership. A key outcome was a database of sharable, reusable play learning designs which aim to increase understanding of real-life human interaction and dynamics.</td>
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<tr>
<td>New technologies, new pedagogies; using mobile technologies to develop new ways of teaching and learning (CG6-33)</td>
<td>This project aimed to create authentic pedagogies for mobile devices. A master slide set providing a framework for pedagogies, a catalogue of the affordances of the mobile devices, case studies, and exemplars for teachers were developed and can be accessed from the project's website.</td>
</tr>
<tr>
<td>Educating the net generation: implications for learning and teaching in Australian universities (CG6-25)</td>
<td>Three universities trialled five technologies in eight case study settings. The key messages were that emerging technologies can improve student outcomes and that pedagogical, technical and administrative issues must be addressed for successful learning outcomes. A handbook and toolkit can be accessed online.</td>
</tr>
<tr>
<td>Development of distributed institutional leadership capacity in online learning and teaching (LE6-8)</td>
<td>This project reviewed the knowledge, understanding and skills needed for academic leadership for online advisors supporting learning and teaching. Online modules for staff and students were developed.</td>
</tr>
<tr>
<td>Developing pedagogical models for building creative workforce capacities in undergraduate students, Professor Erica McWilliam (2006 ALTC Associate Fellow)</td>
<td>This fellowship investigates examples of pedagogical processes and products that characterise creativity-centred learning environments and develops models of engagement for key stakeholders in higher education teaching and learning.</td>
</tr>
<tr>
<td>Creating accessible teaching and support initiative (CG7-543)</td>
<td>This project broadened the focus of an existing web-based resource for students with vision impairment. The website was extended by the addition of a number of professional learning resources including videos, fact sheets, activities and a quality assurance framework.</td>
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<th>Project/Fellowship</th>
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<tr>
<td>LiFE – learning interactively for engagement: meeting the pedagogical needs of refugee students in two Western Australian universities (CG7-496)</td>
<td>The project reviewed the learning and adaptation needs of students from refugee backgrounds. It developed a pilot program and user-ready materials including a DVD and four modules that address the pedagogical needs of the students.</td>
</tr>
<tr>
<td>Supporting student peer assessment and review in large groupwork projects (PP6-49)</td>
<td>This project developed an online tool to support and facilitate self and peer assessment of individual contributions in large group projects.</td>
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<tr>
<td>Retrofitting university learning spaces: from teaching spaces to learning spaces (PP8-921)</td>
<td>This project produced a report outlining the principles for cost-effective redevelopment of existing spaces; a repository of student and staff perspectives on learning spaces and a multimedia exhibition that provides access to plans, data and videos which can be viewed online.</td>
</tr>
<tr>
<td>eDST: Decision support tools for multi-disciplinary applications in higher education (CG9-1135)*</td>
<td>The project produced two position papers on design support tools (DST) for multi-disciplinary applications in higher education, prospectus for membership of the simulation platform for learning and teaching, and request for proposal (RFPs) for organisations capable of supporting such a platform.</td>
</tr>
<tr>
<td>Developing and disseminating TEAM SKILLS capacities using interactive online tools for team formation, learning, assessment and mentoring (CG7-531)*</td>
<td>This project produced a printed manual available online, an interactive and customisable website for students called Working in Teams, and an online peer-evaluation tool called WebPAf.</td>
</tr>
<tr>
<td>Learning in Networks of Knowledge (LINK) – improving student educational outcomes in online learning, using Web 2.0 concepts and a knowledge-networking approach, Associate Professor Matthew Allen. 2008 ALTC Teaching Fellow*</td>
<td>A website which provides key concepts, practical tips, detailed examples and links to other useful materials on knowledge networking.</td>
</tr>
<tr>
<td>Implementing effective learning design (CG8-758)*</td>
<td>The project produced a highly scaffolded but flexible learning activity planning tool that helps academic staff understand the rationale for using exemplar learning designs and guides practitioners through learning design options. There are 30 exemplar learning designs available for reference.</td>
</tr>
<tr>
<td>Learning to teach online: developing high-quality video and text resources to help educators teach online (CG9-1091)*</td>
<td>The project produced a suite of 32 video and PDF episodes to support educators who want to learn how to teach online. It has also developed a technical infrastructure to disseminate the episodes through the project’s website, UNSW TV, iTunes U and YouTube channels.</td>
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<tr>
<td>Project/Fellowship</td>
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<tr>
<td>Embedding peer review of learning and teaching in e-learning and blended learning environments (PP7-332)*</td>
<td>The project developed a flexible, scholarly framework to support and structure peer review of teaching goals, preparation, methods, communication and interaction, outcomes, reflection and subsequent improvement.</td>
</tr>
<tr>
<td>Spaces for knowledge generation: a framework for designing student learning environments for the future (PP8-849)*</td>
<td>The project developed a framework to evaluate the design of learning spaces which can support student-directed learning and knowledge generation.</td>
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<tr>
<td><strong>Society and culture</strong></td>
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<tr>
<td>Peer instruction in the humanities (CG6-51)</td>
<td>Peer instruction is a technique to generate active learning in lectures. A peer instruction website was developed to give access to resources such as a database of ConcepTest questions, questionnaires, student evaluations and information about the strategy.</td>
</tr>
<tr>
<td>Designing a diverse, future oriented vision for undergraduate psychology in Australia (DS6-603)</td>
<td>This project developed a framework for the development and articulation of graduate attributes for psychology. These attributes have been incorporated in the Australian Psychology Accreditation Council’s Rules and Standards.</td>
</tr>
</tbody>
</table>
Completed ALTC projects and fellowships
(The year at the end of each title is the year in which the project or fellowship is funded. Project/fellowship titles are live links to the resources.)

Education

Strategies and approaches to teaching and learning cross cultures (CG7-494) (2007)

The aim was to improve learning approaches and perspectives in Australian universities when in the cross-cultural environment. The project would develop a set of guidelines and suggestions to enhance the quality of teaching and learning. Five Australian universities with business and IT fields participated to give a broad view of the issues faced by international students studying in Australia. The strategies, set of guidelines and suggestions that could enhance the quality of teaching and learning for international students were published. The use of textbooks in lectures and face to face lectures were a particular focus as they are the preferred format for many international students. This more traditional mode of delivery is contrasted with the critical enquiry pedagogical approach of Australian universities. A blend of pedagogical approaches is the blended learning reviewed in this project rather than a blend of modes of delivery. The report provides data and suggestions to inform good practice but it is noted that there is not a definition for what constitutes good practice or blended learning.

The report provides guidelines for lecturers and education managers and guidelines to assist students of Asian background. The methodology is clearly outlined and conclusions were drawn from both qualitative and quantitative data gathering and analysis. The project collected data from over 50 interviews and one thousand valid survey responses which gave a rich insight into the problems being investigated and informed the outcomes of the project. The data analysis provided is comprehensive. The literature review highlights that decisions made on assumptions rather than research, is a major barrier to improving education in cross cultural education in Australian universities and that there is a lack of research to inform good practice.

Formative evaluation, both internal and external, provided feedback for the team and informed the guidelines developed. An expert in cross cultural teaching and learning, Dr. Helen Lu from University of Technology, Sydney, read through the report and wrote an evaluation report which is attached to the report (http://www.altc.edu.au/resource-strategies-and-approaches-teaching-and-learning-cross-cultures-uts-2010). Experts from the Technology and Education Design and Development Research (TEDD) Lab and the ELSSA Centre UTS provided feedback to this project.

The report identifies teaching methods as the biggest difference between Australian universities and those Asian institutions attended by the international students before coming to Australia. English as a second language is also a problem as is the range of language competency levels that the students possess. Information was disseminated through workshops, teaching and learning forums, conferences and journal papers. Website addresses for five ALTC funded projects with ‘international students’ and ‘inter-cultural’ themes are provided:


Recommendations are made to enhance learning and teaching in the cross culture setting.

The aim of the project was to develop the professional capacities of early childhood (children aged from three to eight) education students as effective teachers of science, to address the lack of early childhood science resources, to increase the science knowledge content, to increase the confidence and improve the attitude towards teaching science in the early childhood sector. To facilitate these aims, a model of institutional interdisciplinary collaboration for developing curriculum and resources was developed.

The action research methodology is clearly outlined. Continuous formative assessment informed decisions made during the research. Results from the evaluations of the discussion group, the consultant and professional development sessions are outlined. An independent evaluation was conducted by Professor Darrell Fisher, Science and Mathematics Education Centre, Curtin University.

This evaluation assessed each of the eight deliverables listed in the original project proposal:

1. Collaboratively engage scientists, engineers, teacher educators and experienced early childhood teachers to develop a science resource.
2. Develop science resources for early childhood teacher education students. This outcome was achieved through the development of the 128-page resource book, *Planting the Seeds of Science*, (http://seedsofscience.altc.edu.au/) which contains five science modules.
3. Increase the confidence in early childhood teacher education students towards science.
4. Enhance the science content knowledge of the pre-service teachers. While cognitive growth was not assessed in this project, the evaluator noted that a wide range of other instruments were used to determine students’ perceptions of their increased science content knowledge.
5. Implement a discussion group and use feedback to improve the project. Suggestions for improvement were identified, and subsequently acted on to improve the modules.
6. Implement a half-day forum for the students to share their science experiences with various stakeholders and audiences. This forum was held in November 2008 as a poster session.
7. Actively support the students as they develop their science programs in a classroom context.
8. Identify and interpret an appropriate model to describe the collaboration of stakeholders within the project. The model was developed based on a theoretical framework of structural holes and social capital.

The evaluator concluded that all outcomes had been successfully achieved. Many aspects of good practice are implicit in the report. Aspects of blended learning could not be assessed as a guiding definition was not included. The results of the project were disseminated via the report, meetings, forums, discussion groups, journal articles and work to be published as a book chapter. The book, *Planting the Seeds of Science*, (http://seedsofscience.altc.edu.au/) addresses a need within the sector. It is a colourful, well-presented and valuable resource. A CD of the book is available free of charge by contacting Dr Christine Howitt, Curtin University, c.howitt@curtin.edu.au. The recommendation to make it commercially available has merit.
Engineering and related technologies

Assessing and improving spatial ability for design-based disciplines utilizing online systems (CG7-524) (2007)*

Lead Institution: The University of Newcastle

Partner Institutions: Edith Cowan University, La Trobe University, Michigan Technological University (USA), Southern Cross University

Project leader: Ken Sutton

Final report: Assessing and improving spatial ability for design-based disciplines utilising online systems (Ken Sutton, Rebecca Allen) (The University of Newcastle(Lead), Edith Cowan University, La Trobe University, Michigan Technological University (USA), Southern Cross University) (2011)

The project team created a resource for educators and students consisting of four online components, including: a psychometric instrument to assess spatial ability; interactive learning tasks to improve spatial ability; a remediation module for poor performers; and specific learning tasks to address gender differences in spatial ability. The resource helped to assess and improve spatial ability.

OUTCOMES AND TOOLS:

The project provides a psychometrically developed test of spatial ability, specifically for design-based disciplines, assessing a range of spatial skills. The psychometric test is suitable for use as a spatial diagnostic tool for education and/or research purposes. The project further provides a series of online interactive 3D learning tasks designed to improve spatial skills. The learning tasks include remediation options for poor performers and purpose-designed gender neutral activities to address the gender bias in spatial performance. This project highlights the importance of spatial ability for design-based disciplines and the ability to improve spatial skills through education and training.

Dissemination:

Conference attendance generated multiple project contributors and partnerships for after the end of the funding period; the project websites (regularly updated throughout the project) were essential tools for disseminating project information and providing access to resources:

Project Website: http://psych.newcastle.edu.au/SpatialProj/index.html
Project Weblog: http://spatialproject.blogspot.com
3DAT Online: http://psych.newcastle.edu.au/SpatDiag/Altc/
A pro-active approach to addressing student learning diversity in engineering mechanics (CG8-695) (2008)*

Lead Institution: University of Wollongong

Partner Institutions: Australian Maritime College, University of Tasmania, University of Technology, Sydney

Project Leader: Timothy McCarthy

Final report: A pro-active approach to addressing student learning diversity in Engineering Mechanics (Timothy McCarthy, Anna Carew, Anne Gardner, Thomas Goldfinch, Alan Henderson, Giles Thomas) (University of Wollongong (Lead), Australian Maritime College, University of Tasmania, University of Technology, Sydney) (2011)

Engineering mechanics is a foundation topic for many engineering disciplines. However, most engineering students have significant difficulties with introductory mechanics and failure rates of between 20 to 50 per cent are common. The challenge is compounded by the increasing diversity of prior learning in incoming engineering students. Some opt to discontinue their engineering studies with the prospect of further difficulties in engineering subjects or added expense of repeating subjects. The project aimed to explore the factors contributing to high fail rates in first year engineering mechanics courses, and to propose an approach to improving learning outcomes.

OUTCOMES AND TOOLS:
The main outcome of the project is a website which contains a variety of learning resources for students and lecturers in engineering mechanics.

The website provides students with options of self study, revision work and additional learning resources.

Lecturers can point students towards easily accessible learning resources available online particularly if they are having difficulty with fundamental concepts. The website also allows the academics to make resources available to a wider audience should they choose to.

There is a directory of publicly available learning resources for engineering mechanics and a guide to their application (a ‘toolbox’).

The toolbox will be continuously evaluated to investigate: the uptake of the database; which resources appear to be most popular; and the ways in which students make use of alternative online learning resources.

Project website: learnmechanics.org
Large first-year classes pose a challenge to instructors who aim to enhance learning in cohorts where diversity in learner's abilities, interests and backgrounds is a common occurrence. In order to overcome this diversity many instructors have introduced collaborative learning tasks. The project aimed to:

- promote active learning in first-year STEM disciplines and ease student transitions
- provide learning experiences which are interactive, interdisciplinary, contemporary and challenging
- enable students to develop metacognitive skills that foster deep thinking
- enhance student engagement and learning outcomes in the context of large first-year classes.

OUTCOMES AND TOOLS:

The key findings in this project are:

- Collaborative small-group work implemented in very large STEM courses can address issues of student engagement and diversity.
- Engagement is enhanced when students select contexts and group membership; this increases investment in learning outcomes.
- Learning tasks require a task-management technology for academics to facilitate and assess collaborative tasks effectively.
- Technology-enhanced learning is most effective when the facilitation team includes the course coordinator, IT support and teaching assistants.
- Regardless of how streamlined the system is, engaging students in inquiry-based methods is time-consuming; work-allocation and rewards systems need to take this time into account.

The project has produced the following resources:

- Evaluation questions of learning environment, process and outcomes for Interdisciplinary Scenarios-Inquiry Tasks (IS-ITs).
- iCAS (alpha and beta versions) are freely available for other institutions to manage collaborative group work and peer assessment tasks.
- A handbook of 27 contemporary scenarios that can be adopted or adapted for any problem-solving or inquiry-based learning activity.
- An evaluation framework to analyse collective writing products and explore the learning outcomes from collaborative active learning tasks.
- Guidelines to change the way large courses are presented in institutions.
- A template for implementing interdisciplinary collaborative active learning tasks in a STEM course.

The final report and handbook is under review and will be available soon. Please send your enquiries to learningandteaching@deewr.gov.au.
Health

Virtual microscopy for enhancing learning and teaching (CG7-398) (2007)

The primary goal of this project was to generate four sets of virtual slides to form the basis of an online repository for use by medical and science students in the areas of human anatomy, human pathology, comparative anatomy/zoology and plant ecology/evolution. Successful outcomes from the project would allow less reliance on traditional microscopy and inform innovation in learning and teaching, particularly in relation to the role of new technologies and strategic approaches to learning and teaching that address the increasing diversity of the student body. Furthermore, it aimed to help build the necessary capacity to enable systemic change, and – by supporting the development of collections for multiple disciplines – to facilitate cross-disciplinary approaches. The aim was to improve student outcomes, to publish the results of the project and make the slides widely available. The repository was available on-line in May 2009 (http://virtualslides.unsw.edu.au). A simple Google search will retrieve information about the slides and provide a pathway to accessing the slides and accompanying handouts. A specific objective was to focus on producing Australian specimens. The methodology for developing the slides is clearly outlined but the report does not provide an index of the slides produced. The URL to access the repository (http://www.altcexchange.edu.au/invitation-view-virtual-microscopy-slide-collection) is provided. Improvements in student outcomes are reported. Substantiating tables and statistical analysis of data collected are not attached to the report.

The technical difficulties that faced the team are identified and the subsequent solutions are outlined. The benefits for faculties, faculty staff and students are clearly expounded. As is the case for complex projects, changes to the original plan are inevitable when the project is actually implemented. The team members enabled changes to be made in response to changing circumstances and the responses to lessons learnt are reported. The provision of the repository meets many of the principles of good practice but the report does not explicitly outline how the project informs good practice. It is noted that a definition for what constitutes good practice is not included in the report.

The success of the initial implementation of virtual slides led to greater acceptance and use. The work allowed for specialty slides for Australian students and universities. The Le@rning Federation (http://www.tlf.edu.au) has selected around 120 slides they believe will be highly relevant to science students in the middle years, as well as to years 11 and 12 Biology students. They noted that the slides would quite possibly also be of interest for students doing some VET/TAFE electives. This unexpected positive outcome underscores how successful this project has been and highlights that further research and work could benefit education sectors outside higher education. It is clear from the report that the establishment of the repository has encouraged active learning, as the use of computers, rather than microscopes, has led to more collaborative learning and student interaction. The measured assessment outcomes were improved as was client satisfaction. The information gained from the project has been disseminated via seminars, conferences and journal papers and the collection of slides is being used by other institutions nationally and internationally. The outcomes of the report show that the virtual slides and handouts can enhance blended learning courses and foster good practice. The project achieved its goals. There were positive outcomes in improved student outcomes and the information has been disseminated. The recommendation to pursue developing interactive tutorials in pathology is informed and supported by the positive outcomes of the project.
Leading for effective partnering in clinical contexts (LE6-14) (2006)

The aim of the project was to develop an effective partnering model between tertiary institutions and nursing clinical settings to improve clinical education. The focus was to enact leadership by making communication explicit and to identify specific barriers to communication between institution and hospital management, staff and students. A learning circle approach was adopted and the model applied to the clinical context of the project was based on an agency-partnering process developed in Griffith’s School of Human Services.

The methodology included:

- Student surveys
- Staff surveys
- Records of learning circle group discussions
- Independent evaluation that involved interviews with members of advisory group, circle participants, students, clinical and university staff.

The methodology is informed by relevant literature. A separate literature review is not included in the report or available via a website. The report identifies a lack of literature about the practice of leadership in facilitating communication between the broader academic community and clinicians.

Details of the methodology and the analysis of the data can be read in the report (http://www.altc.edu.au/resource-leading-for-effective-partnering-griffith-2009). The Princess Alexandra Hospital, the Logan Hospital and the Gold Coast Hospital were partners in the project and students from several universities and TAFE colleges were involved. The intent of the investigation was to improve the work readiness of graduates by improving cross disciplinary leadership between the tertiary and clinical settings and effecting a better, more productive transition to the workplace.

Learning circles were used to explore the identified issues of sharing, dialogue and discussion between academic institutions and health care organisation. Key strategies developed to address some of the identified issues in successfully placing students in practicum included:

- Preparation of students before practicum (student tips)
- Communication between student and clinician recorded in a student portfolio
- Evaluation of practicum
- Workshops to prepare clinicians.

Evaluation of the project was conducted using the Clinical Learning Organisational Culture Survey and the Clinical Environment Inventory. The feedback from the registered nurses was more positive than feedback from students. The focus on student outcomes is consistent with good practice policies. Further investigation of these initiatives would assist the development of future programs to enact leadership in clinical settings and improve student outcomes. Results of the project were disseminated by providing professional groups and government agencies with copies of the report and The Carrick Leadership Mini-Conference held in November 2007. There are plans to develop a website to disseminate the information and encourage discussion.
In Australia, students can take a 3-year exercise science degree with no predetermined vocational outcome, or a 4-year clinical exercise rehabilitation degree that generally leads to accreditation as an exercise physiologist with Exercise & Sport Science Australia (ESSA). This project focused on producing a nationally supported accreditation criteria for the generic exercise scientist, and supporting the professional development of accredited exercise physiologists (AEPs). It builds on a completed ALTC discipline-based initiative (DBI) Meeting the challenges of clinical exercise science and practice (Selig et al. 2008).

OUTCOMES AND TOOLS:

Critical areas of exercise science curriculum and graduate skills were identified and used in the development of a draft accreditation framework. The barriers which AEPs face in clinical settings were identified and solutions were devised to improve the learning and teaching environment.

Some of the key recommendations are as follows:

- Develop a standard label (name) and definition for a 3-year exercise science graduate and an exercise scientist.
- Consult widely with stakeholders (including heads of schools and programs) to comment or revise on the exercise science graduate attributes, knowledge and competencies while maintaining a system of national accreditation for AEPs.
- Ensure that all exercise science degrees provide a solid ground in science.
- Deliver the necessary clinical learning for accredited exercise physiologists (AEPs) through a combination of preclinical studies at university and a strong clinical placement program.
- Eliminate barriers to clinical practice through collaboration between Exercise & Sport Science Australia (ESSA) and universities, taking into account the solutions proposed from this project (refer Table 19 within final report).

Dissemination:
The project team shared the outcomes with the heads of schools in South Australia, Western Australia and Northern Territory with representations from Exercise and Sports Science Australia (ESSA). The findings were also shared at international conferences in Hong Kong, China and Singapore.
Management and commerce

Promoting classroom experiments in undergraduate economics teaching. Professor Ross Guest (2008 ALTC Teaching Fellow)

The aim of the fellowship was to improve the quality of the undergraduate student learning experience in economics. The specific outcomes were:

1. Online resources for academics on Griffith University’s website with open access
2. A greatly enhanced appreciation by economics academics of the value of classroom experiments, and a willingness to embed these as an integral part of their teaching
3. A teaching and learning grant from Griffith University to develop new classroom experiments
4. A special issue of the International Review of Economics Education (IREE) on classroom experiments
5. A new evaluation instrument and new evidence of the effectiveness of classroom experiments.

The online resource (http://www.economicgames.org/) is a portal to a wealth of resources and information to support good practice. It provides links to a number of websites that catalogue and describe classroom experiments that maybe of value and assistance to staff and students (http://www.economicgames.org/#/links). An example of the wealth of information that can be accessed from the website is Econport (http://www.econport.org/content/teaching.html). The content includes teaching modules, a handbook of economic and game theoretic principles and concepts, a glossary of economics terms, and an extensive collection of educational material, as well as software for running experiments.

A special issue of the International Review of Economics Education was published in November 2010 and a grant from Griffith University supports the Economic Games Resource Portal. To develop a new evaluation instrument and provide evidence of the effectiveness of the experiments, an unstructured focus group provided feedback on the economics games that had used during the semester. The responses were positive. No empirical data was gathered. To improve the uptake of games in curriculum, a series of workshops and seminars were conducted. Details of the approach and methodology are included in the report.

A review of the literature supports the report and informs the fellowship’s aim to engage students and improve the teaching and learning of university economics. This program promotes the benefits of embracing new teaching methods. It challenges the perception that a new approach is not justified in terms of the cost of preparation time and the effort of using a more challenging style of teaching. This has been achieved by promoting the use of classroom ‘experiments’ to teach economic principles at undergraduate level. This activity puts students in a controlled environment and introduces a more dynamic student-centred approach to teaching and learning economics. The outcomes of the report indicate that the use of these activities promotes good practice and warrants further research. It is noted that a definition of what constitutes good practice is not included. In Australia there are no published evaluations of classroom experiments in economics and this report has added to the body of knowledge.

The outcomes of the fellowship were disseminated via the report, the website, the posting of the project’s web address on websites of the Economics Network and the Economics Society of Australia, the special issue of International Review of Economics Education and through the fellow’s contacts at the Higher Education Academy, UK.

Natural and physical sciences
PhyScilips II – waves and sound: an integrated set of multi-level media resources and laboratory experiments (CG8-644) (2008)*

**Lead Institution:** The University of New South Wales

**Project Leader:** Joe Wolfe

**Final report:** PhyScilips II - Waves and sound: an integrated set of multi-level multimedia resources and laboratory experiments: Final Report. (Joe Wolfe, George Hatsidimitris, John Smith) (The University of New South Wales) (2011).

Physics students have difficulties applying the theoretical principles in the real world. PhyScilips uses film clips of events and experiments and adds these quantities animations to show the learner physics at work in the real life situation. The project aimed to produce multimedia resources about the principles and applications of waves and sounds in physics for educators and students in upper high school and tertiary levels. The resources are readily available to the public via the Internet and the website has an extensive library of learning objects.

**OUTCOMES AND TOOLS:**
High quality multi-media learning and teaching materials including experimental exercises, virtual experimental devices, tutorials, film slips, animations and supporting materials are publicly available and widely used online.

The website has over 100 learning objects, not including the experiments, in an extensive library available for download either singularly or in a compressed folder.

The team provides ongoing technical advice for the public through an ancillary website (http://animations.physics.unsw.edu.au/educational-animations/) that illustrates some of the design techniques and cognitive design principles. The team addresses questions raised by the public through the website.

There is a list of publications at the end of the final report.

**Dissemination:** The team achieved an online distribution of the resources to key educational websites. PhyScilips can be found on over 8000 sites, most of these are directories or discussions that point users to the PhyScilips site.

There are 2000-4000 unique users logging into PhyScilips each day. The site has a hit rate of 30,000 – 100,000 per day. Hits from Australia vary between 10 to 30 per cent because these topics are mostly covered in the first semester.

Project website: http://animations.physics.unsw.edu.au
Non-disciplinary

The impact of web-based lecture technologies on current and future practice in learning and teaching (CG6-22) (2006)

The aim of the project was to explore the impact of Web-based lecture technologies (WBLT) on learning and teaching. WBLT are used for digitally capturing face to face lectures for web delivery and the communication is one way with the lecture content delivered close to real time. Experiences and perceptions of staff and students were explored. Particular focus was given to the integration of the technology into the curriculum, its role and relationship with other curriculum elements; how the technology can support learning and teaching in different contexts; the educational implications for design and delivery of curricula and the overall implications for staff and students.

The project also aimed to provide an overview of practice in the use of WBLT and the subsequent issues arising from a staff and student perspective. In addition, the project aimed to provide a more in-depth understanding of specific issues arising from the use of WBLT in different teaching and learning contexts including recommended guidelines for good practice in the use of WBLT. These guidelines are not explicit. The deliverables and outcomes of the project directly contribute to that objective. The external evaluation prepared by Associate Professor Helen Carter of the Australasian Evaluation Society acknowledges this. Four universities collaborated and the report gives a penetrating insight into how WBLTs can be used to best effect to support learning and teaching and the implications for institutions adopting the technologies.

The in-depth final report was disseminated via methods outlined in the project and the agreed process for an external evaluation was completed. The project was complex in undertaking both in scope and process. It has been largely implemented as outlined. The findings are clearly stated and supported by detailed analysis of the data and a literature review that informs the processes. Information has been disseminated informally; via professional conversations, through professional organisations, the provision of survey instruments for other institutions and informing recommendations for policy, practice and professional development. Formal dissemination of the project and outcomes has been achieved through published journal articles, the project website http://www.mq.edu.au/ltc/resources/wblt/ and conferences.

The project has successfully achieved the stated goals of:

- development of a register of issues relating to the use of web-based lecture technologies for teaching and learning
- development of suggested strategies for dealing with said issues
- documentation of examples of how WBLT can be effectively used
- considered of implications for policy development in relation to academic practice, quality learning and teaching, and curriculum development

A broader benefit of the study was that external students had a reduced sense of isolation. The staff responses were mixed. The report acknowledges that one of the limitations of the investigation was the focus on student perceptions about the usefulness of WBLT and that a more comprehensive understanding of how the technologies actually support learning and teaching is needed. The scope of the report was confined to a single technology and the role of lectures in a technology rich environment. The outcomes and deliverables from the project are well documented.

The aim was to investigate the factors which affect student learning outcomes during the use of remote laboratories. The project considered issues such as the impact the remote experience had on student engagement with the learning experience, the impact of group dynamics, students’ perception of reality when using remote labs or simulated labs, evaluating cross-institutional access issues based on more diverse base of students to evaluate the outcomes of two key issues; the student acceptance of the reality of laboratory experience and if the lab design reflects professional reality. The project also established a pedagogical framework for guiding the use of remote laboratories to improve student learning.

The University of Technology Sydney (UTS) and Curtin University shared facilities and the data collection of student experiences. A broader benefit of the study was a strengthening of pre-existing collaboration between the two institutions. There emerged research and development collaborations with international institutions. Over the duration of this project numerous new remote laboratory projects have emerged around Australia. A nascent remote laboratories interest group is emerging with significant cross-institutional collaborations. The Department of Education, Employment and Workplace Relations funded a project on a national strategy for sharing laboratory infrastructure funded by the Diversity and Structural Adjustment (DSA) Fund. This project should support the emerging cross-institutional collaborations.

Results of the project were disseminated through a number of key publications highlighting the pedagogic design issues, through workshops and conferences. Broad-based involvement was supported through a remote laboratories workshop at the annual conference of the Australasian Association of Engineering Education (http://www.cs.mu.oz.au/aaee2007) and a listserv has been established.

An extensive literature review revealed little research about the educational objectives of student laboratories let alone remote laboratories. The major material outcomes of this project are:

- A set of USB memory sticks containing key resources related to the pedagogy of, and effective utilisation of, remote laboratories.
- Resources associated with a number of existing remote laboratory implementations
- Copies of key references in the field
- Copies of the student response survey instruments developed as part of this project (included in the report)
- Materials from the AAEE workshop on remote laboratories.

The project has highlighted the lack of research in the area and the results of the research and the uptake of the technologies indicate that further research is warranted. The project considered how the remote laboratory experience affects student learning outcomes, how to design effective remote laboratory experiences, the impact of group dynamics on typical laboratory experiences and how to translate this experience to a remote situation and what aspects are crucial for learning. Good practice in blended learning is embedded in the report and the report provides direction for other participants in the field. The methodology is clear and the analysis of the data is comprehensive. Details are provided in the report and can be viewed at the website (http://www.altc.edu.au/project-remotely-accessible-laboratories-uts-2006).

The aim of the project was to encourage the increased use of online role-based learning environments with particular focus on role play and to develop a repository and website to enable increased uptake and raise awareness of the resources available. The project developed guides and framework about peer review, partnerships, fellowships, and leadership. Educational role plays in Australian universities were designed to increase understanding of real life human interaction and dynamics. The developed resources can be accessed at http://enrole.uow.edu.au/resources.html.

The focus for the project was on online and blended role plays for Australian universities and the role plays needed to be substantial enough for learning outcomes to be assessed and student reflection generated. To encourage greater use of this pedagogy, the project adopted three strategies:

- **Recognition** – developing a shareable/reusable database of play learning designs with an associated peer review process
- **Support and reward** – by facilitating the evaluation and publication of refereed papers
- **Workload and sustainability** – by establishing national and international role play partnerships and developing a checklist of policies and procedures for quality assurance and aid sustainability.

The project continued to refine the definition and decided to broaden it as shown in the Simulation Triad.

To achieve the goal of increased uptake of online role-based learning environments the project was divided into four segments; Building, Linking, Understanding and Extending. Role play intersects with fields using a variety of terms such as authentic learning, experiential learning, situated learning, role play simulations or virtual worlds. For the purposes of the project, it was agreed that the following features would differentiate role play from simulations:

- The design of the role play is to increase understanding of real life human interactions
- The participants assume a role in someone else’s situation
- The participants are undertaking authentic tasks in an authentic context
- The task involves extensive in-role interaction with other roles for collaboration, negotiation, debate.

The complex nature of the project and the length of time needed to build and implement the structures, flexibility in the plan were necessary to accommodate the changing circumstances of personnel and institutions. The results of the project were disseminated through peer-reviewed publications, at writing retreats, workshops, conferences, journals and in February 2011 through an e-book (http://enrole.uow.edu.au/news.htm).

A wealth of resources and information can be accessed through the project website http://enrole.uow.edu.au. A review of the literature informed the framework for the project and internal and external evaluations provided insights for the direction, processes and purposes of the project. The successful establishment of a community of practice will continue to inform good practice for online role plays.

New technologies, new pedagogies; using mobile technologies to develop new ways of teaching and learning (CG6-33) (2006)
The project aim was to take an innovative approach to the creation of new and authentic pedagogies for mobile devices. Active learning was the focus for the professional development of participants. The educational potential of two hand-held ubiquitous mobile devices was explored. The stated aims were:

- Investigate the potential uses of two mobile devices
- Engage teachers to explore and develop appropriate pedagogies to complete a complex task in an authentic learning environment using an action learning professional development framework
- Implement the tasks in learning activities over four to six weeks in a range of subjects
- Describe, categorise and disseminate the pedagogies and professional development activities through a dedicated website and published handbook
- Implement the professional development activities across other faculties at the University of Wollongong and disseminate in web-based template form to other universities.

The methodology is outlined. A master slide set providing a framework for pedagogies, and a catalogue of the affordances of the mobile devices were developed and can be accessed from the website (http://mlearning.uow.edu.au/pedagogies_affordances.html). Case studies, and exemplars for of the pedagogies developed for the devices are also available at the website. The learning tasks were implemented and evaluated with students in classes. Some of the pedagogies implemented were:

- A game-centred approach to enhance student learning
- Taking iPods into the field to create ‘teacher wisdom stories’
- Digital story books
- Mathematics (or Science ) is everywhere
- Curriculum resources in adult learning.

These resources are also available on the website (http://mlearning.uow.edu.au/pedagogies_projects.html). The results of the project were also disseminated through conferences, conference papers and posters, workshops, listservs and electronic newsletters. The work was informed by current literature. It is unclear if there are sound theoretical reasons for using mobile devices in learning. This project has given insights into the potential of these devices in teaching and learning in the higher education sector and the pedagogical implications.

The project highlighted the logistical support needed for mobile technologies to be used effectively. How institutions provide the technological support and plan for the rapidly changing capabilities and changing affordances of mobile hand held devices is not addressed. Research into the financial sustainability of delivering education this way and explicit guidelines for good practice would be beneficial.

Australia does not have a national policy for the use of mobile technologies in learning. The results of the project could help inform a national policy. The website also provides links to the published papers that resulted from this project.

The aim of the project was to identify the implications of education of the “Net Generation” for learning and teaching in Australian universities and identify whether this generation learns differently to ‘digital immigrant’ lecturers. The University of Melbourne, the University of Wollongong and Charles Sturt University explored and documented the use of established and emerging technologies and aimed to provide a systematic, evidence-based approach to student learning through the use of technology-based tools. The project was conducted in three phases: investigation, implementation and dissemination.

The investigation phase found:

- Little empirical evidence to support the proposition that students are digital natives and academic staff are digital immigrants
- A great diversity in stakeholders’ experiences with technology and their preferred use of technology.

The key contribution of the investigation stage was the provision of empirical research that questioned assumptions about the technology skills, preferences, and experiences of Australian net generation students. Until recently, little research was available that examined student and staff use of technologies in an Australian context. The findings have been used to develop a set of guidelines outlining the practice and policy issues for consideration when implementing new technology-based activities.

The implementation phase trialed five technologies in eight case study settings. The key messages were that emerging technologies can improve student outcomes and that pedagogical, technical and administrative issues must be addressed for successful learning outcomes. To achieve successful learning outcomes requires effort from staff and students and the development of new learning, teaching and technology-based skills. The questionnaires, analysis of data and details of the case studies can be accessed at http://www.netgen.unimelb.edu.au.

The methodology is clearly outlined. The approach was informed by a literature review and a succinct summary of the issues is included in the final report.

The four key outputs of the project are:

- Workshops (http://www.netgen.unimelb.edu.au/outcomes/workshops.html)
- An online community to support the workshops and further dissemination of the findings of the project (http://www.netgen.unimelb.edu.au/outcomes/community.html). The online community is hosted at http://www.groups.edna.edu.au.

The results of the project were also presented at numerous academic seminars, published in journals and conference proceedings and cited in the media. More information is provided via the website. The findings show that more empirical research would further the innovation of teaching and learning in higher education, particularly in relation to the role of new technologies.
Digital learning communities (DLC): investigating the application of social software to support networked learning (CG6-36) (2006)

The aim of the project was to produce a set of pilot reports and practical guides to the application of social software techniques; a set of exemplars that use socially-oriented technologies to engage students; a project evaluation and report that presents the key findings of the project and make recommendations for the applications of social software in higher education institutions in Australia.

The pilot courses explored a range of activities using a variety of different software and tools:

- Blogs, wikis, social bookmarking, social media – incorporated into creative design courses
- Whole-of-course approach using a university-wide blogging platform
- MyToons as a digital learning community for new media
- Plants and animals used a Drupal based online social network to supplement an existing WebCT unit
- Social bookmarking using Delicious which developed specific tags to encourage students and staff to share resources which would be accessible after graduation and lessen the load on the institutions’ ICT resources
- Information systems job registry on a wiki
- Digital photomedia and Flickr replaced a Drupal run server and allowed the project to be accessed after the course finished and the open source sites were cost effective.

Staff interviews and student focus groups gave insights that informed the project as it progressed. An analysis of the difficulties encountered and the subsequent successes of the pilots is underpinned by relevant literature with a reference list attached. A literature review is not included in the final report.

The report (http://www.altc.edu.au/resource-digital-learning-communities-canberra-2009) provides information on how to incorporate social technologies, insights into how students react to the use of these platforms and feedback on the benefits and drawbacks of the inclusion of the socially-oriented technologies. More research into the effect on student learning and student outcomes would assist decision making and help inform good practice in the courses adopting these technologies.

The project deliverables have been achieved but access to all of the outcomes is limited. The social software cookbook (http://wiki.mashedlc.edu/index.php/CookBook) which is the repository of the resources developed and gathered during the course of the project cannot be found online. The report acknowledges that it is a work in progress. If an external evaluation was conducted, it is not reported.

The project was a complex undertaking in scope and given the rapidly changing context of the technologies and the mode of delivery, the project has been largely implemented as planned. The link to the website for the project and the exemplars and resources is not available (http://wiki.mashedlc.edu.au/index.php/CookBookManifesto). Screen shots of the cookbook and some insights into how the resource could support teachers when using social software are in the final report.
Development of distributed institutional leadership capacity in online learning and teaching (LE6-8) (2006)

The project aim was to develop distributed institutional leadership capacity in pedagogical and evaluative dimensions of online learning and teaching at the Australian Catholic University. Six academic staff who are online advisors engaged in specialised training to operate in leadership roles specifically in pedagogy and evaluation in an online setting (http://www.altc.edu.au/resource-development-distributed-institutional-leadership-acu-national-2008).

The project had three phases. In phase one the staff engaged in specialised training in leadership and the pedagogical and evaluative dimensions of online teaching and learning. During the second phase, the advisors undertook a range of activities at campus, faculty and university levels. From 2008, the advisors continued to operate in leadership roles. This is the third phase and is funded by the university faculties.

An external evaluation was commissioned and was conducted by Dr Tony Koop and Associates (http://www.altc.edu.au/resource-development-distributed-institutional-leadership-acu-national-2008). The evaluation report found all parties agreed that the online advisors had developed individually and as a group and were exerting an influence across the university which fulfilled the stated outcome 1; demonstrable changes in knowledge, understanding and skills underpinning pedagogical and evaluative dimensions of online learning and teaching, and academic leadership, across the six faculty participants. The second outcome was the identification of faculty online development needs, plus strategies to meet these needs. Strategies identifies included:

- Online advisors becoming members of relevant working parties and committees
- Online modules and website project to develop modules for staff and students with two online advisors as leaders
- Online advisors participating in workshops
- The introduction and conduct of ByteSize sessions to introduce faculty to the basics of online and web supported modules and how teachers can gain support and assistance
- Identifying online advisors’ specific areas of expertise and informing heads of school
- Conduct research to ascertain specific needs, identify faculty needs, identify ‘champions’ from within staff to assist in the dissemination of knowledge.’

The external evaluation identified a lack of in-depth detail on individual faculty needs. The project team commissioned further research and subsequent reports have been commissioned. The evaluation also highlighted that little formal evaluation of the strategies has been undertaken. As a result, plans were made to conduct a review in phase three. Dr Tony Koop and Associates’ report also addressed how this project contributed to the objectives of the then Carrick Institute.

The results were disseminated through conference presentations, professional newsletters and refereed journal articles and the report being made available to interested parties. The report highlights the need for change management strategies for successful implementation of online learning and teaching principles and practices.
Developing pedagogical models for building creative workforce capacities in undergraduate students. Professor Erica McWilliam (2006 ALTC Associate Fellow)

The report summarises findings from evaluation of key research questions:

- What does pedagogical work for creative workforce capacity-building actually look like in practice?
- What are the barriers to teaching for creative workforce capacity-building and how can they be overcome?

The goal was to clarify how pedagogical processes can build creative workforce capacities in undergraduate students and identify specific teaching practices that develop creative workforce capacity. Within that goal the fellowship identified five objectives:

1. To understand the relationship between pedagogical work and creative workforce capacity-building in formal learning environments
2. To investigate examples of pedagogical processes and products that characterise a creativity-centred learning environment
3. To identify barriers arising in pedagogical work for creative workplace capacity-building
4. To develop models of engagement that can overcome these barriers
5. To disseminate these models among key stakeholders in higher education teaching and learning.

To understand the relationship, scholarly work undertaken to investigate and theorise resulted in six papers presented at national and international conferences and six refereed conference papers published in 2007 (http://www.altc.edu.au/resource-developing-pedagogical-models-qut-2007).

To investigate objective two, an extensive review of the literature was undertaken and a web log was established to foster discussion and collaboration among peers investigating creativity in the higher education setting. Conversations with interested scholars helped highlight the deficiencies in the current literature and promoted links with research institutions in the United Kingdom, Canada and the United States of America. Research conducted during the fellowship highlighted that most higher education institutions valued creativity but there is not a clear or agreed understanding of what constitutes creative capacity. To investigate the barriers and to further promote creative capacity-building, the National Creativity Showcase was held in December 2007. It aimed to establish networks and collaborations for scaling creativity-focused pedagogies. The fourth objective was to develop models of engagement to overcome the barriers and the models were published in a number of papers. The National Creativity Showcase added to the knowledge base of models of engagement by exploring the implications of the specific pedagogical work of thirty participants of the workshop. The clips can be found on YouTube.

Dissemination of the models and evaluation of the fellowship was achieved through keynote addresses, the establishment of a web log, published journal articles, presentations at conferences and media coverage.
Creating accessible teaching and support initiative (CG7-543) (2007)

The project aimed to develop resources that focus on continual improvement and professional learning with a focus on issues for students with disabilities. The inclusive principles underpinning the project ensure the resources can be used to meet the needs of students from diverse backgrounds. The project recognises that the increasing diversity of the student population in higher education institutions presents challenges but argues that the diversity has the potential to enrich learning outcomes and the student experience. The resources developed can assist and inform good practice.

The project built on the research undertaken by the Australian Universities Teaching Committee in 2003. That report identified the potential of broadening the focus of the web-based resource developed to assist institutions to improve the teaching and support provided to students with vision impairments. Further support from the Carrick Institute for Learning and Teaching in 2006 saw the website include a framework for good practice in the provision of teaching and support for students with disabilities. The major outcomes of this report can be accessed at (http://www.altc.edu.au/resource-accessible-teaching-support-utas-2006).

Subsequent funding allowed this project to develop and add to the resources for implementation with higher education. Work included:

Further development of the web resources (http://www.adcet.edu.au/cats/)

- The production of a number of professional learning resources including videos, fact sheets and activities based around these resources (http://www.adcet.edu.au/Cats/Teaching_and_Assessment.chpx).

The methodology is clearly outlined. Dr Val Chapman, Director, Centre for Inclusive Learning Support at the University of Worcester conducted the summative evaluation. The details are included in the report. Good practice strategies are outlined and a separate report on the challenges with suggestions can be found on the website (http://www.adcet.edu.au/Cats/CATSuite.chpx). A wealth of resources for supporting and improving teaching and learning for students with disabilities and for inclusive education can be found on the website. The resources would be useful for schools as well as universities.

Information generated from the project was disseminated via a series of workshops providing professional development and information to senior managers, academics and practitioners about inclusive practices and the use of the web resource. The project has been showcased at a number of conferences and the booklets, website and resources are actively promoted throughout the sector. A comprehensive literature review can be accessed on the website. The site also provides links to current relevant news and events and other resources that may be of interest or benefit to educators in the disability sector.

Recommendations for future investigation include further development of the online resource, the development of a wiki or similar platform for provide opportunities for collaborative learning, development of a community of practice, investigations to ensure sustainability of the online resource and further research into the provision of practical strategies for students with disabilities. All are worthy of consideration for future funding.

LiFE – learning interactively for engagement: meeting the pedagogical needs of refugee students in two Western Australian universities (CG7-496) (2007)
The aim of the project was to:

- Document the differing learning and adaptation needs of students from refugee backgrounds
- Develop and pilot innovative programs and materials tailored to meet the specific needs of university students from refugee background
- Use the formative evaluation of the program to develop a set of learning modules that can be used in universities
- Produce a DVD for academic staff to raise awareness of the needs of first year students from refugee backgrounds
- Publish and disseminate a teaching resource guide for academic staff.

The project adopted a 'precede-proceed' methodology. It was undertaken in three stages: learning needs analysis; design, delivery and evaluation of programs; development of an awareness-raising DVD. The results of the qualitative research are clearly outlined and the work was informed by a literature review focused on the current knowledge of refugees in Australia; the pre-migration experiences of the refugees; diversity in tertiary institutions and the implications for educators; the changing profile of tertiary education in Australia; and student engagement and social inclusion. The goals of the project are consistent with good practice but it is noted that no definition is included.

Four modules that address meeting the pedagogical needs of students from refugee backgrounds are clearly set out, very detailed and ready to use. They address key learning strategies such as time management; reflection and self-evaluation; the fundamentals of principles in essay writing; research and computer technology; reading strategies and how to be a proactive learner. The modules developed as a result of the work undertaken in the project can be accessed at http://cih.curtin.edu.au/consultancy/national_projects_LiFE.cfm. The DVD is available on request, from project manager Linda Butcher at Murdoch University (L.Butcher@murdoch.edu.au). A detailed review of the impact of blended learning could not be undertaken because data was not available. Further investigation may be needed to determine issues around best practice and blended learning for students from refugee backgrounds.

Each stage of the research was evaluated. The results informed the progress of the research and development of the resources. The modules have value for the broader community and this is evidenced by requests from the St Vincent de Paul Society in Western Australia, a neighbourhood centre on Christmas Island, Multicultural Services Centrelink Area WA and universities from other states.

The information has been disseminated through community and university presentations, conferences, refereed journal articles and the report. Recommendations for future initiatives include raising awareness of the program through local community organisations and churches, and commissioning more evaluations to assess the qualitative and quantitative aspects of the workshops. More research into the pedagogical needs of refugee students would benefit sectors of society outside higher education and assist tertiary educators in developing appropriate learning and teaching programs.
Supporting student peer assessment and review in large groupwork projects (PP6-49) (2006)

The project's aim was to further the educational design of an online tool to support and facilitate self and peer assessment of individual contributions in large group projects. The online tool would develop assessment skills by providing quantitative and qualitative feedback, evaluation, and review opportunities.

This project furthered work done on a prototype tool developed by the project leaders before 2006. The software architecture and educational design was pilot-tested in various disciplines in different Australian institutions. The project also aimed to begin the distribution of the tool and to prepare some of the supporting framework to continue disseminating the outcomes of the project. The TeCTra online tool, student user manuals, manuals for assist academics managing groups and projects, documentation to facilitate the hosting of the tool on local servers and a website to assist and support a community of users was developed (http://tectra.it.uts.edu.au/). To access the manuals, review case studies and view other resources requires the reader to register with TeCTra. The manuals, case studies and other resources listed on the website were not available for review.

The evaluation is outlined in the report. A summary of the approach taken and the results give an insight into the potential of the tool. A review of the evaluation instruments was not undertaken as they could not be located at the address listed in the report (http://www.altc.edu.au/resources).

The report notes that the literature review revealed that it is difficult to diffuse and disseminate information regarding innovations to curriculum and academic practice. The project's experience confirmed the observations. The results of the project and the TeCTra software were presented at workshops in Australia and overseas. Expressions of interest in the tool did not translate into institutions integrating the tool or investigating the software. An acknowledged barrier to the success of the project is the lack of successful marketing of the tool to academics and universities.

This assessment tool could support good practice in teaching and learning. The implications for blended learning assessments are not outlined specifically. Further funding for marketing, increasing technical support and the maintenance of the website would increase the opportunities to successfully integrate the tool into assessment activities. The software would require further development to remain compatible with future internet browser protocols and this would also require further funding support.

The main aim of the project was to develop solutions to the question, “How do we redevelop existing university spaces to facilitate new styles of learning in a cost effective manner?” To achieve this, the project committed to delivering the following outputs:

- A report outlining the principles for cost effective redevelopment of existing spaces
- A repository of student, academic and professional and support staff perspectives on learning spaces
- A portfolio of resources arising from the project
- A one-day colloquium to share project results.

The project website is a portal to the resources developed by the project (http://learnline.cdu.edu.au/retrofittingunispaces/resources/intro.html). The overview of the literature surrounding learning space design principles identified some 46 principles that could guide the development of learning spaces. The perspectives of students, academics, professional and support staff were considered to refine this list. The resulting report and the literature review can be accessed at (http://learnline.cdu.edu.au/retrofittingunispaces/resources/intro.html).

A short report outlines 25 ideas for use in the redevelopment of existing learning spaces and offers solutions that are practical, cost-effective and easy to implement. The report is available via the website and is presented using wiki-technology to allow comment from the wider community. A multi-media exhibition that provides access to plans, data and videos is a major resource that can be viewed at ‘resource repositories’ (http://learnline.cdu.edu.au/retrofittingunispaces/resources/intro.html).

The final report details the methodology adopted, summarises the analysis and findings succinctly and gives insight into the processes used to develop the resources. Eight key principles were identified to inform the redevelopment of specific university sites:

1. Spaces should support a range of learners and learning activities
2. Spaces should provide a quality experience for users
3. Spaces should help foster a sense of emotional and cultural safety
4. Spaces should enable easy access by everyone
5. Spaces should emphasise simplicity of design
6. Spaces should integrate seamlessly with other physical and virtual spaces
7. Spaces should be fit for purpose, now and into the future
8. Spaces should embed a range of appropriate, reliable and effective technologies.

To demonstrate and further develop the design principles, Charles Darwin University redeveloped an old general-purpose computer teaching space into a 50-person general-purpose, flexible wireless lab for IT, architecture and engineering students. Post-occupancy evaluations suggest the new space both engages and empowers students and academics in the way intended by the design principles. The redevelopment of five classrooms and a connecting corridor at Queensland University of Technology was equally successful. Full details of these case studies can be accessed at the website. Information was disseminated via the website, a colloquium, local presentations, conference presentation and workshops.
eDST: Decision support tools for multi-disciplinary applications in higher education (CG9-1135) (2009)*

Lead Institution: University of New England (Lead)

Partner Institution: University of Tasmania

Project leaders: David Cottle, Peter Lane, Belinda Tynan

Final report: eDST: Decision Support Tools for multi-disciplinary applications in higher education (David Cottle, Peter Lane, L. Ray Fife) (University of New England (Lead), University of Tasmania) (2011)

This project was based on the idea that, among university teachers of agricultural science and related degrees across Australia, simulation software programs (or digital support tools (DST) were being incorporated into units as valuable learning experiences for undergraduate students. In most cases, these software programs were supported by special funding. In general, once the funding support was finished, these initiatives proved unsustainable. The eDST project sought to support deeper professional learning experiences for students by developing a protocol to facilitate the development of a national DST platform. The proposed national platform will be robust, secure and appropriate for use by academics and students in a variety of contexts.

OUTCOMES AND TOOLS:

Because of the widespread use of DST applications in industry and government, and the benefits for enhanced learning in higher education, the project team found that there is considerable potential for an organisation to offer and support DST software across a range of universities and teaching sectors. It is recommended that a ‘champion’ be sought to address the unresolved delivery and funding issues, and to manage the implementation of a pilot project.

Project outcomes include:
- two position papers on design support tools (DST) for multi-disciplinary applications in higher education
- prospectus for membership of the simulation platform for learning and teaching
- request for proposal (RFPs) for organisations capable of supporting such a platform.

Final report is available upon request. Direct queries to learningandteaching@deewr.gov.au
Developing and disseminating TEAM SKILLS capacities using interactive online tools for team formation, learning, assessment and mentoring (CG7-531) (2007)*

Lead Institution: The University of Queensland

Partner Institutions: RMIT University, The University of Melbourne, The University of Western Australia, University of Southern Queensland, University of Technology, Sydney

Project Leader: Lydia Kavanagh

Final report: Developing and disseminating team skills capacities using interactive online tools for team formation, learning, assessment and mentoring (Lydia Kavanagh, David Neil, John Cokley) (The University of Queensland (Lead), The University of Melbourne, The University of Western Australia, RMIT University, University of Southern Queensland, University of Technology, Sydney) (2011) (The final report will be available on the ALTC website soon.)

Teamwork in higher education allows for larger real-world projects to be set, teamwork skills to be improved, collaborative learning and the establishment of student social networks. Academics must implement team projects effectively and professionally for learning objectives to be achieved. This project aimed to produce a multifaceted approach to creating effective, productive and happy student teams and minimising team dysfunction and poor project outcomes. The PETS (Proactively Ensuring Team Success) process, which addresses team dysfunction and social loafing, has been tested, evaluated and continuously improved across a range of disciplines since 2002.

OUTCOMES AND TOOLS:

This project has produced a printed manual available online, an interactive and customisable website for students called Working in Teams, and an online peer-evaluation tool called WebPAf. Together these three components contain all the essential resources for the PETS process, including interactive teamwork exercises, downloadable models and examples of team structures, and video and audio packages to complement text and images. It is important to note that the PETS process is not a quick fix nor is it a substitute for content. Instead, it is an effective teamwork overlay requiring good project management and a reasonable investment of time.

Dissemination: In addition to the manual and online resources, a workshop for academics delivered through academic staff development units in all participating institutions has been developed. Workshops have been successfully given to tutors and academics at the University of Western Australia, Monash University and others at The University of Queensland.

The workshop material has been disseminated to the members of the SG for dissemination in a strategic fashion to teaching and learning committees, professional development bodies and discipline leaders.

Project website: http://ceit.uq.edu.au/content/pets
The Learning in Networks of Knowledge (LINK) Project explored and identified Web 2.0 applications and tools that can contribute to innovative and agile teaching and learning approaches centred on knowledge production in a networked environment. These approaches and a wide range of Web 2.0 applications were tested within an applied research setting in the Department of Internet Studies at Curtin University. Pedagogical challenges involved the development of authentic learning experiences and assessment tasks, while providing effective cognitive scaffolding within which learning could occur. The project website is a substantive outcome of the fellowship and should be referred to in conjunction with the final report.

The website [http://knowledgenetworklearning.net/](http://knowledgenetworklearning.net/) is an excellent source of resources and provides the following:

- key concepts about knowledge networking, Web 2.0 pedagogy and their interrelationship
- practical tips on where to start applying knowledge networking via Web 2.0 applications
- a list of 50 carefully selected and analysed tools on where to start
- detailed examples on knowledge networking approaches to learning in the Internet Communications course at Curtin University
- links to papers, presentations and other useful material (including research and other writing emanating from the fellowship).

A website which provides key concepts, practical tips, detailed examples and links to other useful materials on knowledge networking
Implementing effective learning design (CG8-758) (2008)*

**Lead Institution:** Macquarie University

**Partner Institutions:** Australian Catholic University, Edith Cowan University, University of Technology, Sydney, La Trobe University, Charles Darwin University, Griffith University

**Project Leader:** James Dalziel

**Final report:** Implementing learning designs (James Dalziel, Leanne Cameron) (Macquarie University (Lead), Australian Catholic University, Edith Cowan University, University of Technology, Sydney, La Trobe University, Charles Darwin University, Griffith University) (2011) (The final report will be available on the ALTC website soon.)

Designing learning materials which accommodates different student ability levels, learning approaches and media, and curriculum developed to support a variety of discipline-specific outcomes is a complex task. Most academic staff are not trained for the task. The project implemented scaffolded learning design templates that provide comprehensive guidance for academics and which assist them in the development of inspiring learning design examples and supportive activities.

**OUTCOMES AND TOOLS:**

The project’s outcomes are:

- A range of courses and units across several disciplines that have adopted pedagogically sound learning designs from participation in the project.
- Improved student learning outcomes by introducing a range of learning designs that promote best practice.
- A community of educational developers and academic staff who are participants in the project and are able to engage with additional staff in their own and other universities to disseminate the project outcomes.
- An eight-minute video presentation was prepared so that the features of the current Planner can be viewed. The video is available at: [http://wiki.lamsfoundation.org/display/planner/Activity+Planner](http://wiki.lamsfoundation.org/display/planner/Activity+Planner).
- A highly scaffolded but flexible learning activity planning tool that helps academic staff understand the rationale for using exemplar learning designs and guides practitioners through learning design options.
- 30 exemplar learning designs and guides.

**Dissemination:** The team conducted a series of eight workshops to promote the adoption of best practice and introduce a Learning Design approach, and sharing of experiences among 94 practitioners. Throughout the life of the project, team members made 42 presentations to approximately 2,445 people. The team produced 19 research articles and 42 conference presentations at a national and international level.

Project website: [http://implementinglearningdesigns.lamsfoundation.org](http://implementinglearningdesigns.lamsfoundation.org)
Learning to teach online: developing high-quality video and text resources to help educators teach online (CG9-1091) (2009)*

Lead Institution: The University of New South Wales

Project Leader: Simon McIntyre

Final report: Learning to teach online: developing high quality video and text resources to help educators teach online (Simon McIntyre) (The University of New South Wales) (2011) (The final report will be available on the ALTC website soon.)

Educational institutions around the world are facing an increasing demand for online learning options by their students. Despite this demand, institutions have in many instances been slow to adopt properly resourced and supported online teaching endeavours (DiPaola, Dorosh, & Brandt, 2004; Hannon, 2008). The overall aim of the project was to provide educators with a series of free online resources to help them start to teach online, or to become better online teachers.

OUTCOMES AND TOOLS:

The project has produced:
- A suite of 32 video and PDF episodes categorised into: context, planning and teaching; case studies; and technical glossary.
- An online forum to support the community of practice.
- Development of a technical infrastructure to disseminate the episodes including a website, UNSW TV, iTunes U and YouTube channels.
- A social media dissemination strategy that has resulted in 36 unsolicited national and international blog posts, and 372 Twitter users sharing information about the project across 34 different countries.

The project has developed a reputation for providing quality, pedagogically sound and broadly applicable professional development resources relevant not only to the Australian higher education sector, but to other sectors around the world. The daily use of Learning to Teach Online continues to increase as more people around the world become aware of the project. It has gained significant momentum and exposure thus far over its short life, and indications are that it will have a relatively long life span, particularly in cases where it will be used repeatedly on a semester-by-semester basis support instances of educational programs.

Dissemination: The results and impacts of the Learning to Teach Online project have far exceeded the original expectations:

- Teachers in 117 countries, from a range of disciplines and education sectors, have accessed the episodes over 60,000 times in just 8 months.
- Twenty-two institutions in six countries have linked to the project on their own websites as learning and teaching resources.
- Fourteen institutions in five countries have embedded the project resources into their own professional development or educational programs.

Project website: http://online.cofa.unsw.edu.au/learning-to-teach-online/ltto-episodes
A video introduction to the project is here: http://bit.ly/9pOeEE
Embedding peer review of learning and teaching in e-learning and blended learning environments (PP7-332) (2007)*

Lead Institution: University of Technology, Sydney

Partner Institutions: Curtin University, Queensland University of Technology, RMIT University, University of South Australia, ATN Universities

Project Leader: Jo McKenzie

Final report: Peer review in online and blended learning environments (Jo McKenzie, Nicola Parker) (University of Technology, Sydney (Lead), Curtin University, Queensland University of Technology, RMIT University, University of South Australia, ATN Universities) (2011)

The project aimed to improve the quality of teaching and learning in blended learning environments and extend the range of evidence for good teaching in blended learning environments to embed scholarly peer review processes in institutional practices for recognising and rewarding teaching. The project sought to develop a scholarly framework, processes and resources for peer review of learning and teaching in online and blended learning environments to recognise and reward good teaching.

OUTCOMES AND TOOLS:

The project confirmed many of the issues that have been identified in the peer review literature and other Australian Learning and Teaching Council peer review projects. Specific insights include:

- There was value in using a flexible, scholarly framework for both formative and summative purposes. The framework supports and structures peer review of teaching goals, preparation, methods, communication and interaction, outcomes, reflection and subsequent improvement.

- Peer review in online and blended learning environments:
  - needs to be carefully scoped, with specific aspects of teaching and subjects considered in relation to the whole of a subject or teaching context; and
  - is often best conducted by peers with similar or more advanced levels of experience in these environments, particularly when the reviewee is using innovative approaches.

- Approaches to the use of peer review for promotion may range from formative, indirect approaches, to summative voluntary approaches, to summative mandated approaches with independent reviewers. It is suggested that peer review in online and blended environments is most useful when it includes a formative focus and voluntary elements, to enable insightful evidence to be provided by reviewers who enter into the learning and teaching environment.

Dissemination: The project was designed to encourage dissemination in the institutions beyond the core team and ideally more widely in participants’ departments. Specific dissemination activities include workshops to engage participants, and scholarly presentations and publications that intended to raise awareness.

Spaces for knowledge generation: a framework for designing student learning environments for the future (PP8-849) (2008)*

**Lead Institution:** La Trobe University

**Partner Institutions:** Charles Sturt University, Kneeler Design Architects, Apple Inc.

**Project Leader** Associate Professor Kay Souter

**Final report:** Spaces for Knowledge Generation (Kay Souter, Matthew Riddle, Warren Sellers, Mike Keppell) (La Trobe University, Charles Sturt University, Kneeler Design Architects, Apple Inc.) (2011)

Learning spaces which invite students to configure their working environment tend to help produce an engaged and considerate community of learners. This project addressed the emerging learning and teaching practices and the extent to which learning environments that students prefer are catered for. The project developed a framework for the design of future-proofed learning spaces.

**OUTCOMES AND TOOLS:**

Project outcomes include:
- An interactive online site <http://www.skgproject.com/> with links to photo galleries, video interviews, forum presentations, design prototypes, hyperlinked glossaries, an annotated bibliography, and other project resources
- A practical guide for the design of future-proofed, forward looking, adaptable learning spaces that can support student-directed learning and knowledge generation: Designing Student-Centred Learning Environments: Six steps for the Production of Future-proofed Spaces for Knowledge Generation.
- Seven Principles of Learning Space Design
- Improved learning space provision in the participating institutions, and increased student input and awareness of student needs
- Final report to the Australian Learning and Teaching Council.

**Dissemination:**
The project’s findings were presented at five university workshops, 11 national and international presentations.
Peer instruction in the humanities (CG6-51) (2006)

Peer instruction (PI) is an innovative technique for generating active learning in lectures. The aim of this project is to facilitate and encourage the adoption and evaluation of peer instruction in philosophy and the humanities throughout the higher education in Australia. The website http://wwwarts.monash.edu.au/philosophy/peer-instruction provides access to many resources including what is peer instruction, how to use peer instruction, a question database, links to other resources and the facility for ongoing contributions to the database.

The planned outcomes and deliverables of the project were:

2. Creation of a Peer Instruction website to share the information (http://www.arts.monash.edu.au/philosophy/peer-instruction/)
3. Creation and development of other resources (http://www.arts.monash.edu.au/philosophy/peer-instruction)
4. Research report on the effectiveness of the method and measure the success by student evaluations and comparative studies of examination results.

A questionnaire was used to evaluate student responses and a summary report was compiled for each course evaluated. Overall the student response was positive. The range of the questionnaire was extensive and the findings are reported in detail. The investigation was mainly qualitative. The empirical results of examination outcomes are less clear. More data will become available on the website when analysis of subsequent examinations from other philosophy subjects becomes available.

The creation of the online question database will assist other interested educators and potential adopters of peer instruction. The database has ConcepTest questions on a wide variety of topics such as critical thinking, ethics, philosophy of religion, logic and ancient philosophy. The literature review was not included in the final report. The research and references can be accessed through the project website.

The results were disseminated via the website, conferences, academic journals, presentations, an e-learning wiki website at The University of Sydney (http://wiki.arts.usyd.edu.au/elearning/index.php/Peer_instruction) and a subscriber email list. The project achieved the original aims and the additional trial showed that the use of peer instruction could be a useful strategy for blended learning courses and improve student learning and outcomes. The dissemination of the findings has raised awareness of the technique outside science courses. It is anticipated that the project website will allow more people learn about the potential of the strategy and help serve as a central focus for lecturers to share and exchange information. Components of good practice are embedded throughout the report including improving student outcomes, encouraging interaction between faculty members, developing cooperation among students and fostering habits for lifelong learning.

The information available forms a basis for future research into the field. The report does not suggest future directions for research. More empirical evidence may better inform potential users of the strategy on the effectiveness of the pedagogy and inform future directions for inclusion in courses.
Designing a diverse, future oriented vision for undergraduate psychology in Australia (DS6-603) (2006)

The aim of this project was to develop and provide a framework for:

1. The development and articulation of graduate attributes for psychology
2. Research and application of evidence-based teaching in psychology
3. The creation of a diverse, future-oriented vision for undergraduate psychology education.

As a result of the investigation, a comprehensive list of key attributes psychology students can develop during their undergraduate studies is available and has become a valuable research-led resource for both students and teachers of psychology. The agreed set of graduate attributes has been incorporated in the Australian Psychology Accreditation Council’s Rules and Standards and is a resource to enable the extension of graduate attributes to postgraduate psychology education and will support good practice in teaching and learning.

There were 37 participating universities and discipline bodies. As is the case for complex projects, flexibility in the plans enables changes to be made in response to changing circumstances. The prioritising of objectives and methods in this project was fluid and made in response to stakeholder input and changing environmental demands.

The investigation employed action research methods involving iterative cycles of planning, actions, observation and reflection. A summary of the investigation and detail of the specific methodologies is provided. Stakeholders included the Heads of Schools and Departments of Psychology Association, the Australian Psychological Society and its Program Development and Accreditation Committee, the Australian Psychology Program Accreditation Council Limited, the Australian Psychology Educators Network, the Psychology Foundation of Australia and psychology academics, students, employers and consumers.

The project developed a vision statement and accompanying implementation plan (http://www.altc.edu.au/resource-future-psychology-unsw-2008). Strategies identified for developing good practice in education, training and professional practice include:

- Reviewing program accreditation processes and standards
- Reviewing models of education and training by peak discipline bodies and statutory authorities
- Reviewing professional registration systems by peak discipline bodies and statutory authorities
- Improving resources for education and training in psychology
- Supporting communities of practice within education, training and workplaces
- Supporting the continued professional development of practicing psychologists.

The report recommends continued review of the model to facilitate student learning and performance and to promote the importance of the discipline of psychology.
Ongoing ALTC projects and fellowships
(The year at the end of each title is the year in which the project or fellowship is funded. Project/fellowship titles are live links to the resources.)

This section is added by ALTC. It provides abstracts of ongoing projects and fellowships, brief updates of projects’ and fellowships’ progress and expected completion date. It is grouped by disciplines and alphabetically by the projects’ and fellowships’ titles.

Health

Building university leadership capacity in the teaching of implant dentistry to dental students and local professional communities (LE9-1177) (2009)*

Lead Institution: Griffith University

Partner Institutions: The University of Sydney, The University of Adelaide

Project Leader: Nikos Mattheos

Project Abstract
Implant dentistry is the fastest developing and most dynamic area in dentistry. The aim of this project is to support strategic change and develop collaborative, cross-disciplinary leadership capacity for universities in the field of implant dentistry. The leadership envisioned in this project involves the development of the long-term and sustainable capacity to design, produce and deliver cross-disciplinary education within implant dentistry, addressing the needs of the undergraduate curriculum and of communities of local practitioners.

A critical mass of expertise from institutional, national and international sources will be developed and directed towards providing structured support for academic leadership through a cross-disciplinary, blended-learning curriculum in implant dentistry and a supportive peer and expert network. This curriculum will target the needs of both undergraduate students and local general dental practitioners. The developed expertise will be directed towards the development of leadership and mentoring capacity among junior staff members, post-graduate students and researchers who will then undertake leading roles in the teaching of implant dentistry, both within and outside universities facilitating long-term sustainable change.

Program Priority
Disciplinary and cross-disciplinary leadership

Key Words
Implant dentistry, cross-disciplinary curriculum development, multidisciplinary input, undergraduate, continuous professional development, national consensus building workshop

Scheduled Completion Date
September 2011
Renewing the curriculum to more effectively accommodate clinical rotation (PP8-916) (2008)*

**Lead Institution:** Macquarie University

**Partner Institutions:** La Trobe University, The University of Melbourne, The University of Sydney, University of Western Sydney

**Project Leaders:** James Dalziel (Macquarie), Bronwen Dalziel (UWS)

**Project Outcome**
The proposed outcomes for the project are:
- development of six e-learning modules that demonstrate best practice in medical education
- documentation that guides practitioners through their delivery
- share the modules produced through repositories and other communities
- create a community of educational developers, academic staff and medical professionals
- conduct a series of workshops to promote best practice, problem-based learning and learning design.

**Methodology**
The project will employ a design-based research methodology (Reeves, Herrington & Oliver, 2005) which involves a flexible, iterative process. The Start Up Phase will involve the analysis of current learning design, e-learning and problem-based learning research literature to determine the needs and opportunities for application of learning designs by researchers, educational developers and teaching staff. Three initial modules and documentation will be developed consistent with the design solutions identified and in consultation with the Advisory Partners. The Implementation Phase will involve trialling three modules with the University of Western Sydney’s third year medicine students. The outcomes of the Implementation Phase will be evaluated by students and staff, Advisory Partners and peer reviewed. The second group of three modules will then be implemented. Revised modules will be uploaded to an online library for staff to implement the modules in collaboration with the Advisory Partners.

**Key words**
e-learning, problem-based learning, learning design, medicine, medical education, online learning, LAMS, learning modules

**Project Completion Date:** March 2010
Natural and physical sciences

Developing leaders of change in the teaching of large university chemistry classes (LE8-818) (2008)*

Lead Institution: Charles Sturt University

Partner Institutions: Curtin University of Technology, Deakin University, The University of Adelaide, The University of Sydney, University of Tasmania

Project Leader: Danny R Bedgood, Jr

Project Outcome
This project will:
• provide training and resources to chemistry instructors as tools and support for leadership of change in teaching practice
• provide workshops around Australia; these workshops will demonstrate student-centred teaching methods for use in large classrooms
• develop Teaching Practice hubs for chemistry instructors to support each other in implementing change in their teaching practice

Methodology
This project will help project leaders and participants develop in particular two initial aspects of leadership in learning and teaching: learning and teaching; and leading and working in teaching and learning teams. Leadership development will occur within the participants by empowering their teaching practice in four ways: introduction to the methods of student-centred learning; provision with pedagogically founded resources for student use; provision with evidence of improved student learning; and development of an active community of scholars to support participants in their changing practice over time (and so build their emotional intelligences and skills).

This project will run workshops introducing student-centred teaching practice at university in five major cities around Australia; these activities will allow maximum opportunity for local instructors to easily gain exposure to teaching methods. The project leaders in the major cities will serve as learning leaders, providing the seed to foster local communities of practice at local institutions.

Key words
chemistry, student centered teaching, leadership in developing teaching practice, community of practice

Project Completion Date: October 2010
A national soil science curriculum in response to the needs of the students, academic staff, industry and the wider community (PP9-1341) (2009)*

Lead Institution: The University of Sydney

Partner Institutions: The University of Adelaide, The University of Melbourne, The University of Queensland, The University of Western Australia

Project Leader: Alexander McBratney

Project Abstract
The project aims to develop a national soil science curriculum using transferable learning and teaching approaches that produce work-ready graduates with the interdisciplinary knowledge, skills and capabilities relevant to the needs of Australia. The method for achieving this is an incremental four cycle process designed to bring about required change.

• Cycle 1 will identify the university issues concerning learning and teaching soil science where the national critical mass of expertise is dwindling and local students may not experience the full discipline or optimal learning.
• Cycle 2 will bring on board the industry perspective by consulting employers and soil science graduates in the workplace about the curriculum. The outcome of these cycles will be a shared picture of teaching and learning practices, limitations and capability deficiencies, and curriculum revision requirements.
• Cycle 3 will scope and implement the platform for delivering the required revised curriculum at a national level.
• Cycle 4 includes national and international dissemination to agriculture and related disciplines.

Program Priority
Curriculum renewal

Key Words
Action learning cycles, generic graduate attributes, domain knowledge, cross-institutional, problem-based learning, industry stakeholders, propositional learning, learning communities, experiential learning

Scheduled Completion Date
January 2012
Plant breeding by example: contextual examples linking theory with practice in plant breeding education (CG9-1120) (2009)*

Lead Institution: The University of Adelaide

Partner Institutions: The University of Sydney, University of Tasmania, The University of Western Australia

Project Leader: Diane Mather

Project Abstract
In this project, educators from Australian universities will create and exchange educational resources based on recent, real-life examples in plant breeding. Examples will be chosen to be relevant to defined learning outcomes and to sample diverse biological, methodological, geographic and economic contexts. The resources developed in this project will be made freely available in electronic format for use via multiple delivery methods. Availability of a pool of example-based resources will diversify learning and teaching experiences in plant breeding education, supporting educators in enriching their teaching and supporting students in learning to apply scientific principles in a wide range of contexts. Through collaboration in the development of these resources, this project will contribute to the development of a community of practice that will support ongoing innovation in plant breeding education in Australia and internationally.

Program Priority
Innovation in learning and teaching, particularly in relation to new technologies

Key Words
Plant breeding, genetics, agriculture, forestry, horticulture, educational resources, contextual examples, plant breeding education

Scheduled Completion Date
November 2011
Non-disciplinary

Community, domain, practice: facilitator’s catch-cry for revitalising learning and teaching through communities of practice, Associate Professor Jacquie McDonald. (2010 ALTC Teaching Fellow)*

Lead Institution: University of Southern Queensland

Fellowship Abstract

Communities of practice (CoPs) are cited in higher education literature and ALTC applications as a successful way of building and sharing a scholarly approach to enhancing learning and teaching practice. This fellowship builds on the fellow’s CoP leadership role at the University of Southern Queensland, which initiated an institutional model for engaging academic staff in situated professional development. This role was recognised through an ALTC Citation (2009) and USQ CoPs received a 2009 AUQA commendation. Academic CoPs operate differently from institutionalised higher education work groups, and the facilitator’s role differs from the familiar chairperson’s role. An action research approach will identify key aspects of the facilitator’s role and use USQ’s multimedia capacity to create digital re-enactments to enable critical analysis of the role. Facilitator capacity-building will also include workshops by an international expert, Dr Milton Cox (Miami University, Ohio), and a facilitator’s start-up handbook. Activities will build on existing collaboration with Australian academics implementing CoPs and international CoP expert, Dr Etienne Wenger.

Fellowship due for completion: Late 2011
e-Teaching leadership: planning and implementing a benefits-oriented costs model for technology enhanced learning (CG9-1242) (2009)*

Lead Institution: University of New England

Partner Institutions: Australian Catholic University, Central Queensland University, University of Southern Queensland

Project Leader: Grant Harman

Project Abstract
This project seeks to assess the costs and benefits of online teaching, specifically via development of appropriate methodologies for within-institution costing of online teaching, and exploring the implications of online teaching for staff workloads. The project team will work with schools and course teams within the four participating universities to plan and implement strategies for a prospective rather than retrospective cost-benefit model, which can enable innovators to plan and understand the relationship between the expected learning benefits and the likely teaching costs. The approach will be based on the models of Laurillard and Twigg. A guidebook for staff will be produced detailing strategies to enhance learning and cost effectiveness in online teaching.

Program Priority
Innovation in learning and teaching, particularly in relation to new technologies

Key Words
Online learning, workload models, teleworker, eLearning, online teaching, cost effective

Scheduled Completion Date
September 2011
Professional staff as leaders in enhancing student engagement: building capacity in emerging technologies through cascade and viral leadership (LE9-1231) (2009)*

**Lead Institution:** The University of Western Australia

**Partner Institutions:** Murdoch University, Edith Cowan University

**Project Leader:** Lisa Cluett

**Project Abstract**
The goals of this project are threefold:
- to develop an ongoing, Western Australian-based network of professional staff leaders who foster student engagement through emerging technologies;
- to design, implement and evaluate web-based resources to support this network and to ensure its continuity; and
- to create a new model of leadership for application in the tertiary sector, based on applying the cascade/viral model to building leadership capacity.

The first phase of the project is a structured learning component and the establishment of a community of leaders across the three partner institutions. Subsequent phases will develop this community through mentoring, networking and community activities, all under the auspices of a new cascade and viral leadership model. The growing community of leaders in Western Australia who are able to recognise, initiate and integrate emerging technologies into the engagement of students will be a lasting outcome of the project.

**Program Priority**
Institutional leadership

**Key Words**
Professional staff, viral leadership, cascade leadership, digital literacy, generation Y, emerging technologies, student engagement, community of practice and capacity building

**Scheduled Completion Date**
June 2012
Recommendations

The literature indicates that blended learning can improve learning outcomes, increase student satisfaction and can make courses more accessible to a wider range of students. It also highlights that academics have mixed reactions to blended learning programs, particularly in regard to: a lack of support, both technically and institutionally; financial sustainability; and the lack of empirical data to support further blended learning curriculum development.

This Good Practice Report reveals that the greatest barrier to successfully implementing a blended learning program is a lack of time. A lack of time for academics to:

- Develop competencies with institutional learning management systems
- Develop competencies with existing technologies (e.g., iPhones, tablets and other devices)
- Identify new technologies that might be appropriate for their discipline
- Adapt the curriculum to direct the teaching and learning opportunities afforded by these technologies
- Develop discipline-specific principles of good practice
- Collaborate with peers, inter and intra-institutionally
- Provide adequate contact time, either face-to-face or online, with students.

Recommendation 1

It is recommended that existing successful models for implementing blended learning be collated on a website and research continued to build on and expand the available resources.

Recommendation 2

It is recommended that the implications for policy development in relation to academic practice, quality teaching and learning, and curriculum development highlighted by *The impact of web-based lecture technologies on current and future practice in learning and teaching* (CG6-22) be further explored.

Recommendation 3

It is recommended that research be conducted into how institutions can support changes to teaching and learning in blended learning with particular emphasis on staffing ratios, changing technology and resources.

Recommendation 4

It is recommended that research be conducted into how much professional development and what kind of professional development is necessary to support academics in the blended learning area (ACU).

ALTC-funded research can benefit the wider community. The outcomes from projects such as Virtual microscopy for enhancing learning and teaching (CG7-398) have already been incorporated into the Learning Federation for the use of school students and have merit for use in institutions such as hospitals and other laboratories. Science for early childhood teacher education students (ECTES): collaboration between teacher educators, scientists and engineers (CG8-724), Creating accessible teaching and support initiatives (CG7-543), and Remotely
accessible laboratories – enhancing learning outcomes (CG6-40) also have the potential for broader applications. The outcomes from these papers could be useful to the secondary education sector, the TAFE sector and some commercial enterprises to give better access to expensive laboratories and help develop skills in high achieving students and the employees of relevant companies. Retrofitting university learning spaces: from teaching spaces to learning spaces (PP8-921) gives insights that may help School libraries restructure the spaces in existing buildings to facilitate collaborative learning, the increased use of technology in schools and to support student learning. The increased enrolments of overseas students in suburban schools is presenting problems to classroom teachers and the lessons learnt in Western Australia; LiFE – learning interactively for engagement: meeting the pedagogical needs of refugee students in two Western Australian Universities (CG7-496), could be adapted to the school environment.

Recommendation 5

It is recommended that research into how to best disseminate the information and resources be funded.

Active learning is the focus of some of the research projects and the literature evaluated in this report. Blended learning is changing curriculum development and the roles of both educators and students.

Recommendation 6

It is recommended that research be undertaken to support the shift from passive to active learning for students. To further this process, educators need to facilitate active learning. It is recommended that further research be funded to develop guidelines to assist this process. The approaches outlined in Strategies and approaches to teaching and cross cultures (CG7-494) could be further developed.

Ethical considerations such as: privacy, confidentiality, intellectual property, plagiarism, codes of conduct, health and safety implications, accessibility and the digital divide have not been the main focus in the literature.

Recommendation 7

It is recommended that further research into the implications of ethical considerations would inform good practice and provide invaluable information for those developing frameworks and models to improve the delivery and outcomes of these courses.

Recommendation 8

There was a lack of empirical data to support some of the theoretical frameworks. It is recommended that a wider range of research methods be employed to gather data to explore good practice in blended learning.

Recommendation 9

It is recommended that the scope of research be extended to include impacts and implications of blended learning at undergraduate and postgraduate whole of degree level.
Conclusion

The concept of blended learning has been adopted into the higher education environment and is now frequently cited as an emerging trend within this context. This report was commissioned by the Australian Learning and Teaching Council to examine best practice within this important emerging area. By critically examining the 19 completed ALTC funded projects and fellowships undertaken in this space, as well as key national and international literature, this report has identified areas for further work and development which will allow Australia’s higher educators, regardless of discipline, to take best advantage of blended learning within the learning environments they craft to support student learning outcomes.
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