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Developing Evaluation Frameworks for Assessing Quality ICT-based Learning in Higher Education

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Abstract

This paper describes the evaluation of high quality learning designs which are being selected for possible redevelopment in a National Project funded by the Australian University Teaching Committee (AUTC). The project focuses on "Information and Communication Technologies (ICTs) and Their Role in Flexible Learning" and is evaluating over 50 projects with a view to developing a range of software tools, templates and/or guidelines based on those that are deemed to be effective ICT-based learning projects. The approach is unique in that it tries to pinpoint the key attributes of ICT-based projects that make them suitable for application in other contexts and in other knowledge domains.

Introduction

There tends to be general consensus among experts that the forms of learning environments most effective for meaningful learning in higher education are those that are based on the contemporary theories of learning which support knowledge construction through learner-centred settings (e.g. Duffy & Cunningham, 1996; Bostock, 1998). These perspectives about learning are challenging conventional teaching approaches. For example, Cunningham et al. (1998) state:

> The growing acceptance of new educational philosophies and practices, such as constructivism and action learning during the 1980s, have challenged the valence of the didactic lecture/tutorial/textbook model common in higher education, promoted the notions of the academic role as 'a guide on the side' rather than 'the sage on stage', and conceived of the student role as one of independent self-directed learner. (p. 25)

The growing awareness of effective and meaningful teaching and learning plus the recent developments in ICT has led to synergies emerging between the use of ICT and the adoption of powerful learning strategies. The Web is one technology that shows particular promise for supporting meaningful learning through its remarkable functionality, support for flexible delivery modes and capacity to link and connect those involved in the learning process (e.g. Levin, 1999). The possibilities exist for rich learning based on this technology, but for the most part, pedagogically sound and exciting Web courseware tools have yet to be developed to take advantage of such opportunities.

One of the key issues is that the pace of change of emerging Web technologies is so rapid that pedagogical models may be needed to help create Web tools from a learner-centred perspective. Salomon (1998) has supported this concern and has noted that for the first time in history, technologies are outpacing pedagogical and psychological rationale. However, a body of literature is starting to report on innovative tools, with strong pedagogical underpinning. Bonk (1998) has reported on interactive tools for on-line portfolio feedback, profile commenting, and Web link rating. Oliver and McLoughlin (1999) are building tools for on-line debate, reflection, concept mapping and student surveying and discussion. Wills, Ip & Bunnett (2000) are building engines for online role plays. As a way of describing the range of options that might contribute to a learning design in such contexts Figure 1 shows the combination of elements that might be considered in such an endeavour.

In this project, the terms "learning designs", "high quality learning experiences", and "flexible learning" are defined as follows: *Learning designs*: refer to a variety of designs that support student learning experiences. Learning designs may be at the level of a whole subject, subject component or learning resource. *High quality*

learning experiences : refer to experiences resulting from an environment, which encourages students to seek understanding rather than memorisation (only for the purposes of assessment), and which encourage the development of lifelong learning skills. *Flexible learning*: refers to an educational approach that meets the diverse needs of students. The project is to focus on how ICT can be used to design flexible opportunities for students.

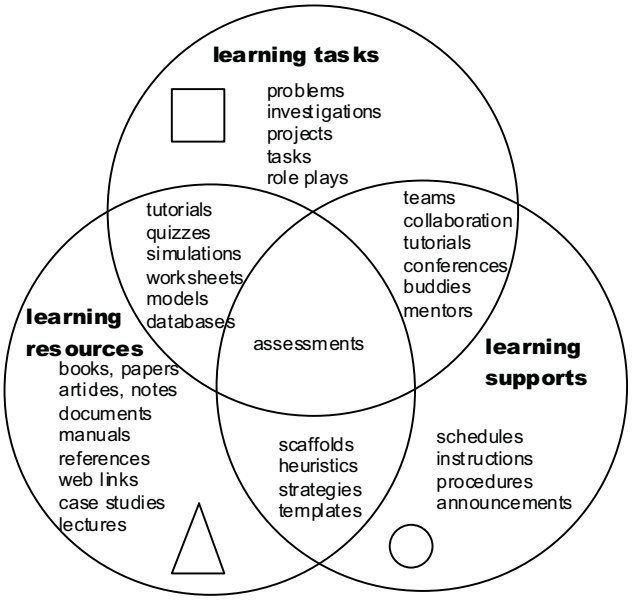

Figure 1: Elements of learning designs for online learning

Current settings hold fewer impediments to ICT uptake than have been present in the past. Universities within Australia have moved swiftly in recent years to develop the necessary infrastructure to support ICT as a delivery medium and most universities now boast a solid ICT infrastructure aimed at supporting teaching and learning programs. The uptake of ICT as a delivery medium has been supported by professional development programs and activities aiming to develop the ICT literacy of staff plus clearinghouses and Web sites for dissemination of information about ICT in teaching. Funding has been applied by government sources to support the development of university teaching and learning and many organisations now exist that support and promote quality teaching as a scholarly pursuit. Among the major impediments that still stand are the lack of quality teaching and learning models and appropriate instructional material and software for teachers to apply.

This project aims to provide some relief to these impediments by identifying and creating quality resources for generic and mainstream application and by providing appropriate support and resources that will guide and encourage their use. Projects of this type should result in a coming decade that witnesses a growth in pedagogically based learning technologies.

Aims of this project

The aim of this project is to assist university instructors to create high quality flexible learning experiences for students by providing a range of generic resources/tools/templates/guidelines that draw upon successful flexible learning projects that utilise ICT and which may be generalised beyond the scope of the individual project. Successful ICT-based learning projects are those that facilitate high quality learning experiences for students. A study conducted by Alexander and McKenzie (1998) highlighted that one contributing factor towards a successful learning outcome for an ICT-based learning project was the learning design employed. Thus, this project has followed the process:

1. Identification of a range of learning designs that have been demonstrated to contribute to high quality learning experiences and which can be applied generically;

2. Design and subsequent development of a series of re-usable software, templates and/or guidelines for the learning designs previously identified; and
3. Dissemination of good practice for the use of or implementation of the software, templates and/or guidelines in new contexts.

Crucial to the success of this project was the development of an evaluation instrument referred to by the project as an *Evaluation and Redevelopment Framework* (ERF), with a twofold purpose:

1. To facilitate the identification of learning designs that foster high quality learning experiences; and
2. to provide a mechanism to determine whether such learning activity designs have the potential for re-development in a more generic form.

Project structure

The project began in November 2000 and is structured against four milestones:

1. *Milestone One (May 2001):* Development of the Evaluation and Redevelopment Framework
2. *Milestone Two (November 2001):* Identification and documentation of learning designs that foster high quality learning experiences and that have the potential for redevelopment in a more generic form.
3. *Milestone Three (June 2002*): Development of a selected number of learning designs in a generic form to at least prototype stage.
4. *Milestone Four (December 2002):* Completion of the development of learning designs in a more generic form and finalisation of a web site that will store the project's developed resources.

Development of the Evaluation and Redevelopment Framework

Characterising High Quality Learning

A major project activity has been the critique of what constitutes "high quality learning". Professor Boud and Associate Professor Prosser were commissioned, as two leading thinkers about learning in higher education in Australia, to develop a paper on high quality learning. Their ideas together with feedback from the project team led to the development of a set of "Key Principles for High Quality Student Learning in Higher Education—from a Learning Perspective" (Boud & Prosser, 2001). The key principles describe four main characteristics that underpin high quality learning in the higher education context. The principles are elaborated through a series of questions that provide a lens through which learning environments can be explored. The four principles are holistic in that they incorporate both learning outcomes and learning processes and are based upon an experience-based learner-centred view of learning. The four principles are outlined below in the form of descriptions of high quality learning activities.

High quality learning activities:

1. Engage learners through:

- Building on their learning intents generally and their particular expectations of the activity in question;
- Acknowledging and taking account of their prior experience, both their knowledge and experience of situations which might impinge on the present ones;
- Mobilising their will and desire and developing some kind of emotional engagement with the task in hand;
- Providing them with a sense of agency with respect to the activity or significant parts of it; and
- Recognising that learning is a social act and involves other learners for at least part of the activity.

2. Acknowledge context through:

- Involvement with problems in context;
- Recognising the context of the learner (who may see themselves as decontexualised);
- Maintaining an awareness of the cultural assumptions and stereotyping which may be incorporated in the context;
- Situating learning tasks within disciplinary or professional or practical knowledge as appropriate;
- Taking account of the site of application of what is to be learned (this poses different challenges when the learner is currently engaged in the site of application and when they are not);
- Appreciating the knowledge demands on students and equipping them to deal with them; and
- Ensuring that there is a clear alignment between the activities in which students will be engaged and the ways in which they will be assessed.

3. **Challenge learners through:**
   - Prompting them to seek and discern variation in the knowledge and experiences in which they are involved;
   - Questioning the assumptions they bring to the activity and the assumptions they develop through it;
   - Encouraging them to see what is provided as a means to wider ends and go beyond what is provided; and
   - Creating situations in which they are required to take responsibility for their own learning and to shape the activity to their own ends.

4. **Involve practice through:**
   - Demonstrating what has been learned for themselves and for others;
   - Gaining feedback at strategic points in learning, but also recognising that finding ways of gaining feedback for one self other than that provided is also important;
   - Reflecting on and making sense of their experiences. Continuous exposure to new activities without integration and consolidation within the learner's framework is not conducive to good learning; and
   - Developing confidence in performance from practice.

Developing the evaluation instrumentation

Whilst the above principles formed the basis of the evaluation framework, the following issues were raised by the reviewers that they should be incorporated into the instrument:

- How technology is embedded in a learning design and how its use supports or hinders the learning experience.
- The issues of scalability, transferability, and technology affordances.
- To determine suitability of redevelopment of a learning design, the evaluation should provide a mechanism to glean the critical design features from a learning design and consider how these design features could be implemented in a more generic form.
- To place the review framework within a staged process which might inform the project through a series of critical decision points.

The first complete version of the evaluation instrument was devised by the Core Team and Research Team after the first workshop. This version was formatively evaluated in the second workshop (scheduled one month after the first). The Research Team also examined existing evaluative instruments to determine whether these could inform and/or be incorporated into the project's evaluation framework.

Since the second workshop (held at the end of April 2001) the evaluation framework has undergone further review and formative evaluation. Feedback from the Project Review Panel and International Reference Group has been considered and via discussions with the Core Team, Research Team and Steering Committee, a revised version of the evaluation framework has been developed. A challenge for the project has been how to elucidate the key and/or unique elements of the learning design that enable the facilitation of a high quality learning experience for students. The strategy thus adopted is to request a description of the learning design by the designer(s) in a contextualised form in terms of the following:

- The learning activities (and their sequence) that students are required to do.
- The resources that are required to support the activities.
- The support mechanisms that characterise the learning design, eg., role of the instructor, establishment of collaborative teams, etc.

In addition, all resources utilised by the students along with any evaluation data or findings have also been submitted. The evaluation review framework was implemented in two phases. The purpose, process and outcome for each phase are outlined in table 1.

Table 1: Evaluation Redevelopment Framework Implementation

Phase	Purpose	Process	Outcome
Phase 1	• Identify and describe the learning design. • Assess the data sources	Completion of two instruments: 1. Learning Design Submission Form —to be completed by the designer(s) of the learning design. 2. Learning Design Assessment Form—to be	• Detailed description of the learning design from the designer(s). • Decision whether to proceed to Phase 2. (If to proceed to

Table 1: Evaluation Redevelopment Framework Implementation			
Phase	**Purpose**	**Process**	**Outcome**
	provided and determine whether to proceed to Phase 2.	completed by the Project Manager on receipt of the completed Learning Design Submission Form	Phase 2, details about Evaluation Team specified.)
Phase 2	Evaluation of the learning design in terms of: • Its potential to facilitate high quality learning experiences for students. • Its suitability for redevelopment in a more generic form.	Completion of one instrument: *Learning Design Evaluation Form*. The instrument comprises eight questions: • Questions 1 to 4 address the potential of the learning design to foster high quality learning. • Question 5 addresses how the technologies employed facilitate the learning design. • Questions 6 and 7 are designed to elucidate the key and/or unique elements of the learning design. • Question 8 requires a judgement to be made about whether the learning design is suitable for redevelopment in a more generic form. The instrument is to be completed individually by two evaluators. The evaluators are to reach consensus and submit one completed *Evaluation Form* .	• Judgement of the potential of the learning design to foster high quality learning. • Generic description of the learning design. • Judgement of the learning design's suitability for redevelopment in a more generic form.

The current stage of the project

The current stage of the project is applying the framework to a number of Learning Design exemplars. The outcome from this activity is intended to provide:

1. Documentation of Learning Designs identified as having potential for redevelopment in a more generic form; and
2. A formative evaluation of the framework and its operationalisation to a level of "robustness" deemed adequate by the project team.

In this stage we have:

- Identified over 50 potential ICT-based learning exemplars for examination. 28examples will undergo full evaluation. Some strategies employed to compile the list of exemplars included: nominations made from the project team, review of past CUTSD (Committee for University Teaching and Staff Development) projects; and a review of relevant literature sources.
- Established approximately 30 Evaluation Teams. Evaluation Teams comprise pairs of national and international experts in the use of information and communication technologies for teaching and learning in Higher Education. Nominations have been made by the Project Core Team and by participants who attended a national flexible learning conference in July 2001.

From the feedback received it appears that many of the learning designs the core team identified for evaluation are suitable for redevelopment but the expense may not warrant it. Preliminary analysis of the evaluations returned to date raises the following questions for the core team to consider:

- Do we have a large enough range of types of learning designs?
- Is the evaluation framework adequate to enable reviewers' analysis of the generic attributes of any learning design?
- Are reviewers capable of distinguishing between the task of software evaluation and this task of evaluating the underpinning learning design?
- Are reviewers evaluating a particular implementation of a learning design for redevelopment or are they taking into account other implementations of that particular learning design?
- Do we have an adequate definition of learning design and has it been communicated to the evaluators?
- Is the evaluation process able to cover levels of granularity in learning designs? Should the tasks, resources and supports in the learning design also be evaluated?
- Can learning designs really be context-free?

- Will the essence of a learning design always be translatable into a software product or would it instead be better to write guidelines for good design?

In order to ensure the range of learning designs reviewed is not limited in representation of a broad range of pedagogical approaches, the project team explored the development of a Learning Design classification framework. An analysis of the learning design exemplars collected to produce a grounded learning design categorisation plus a review of categorisations of learning designs in the literature will be presented at the conference. The project Web site aims to inform people of the progress and provide access to the resources and materials as they have been developed. (**http://www.learningdesigns.uow.edu.au**)

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