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Reusing and sharing learning designs in higher education

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This paper discusses the emerging need and opportunities for the development of representations and forms for learning designs, the activities a teacher plans to engage learners in learning settings. The paper argues that effective teaching practice, especially that involving ICT, should be able to be described and represented in ways that facilitate sharing and reuse. The paper discusses the ways in which descriptions of learning activities and practices can be described and stored so that they might be accessed and used by others. It describes a Carrick Institute project which seeks to develop strategies and resources that will provide answers to these questions and goals for the sharing and reuse of quality ICT-based learning settings.

Keywords: learning designs, learning activities, representations, reuse, ICT

Introduction

Teaching is both a science and an art and there has been much written to describe what constitutes effective teaching practice in university settings. In most tertiary classrooms where teachers and students interact, the learning setting tends to be directed by the teacher who provides the students with tasks and activities that are planned to expose the student to a body of knowledge and to bring about some conceptual change (Ramsden, 2003). The literature abounds with words of advice as to what philosophies should underpin teachers' approaches and the forms of engagement and activity that teachers should seek to provide for their students (Biggs, 2003).

Teachers can use many different approaches to designing learning experiences for their students and some of these approaches can be very effective in support of learning while others can be ineffective. This paper explores the possibilities of teachers sharing examples of effective practice. It discusses the notion of learning designs, as deliberate plans developed for learning activities and their constituent elements. It explores the opportunities that exist for teachers who are using learning designs that are found to be effective, for sharing the approaches with others. The paper finishes with a description of a Carrick Institute project which seeks to develop strategies and resources to support the sharing and reuse of ICT-based learning activities.

Learning Designs

Biggs (2003) describes good teaching as a process which involves "getting most students to use the higher cognitive processes that the more academic students use spontaneously" (p.5). In essence good teaching is all about encouraging high levels of student engagement and providing the levels of support needed to achieve this. Good teachers know many ways to engage their students and typically have a raft of strategies that they can employ to accommodate the needs of individual learners. The strategies that good teachers use form the basis of this discussion of learning designs.

The term *learning design* is often used today to describe the outcomes of the process of designing, planning and orchestrating learning activities (JISC, 2006). In much the same way as a blueprint is produced when one designs an engineering entity, or an architect's drawing is used to show the design of a house, a learning design is the product of a deliberate plan for a learning activity (Goodyear, 2005). Learning designs tend to exist in a variety of forms. They can be such things as *lesson plans*, descriptions of planned teaching and learning activities, or *practice models*, generic approaches to the structuring and orchestration of learning activities (JISC, 2006).

A learning design typically involves descriptions of the learners and a space where they act with tools and devices to collect and interpret information through a process of interaction with others (eg. Britain, 2004). In contemporary settings, learning designs can involve descriptions of activities, resources and spaces that are different in many ways to traditional sequences and it is the emergence of new and engaging learning opportunities that is leading to renewed interest in learning designs, their sharing and reuse (Oliver et al. 2002).

Often learning designs are held in the mind of teachers and never written down. Teachers modify and adapt learning designs through their experiences and practices but often have no inclination, nor need, to ever formalise the process (McGlynn, 2001). Like house plans, there are few collections of learning designs which exist to guide teachers and their practices or from which teachers might choose in response to particular learning needs. And where there are collections, there is often little structure or form that can assist teachers to find and use the examples (Littlejohn, 2003; Littlejohn, 2004). It would appear that there is both a need and an opportunity to deal with this issue and to explore strategies that could advance the current position

Characterising Learning Designs

A recent project funded by the Australian University Teaching Commission sought to identify and make available for general use ICT-based learning designs that could support quality learning outcomes. The project sought expert opinion to determine what constituted "high quality learning" and in conjunction with feedback from the project team, developed a set of principles that described high quality student learning in higher education (Boud & Prosser, 2002). The principles used a learning perspective to characterise the essential elements of a learning design with the potential to foster high quality learning in higher education:

- Learner engagement: A consideration of learners' prior knowledge and their desires and building on their expectations
- Acknowledgement of the learning context: A consideration of the implementation of the learning design and its position within the broader program of study for the learner.
- Learner challenge: Seeking active participation of learners, encouraging learners to be self-critical and supportive of learners' ampliative skills.
- Provision of practice: Encouraging learners to articulate and demonstrate to themselves and their peers what they are learning (Boud & Proser, 2002).

The AUTC project reviewed and collected a large number of potentially effective learning designs and used the Boud and Prosser principles to choose those considered to have the best potential for delivering quality learning outcomes. Several methods were trialled to provide a means for organising the learning designs into a database format. The first method involved the development of a framework that drew on the work of Jonassen (2000).

Jonassen (2000) suggests an effective means to distinguish and organise learning designs is on the basis of the form of learner activity that each supports. Using this basis, he articulates eleven types of learning activity as a continuum leading from activities requiring the application of rules; activities based on incidents and events; through to activities that require strategic planning and activity; and problem solutions based on learners' performances. The AUTC project discovered three discrete forms of learning design within the eleven suggested by Jonassen (2000) and added a fourth based on the learning designs that it was exploring (Oliver et al. 2002). The resulting framework provided a successful means for describing and organising all the learning designs that were being used. The four types of learning designs that emerged from this analysis and development are shown in Table 1. The learning designs are discrete and follow what might be seen as a continuum describing the scope of their complexity and open-ness. Table 1 shows these forms and provides descriptions of each type of learning activity and the forms of learning outcome that are associated with each.

Table 1: A framework for a learning design typology

Learning design Focus	Description
<i>Rule based</i>	The learning task requires learners to apply standard procedures and rules in the solution. For example, algorithmic approaches, the application of given procedures and rules in defined ways to effect a solution.
<i>Incident based</i>	The learning activity is based around learners' exposure and participation to events or incidents of an authentic and real nature. The learning is based around activities that require learners to reflect and take decisions based on the actions and events.
<i>Strategy based</i>	Learning is based around tasks which require strategic planning and activity.
<i>Role based</i>	The learning is achieved through learners' participation as a player and participant in a setting which models a real world application. Learners apply judgements and make decisions based on understanding of the setting in real time scenarios

In the development of the website to store these learning designs, it was found that the organisation based on activity types did not necessarily provide a differentiation that teachers would naturally find useful or informative. Another organising framework was developed that used the focus of the learning as an organiser. The framework used five foci: collaborative focus, concept/procedure development, problem-based learning, project/case study, and role-play (Table 2). Whilst it was possible to fit every learning design from the project into this second framework, it was not clear that the category selection would be able to include other learning designs due to it being grounded in the project alone.

Table 2: An alternative framework for a learning design typology

Learning design Focus	Description
<i>Collaborative Learning</i>	The emphasis of the learning design involves interacting and collaborating with peers to facilitate the construction of knowledge
<i>Concept or Procedure development</i>	The emphasis of the learning design is to understand and/or consolidate student learning about concepts and/or procedures
<i>Problem-based</i>	The emphasis of the learning design is on the process of students solving a

Learning	real world problem presented to them
Project/Case Study	The emphasis of the learning design is to create a product or artefact with learning supported by case materials from which the learner can distil/abstract lessons learnt to apply in a new project situation
Role Play	The emphasis of the learning design is immersion as an actor in a role and learning stems from walking in the shoes of others.

The lack of an organising framework for learning designs stems very much on an uncertainty as to what are the important distinguishing features of such. Is it best to distinguish learning designs by the forms of learning outcome they seek, by the forms of learner activity they engender or perhaps through some more practical means such as their scope and/or their granularity? If we wish to be able to supply examples for teachers to use, it will be important to develop an organising framework that can successfully showcase the aspects that teachers might be looking for.

There are many ways to classify learning designs so that they might be stored and accessed by others. Identifying ways that make the learning designs evident and accessible to teachers would appear to play a large part in influencing levels of reuse of learning designs (Goodyear, 2005). An important strategy in this process will be to develop a framework that identifies the critical elements underpinning the choice of a learning design, for example, learning outcomes that are delivered, depth of learning sought, form of student activity, cohort size, time available for the activity, learning space available. It may be that when these items are used as keywords or descriptors, they will facilitate the discovery and accessibility of particular learning designs.

Representing Learning Designs

Whilst it is a relatively simple process to discuss learning designs and to talk about their purpose and role, it is in fact a much more difficult process to actually describe the critical elements within them. Returning to the concept of an architectural plan, there are accepted ways for drawing plans and knowing what has to be drawn but no standard or common method exists for describing a learning design and furthermore, there is considerable difference of opinion as to what information needs to be included. The most common way to represent learning designs is through text descriptions and these tend to vary considerably from one example to the next. Consider for example the following description of a learning activity.

1. *Students are given a problem to solve by the teacher.*
2. *The students read through the problem description and try to understand what solution is required.*
3. *The teacher takes questions and provides further information.*
4. *The students then set about planning the problem solutions and draw up the sequence of activities they will undertake.*
5. *The students then gather information from available materials and organise and summarise the information to assist in their development of a solution*
6. *The students use external resources such as Web sites and other reference materials in the library to further their inquiry and understanding.*
7. *The students work in groups to discuss their findings and solutions and gain feedback on their ideas to from other class members*
8. *The teacher forms students into pairs to develop their solutions and to prepare a joint written submission for assessment.*

Different teachers describing this learning design may have expressed the same activity in very different ways. The description above has no context, some teachers would prefer to see this with an actual problem being used. There is no sense of the time spent in the various activities, there is no specific sense of stages in the activity and there is no indication of what might be the deliverables or assessable outcomes. Another way to represent this learning design is as a flow diagram (Figure 1). In this image, different shapes are used to distinguish between processes and products and lines are drawn to reflect the flow between various stages.

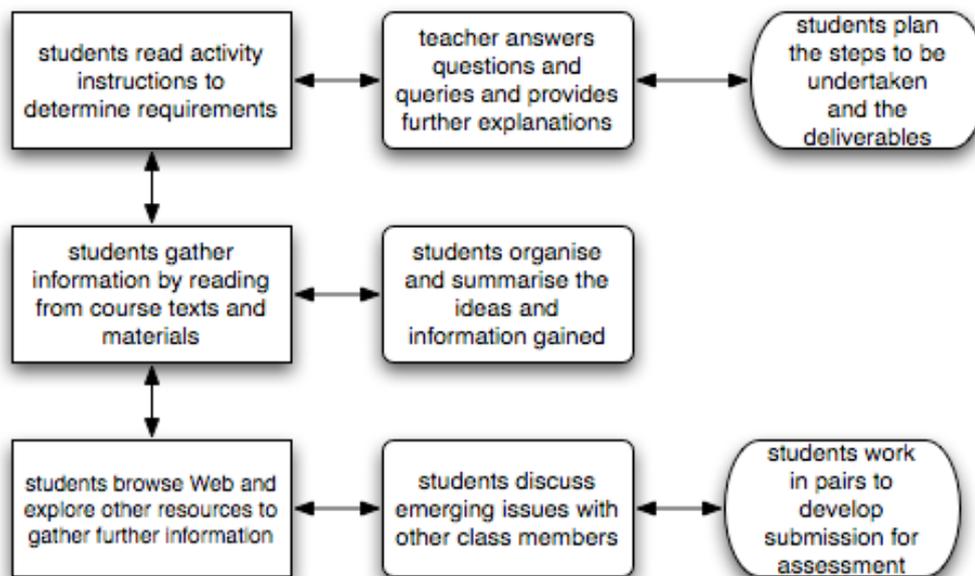


Figure 1: Learning design represented as a flow diagram

Britain (2004) describes the process of representing learning designs as *creating a learner workflow*. Workflows, as the name suggests, describe learning designs in terms of the activities of the student and teacher. They provide a sense of the learning activities that the learner will undertake and the role of the teacher in supporting the learning setting. In more detailed cases, learner workflows enable students to choose the activities in which they will engage, facilitating learners assuming ownership of their learning experiences. Well described learner workflows can conceivably be used repeatedly by other teachers and students to achieve similar learning outcomes.

The temporal sequence representation is another form for representing learning designs. This representation mode describes learning designs in terms of three constituent elements, learning tasks, learning supports and learning resources, a model developed by team members in previous projects (Oliver & Herrington, 2001). Figure 2 shows a representation using the temporal sequence of a problem-based learning activity. There are three tasks that students undertake in a sequence and these start with the observation of a demonstration, an investigation of assessment strategies based on an authentic task and a team presentation of a report. As the students undertake these tasks, the representation shows the resources that are able to support their learning and the various forms of teacher support that are provided at the various times. The flow of the learning is represented through the placement of the various icons and the arrows that connect them.

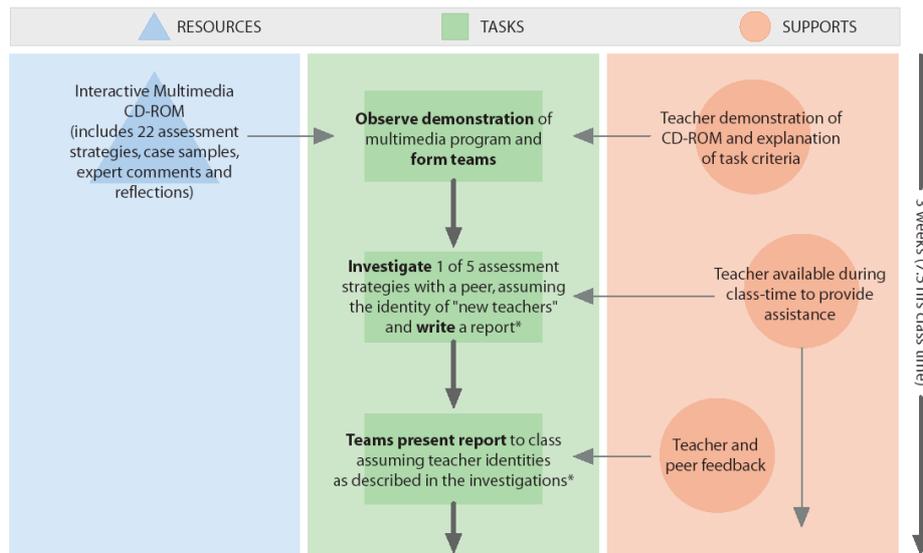


Figure 2: Example of a temporal sequence representation of a learning design

The examples given above reveal how complex an issue it is to describe learning designs given that there is no common method for doing so and there is no broad agreement on what characteristics need to be included in the representation. The purpose for which the design is intended is also a critical factor in determining what information it needs to contain. If the purpose is for enabling a teacher to choose a design, such a representation should conceivably reveal different information than a design intended to guide a teacher, or a student, implementing the actual learning activity.

To further our understanding here, it is necessary to decide the purposes for which different representations are needed and to consider the forms each might take. This will require discussing with teachers the forms of information they might need in order to understand a learning environment and deciding how best this information can be presented to provide efficiency and brevity. It is likely that some diagrammatic form will be useful as will a controlled vocabulary to reduce the ambiguity and limit the scope of learning design descriptions (Beetham, 2004).

Using ICT to represent learning designs.

There has been relatively scant research activity exploring the sharing and reuse of learning designs in higher education (Conole & Fill, 2005). There has been a significant level of discussion as to what constitutes a quality learning experience and the basic forms that effective learning settings might take (Biggs, 2003, Ramsden 2003), but there are few examples of learning designs in forms that readily enable teachers to implement proven and effective learning activities with their students.

Contemporary information and communication technologies (ICT) appear to provide some supports for assisting in the processes of sharing and reusing learning designs. ICT are commonly used in the delivery of learning and teaching across all sectors of education and offer functionality and opportunity that holds strong prospect for the development, storage and access of reusable and sharable learning designs. It is the thesis of this paper that if we wish to pursue the goal of creating opportunities for sharing and reusing effective learning designs, using ICT-based forms would provide an ideal test-bed for this activity.

Research into the uptake of ICT in teaching and learning has shown that there are many factors that can limit the enthusiasm of teachers and a number of factors that can encourage their participation and interest (McNaught, 2002). Recognising that ICTs have yet to meet their full potential in learning and teaching (eg. Bain, 1999), there is a large amount of research currently being undertaken to discover strategies to facilitate mainstream use among university teachers. Figure 3 indicates four strong areas of contemporary inquiry relation to the mainstream use of ICT in teaching and learning and the connections between each.

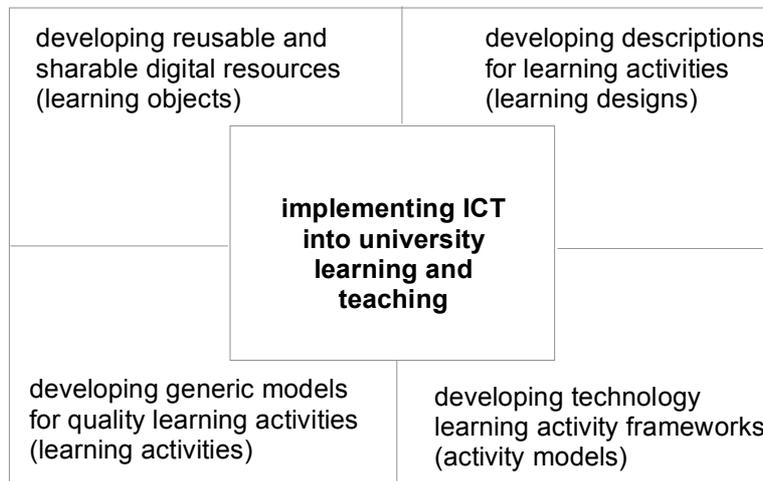


Figure 3: Activities supporting implementing ICT into university learning and teaching

The design and development of learning objects provides strong support for teachers seeking to use ICT in course and unit delivery (Wiley, 2003). The research has led to the development of reusable and sharable learning resources and digital content and has also investigated the development of repositories and methods for promoting the accessibility and discoverability of the learning objects (Downes, 2000; Koppi, Bogle & Bogle, 2005). Many wonder whether a similar approach might be a useful strategy for storing and sharing learning designs as reusable learning and teaching resources.

Researchers have for some time recognised that the availability of reusable and sharable learning resources within itself is insufficient to promote the effective use of ICTs in teaching and learning. Missing from this work has been investigations of strategies and models for teachers to use to apply learning objects in their learning programs. The research into learning designs has intended to fill this gap by exploring learning and teaching approaches and seeking to develop models and templates that facilitate teachers' use of the learning objects (Oliver, Hedberg, Harper, Wills & Agostinho, 2002). An as yet unmet aim in this research has been the development of understandable representations of learning activities, learning designs (Conole & Fill, 2005).

The literature discussing innovation and diffusion, suggests that teachers seeking adopt new teaching practices will be influenced by a number of factors that include seeing a relative advantage in the action, the action being compatible with existing practice, the action being a simple process to implement, there being a chance to trial and for the advantages to be observable and evident (Rogers, 1995). The use of ICT in learning and teaching might be able to act as both an innovative activity and a support for the innovation.

Promoting the Uptake of Reusable ICT-based Learning Designs

The Carrick Institute Project, Promoting the Uptake of Reusable ICT-based Learning Designs, is seeking to explore ways to support teachers' use of ICT-based learning settings through the appropriate provision of exemplars and models of best practice. There are many known examples of strong teaching practice that are supported by ICT applications. The ICT application itself can lend support to the reuse of the activity by other teachers. Use of the ICT provides some structure and support to the activity and can guide the activities and roles of the various stakeholders, the learners and teachers and others. For example, a technology-facilitated problem based learning setting would have many parts of the learning activity managed and supported by various software systems. This can assist teachers implementing the system through the scaffolds that the technology provides. Precisely what forms of scaffold and support are needed to facilitate teachers' uptake of the learning activities is a central aim of the research project.

The project will seek the cooperation and participation of Australian academics who have been recognised as making effective use of ICT in their learning programs. Interested teachers will contribute descriptions of their teaching activities and these will be investigated to determine their potential for reuse in other settings. Up to twenty designs will be selected for investigation and redevelopment into forms and representations that will encourage and support reuse. The project will explore the forms of representation that are needed to attract the attention of teachers. It will seek to discover the attributes that teachers see as important when browsing examples of learning activities with the view to potentially using the ideas in their own classrooms. From this work, it is intended to develop some representations that might be used to provide visibility and accessibility to the various examples.

In a second stage, the project will seek to create appropriate representations and supports that will enable interested teachers to be able to implement the learning designs in their own settings. This component of the project will likely involve the development of various ICT-based resources including descriptions of the learning designs, implementation guides and templates. It is intended to make these items visible and accessible through a Web-based interface.

The project will seek input from teachers across all disciplines using all different forms of learning technologies to support student learning. It will focus on learning activities that demonstrate a capacity to promote higher-order learning outcomes and whose use is not restricted to the domain in which they currently reside. The outcomes are intended to be resources and supports that will encourage both novice and experienced teachers to consider their use and which will make the reuse a relatively simple process.

Summary and Conclusions

This paper has described the context of learning designs as an important aspect of learning and teaching activity in higher education. It has discussed learning designs as blueprints for teachers seeking to instantiate particular forms of learning activity. From the discussion it is evident that the lack of successful strategies and presentations for describing learning designs is an important factor which limits the extent of the sharing and reuse of effective designs among teachers. Teachers who recognise that they may be using limited forms of learning activity have no easy way to discover alternative forms and teachers who have discovered effective and powerful ways to engage their learners are likewise, limited in their capacities to share their knowledge with other teachers.

With these features in mind, the Carrick Institute project, Promoting the Uptake of Reusable ICT-based Learning Designs, has been conceptualised which seeks to address some of the limitations that currently exist. The project will create a process and means for representing learning designs that will facilitate their sharing and reuse. The project will explore what teachers need in order to be encouraged and able to identify alternative learning approaches and to integrate these into their own teaching programs. The project will seek to create representations of effective learning designs across a number of disciplines that are technology facilitated. It will work with teachers to explore the factors that influence their motivations and capabilities to identify and implement alternative learning and teaching strategies. And finally, the project will seek to develop models of best practice that could guide and inform future activities and which could form the basis of a repository of learning designs that teachers across many disciplines in higher education might use extensively to improve learning outcomes for their students.

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