

## A 'pedagogy-first' approach to teaching Learning Design

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This paper recounts a critical classroom experience that occurred when teaching technology-based learning design to trainee teachers, and discusses the implications of the incident for teaching and learning. Observations are drawn from the subject "EDUC261 – Information and Communication Technologies and Education", which is an optional second year course available to trainee primary and secondary teachers at Macquarie University. On the basis of the observations it is conjectured that adopting a 'pedagogy-first' approach to learning design allows teachers to more easily select appropriate technologies from a suite of learning tools (such as LAMS) and sequence them more sensibly than when a 'technology first' approach is adopted. As well, it is contended that by considering the nexus between pedagogy and technologies under the pedagogy-first approach students are better able to appreciate relationship between educational principles and their implementation. Other implications of the approach are discussed and possible extensions are proposed.

Keywords: learning design, teacher training, LAMS

### Introduction

One of the challenges in teaching prospective teachers technology-based learning design is how to have them abstract the concepts they learn. Often students will learn how to create modules of work using a particular piece of software or platform, but will not be able to transfer their skills to other technologies because they have not abstracted design principles from their experiences. Based on observations drawn while teaching the subject "EDUC261 – Information and Communication Technologies and Education" to trainee teachers this paper proposes that a 'pedagogy-first' approach to teaching learning design allows students to more easily select technologies and sequence them appropriately, as well as abstract principles out of the specific technological context in which they are operating. As will be discussed, the approach also enables students to better understand contemporary learning theories by observing and applying them in their own work rather than just reading about them in an external source.

### Teaching Technology-Based Learning Design to Trainee Teachers

The NSW Institute of Teachers Professional Teaching Standards define part of 'professional competence' to be the ability to

*create, select and use a variety of appropriate teaching strategies and resources including ICT and other technologies to make content meaningful to students*

(NSW Institute of Teachers, 2006, p. 9)

Teachers teaching in NSW public schools require NSW Institute of Teachers accreditation, which implies that it is not just desirable for our trainee teachers to acquire technology based learning design capabilities, but it is an imperative for them to possess these skills.

Authors have identified several features of the Learning Activity Management System (LAMS) that can be used to support teacher's learning design processes. Bennett, Agostinho, Lockyer, Koper, & Harper (2008) point out that the ease with which learning designs can be accessed and shared provides more useful, concrete access to effective pedagogical practice. Cameron (2007) discusses the ease with which online lessons can be created using LAMS, and how it allows trainee teachers to actively engage in the learning design process. As well, Cameron (2006) explains advantages afforded by being able to represent lesson

plans in pictorial form (such as rapid interpretation and evaluation of learning sequences) and by teachers being able to easily see what their students would experience when completing their lesson.

However less emphasis has been placed on the best way to go about developing the learning design capabilities of trainee teachers (or indeed teachers at large). For instance, a review of the proceedings of the last four LAMS conferences have found that while several papers have tangentially mentioned factors to consider when teaching learning design, none have principally addressed how to perform this important process. There are several possible approaches to teaching technology-based learning design.

Firstly, there are various instructional design models such as the ADDIE model (Molenda, 2003), Don Clark's Instructional Systems Design model (Clark, 1995) and Gagne's Conditions of Learning approach (Gagné, 1985) which lecturers can present to trainee teachers to support their learning design work. However these instructional models have been criticized for providing more prescriptive, behaviourist approaches that underemphasize the importance of the students' control decisions in the learning process (Kirschner, Strijbos, Kreijns, & Beers, 2004). On the other hand there are more contemporary, flexible guides such as the flexible activity and instruction approaches described by Wilson (2004) or the probabilistic-based model proposed by Kirschner et al. (2004). However more general heuristics such as these have been criticized for being too general to provide pertinent context specific support to designers (Bennett, Agostinho, Lockyer, Koper, & Harper, 2008).

On the other hand, learning design teachers may choose to focus on the technology, its capabilities, and thus what can be technically accomplished in terms of creating lessons and modules. This is useful to the extent that it assists students in accomplishing mastery of the tools they are using, but it does not in itself encourage abstraction of the principles being learnt so that student experiences may be transferred to other design environments. As well, placing the primary emphasis on technology increases the risk of that people or organizations end up creating technologically advanced but educationally sub-optimal learning experiences (van Merriënboer, Bastiaens, & Hoogveld, 2004).

The approach to teaching learning design that is advocated in this paper is a 'pedagogy-first' approach, whereby based on an initial understanding of the capabilities of the technologies at their disposal, trainees identify the pedagogical aims of a learning sequence and subsequently match them to the tools at hand. Note that the term 'pedagogy-first' is not being used in the sense that the pedagogy is discussed before an appreciation of the tools is acquired – students embarking on the learning design process need a concrete understanding of what can be accomplished with the technologies to which they have access. In this context, 'pedagogy-first' means that the selection and sequencing of tools should be based upon pre-identified educational aims of the lesson, module, or topic and the designer-determined approaches to achieving them.

## **Using LAMS in Teacher Training – Introducing the Context**

"EDUC261 – Information and Communication Technologies" is a second year education subject (unit) at Macquarie University designed to engender an understanding of the key principles and practices relevant to utilizing technologies in the classroom. Assessment tasks include performing an in-school technology-based classroom observation, analysing the type of discourse that occurs when using different online collaborative tools, and designing a learning episode using LAMS. While the classroom observation and the discourse analysis are useful for evolving students' appreciation of teaching using technology and the factors that influence it, the LAMS episode creation task provides the main opportunity for students to develop and evidence their learning design skills. The observations drawn in this study relate to the 2008 semester two iteration of the unit which included twelve weekly workshops.

The subject adopted an incremental approach to introducing the features of LAMS to students, as follows. In the week one workshop students participated in a basic LAMS sequence on popular contemporary learning technologies (such as blogs, wikis, podcasts and

so on). The sequence utilized the noticeboard, grouping, chat, voting, resources, and discussion tools, which provides students with an end user experience of learning through LAMS. At the same time the teacher demonstrated how their progress could be tracked in the monitor, so students has seen (but not operated) the administrative interface.

Then in week four, students were asked to evaluate some learning designs by logging onto the LAMS community website and reviewing sequences in the public repository. This further introduced the functionality and potentials of the system, but also started to encourage critical thinking in the practise of learning design. At the end of this workshop students were also shown how to author an elementary sequence, and were provided the brief opportunity to create, save, and run their own three stage sequence. This enabled them to understand the general mechanics of creating and running a lesson so that they could practise using the system if they so chose. They were also advised to collect resources and ideas before the week six workshop, in which they would be commencing the creation of their LAMS sequence assessment task. As well, students were directed to the online animations and discussion forums, and advised that if they wished to experiment with LAMS before the week six workshop as independent designers they should be utilizing those facilities.

In the week six lesson, a more elaborate explanation of how to construct a learning sequence was provided, that included instructions on how to branch, group, place stop-points, create optional tasks and create optional sequences. By this stage students had been shown all the core technical skills that they required to create their sequences. They were also asked to select an age group and syllabus topic to teach, providing them with an authentic learning design context within which to operate. At this stage students were then left to their own devices so that they could spend the rest of the week six class time commencing to produce their LAMS sequence for their assessment task.

### The critical incident

At this point in the week six lesson students found it difficult to begin the design process. Most had an idea of what they wanted to teach, yet there was a general air of hesitation in the class. They had developed the technical skills required to operate LAMS, but had not necessarily formed an understanding of how to *appropriately design* using the system.

This lead to one student asking:

*But there are so many tools. How do you know which ones to use and when?*

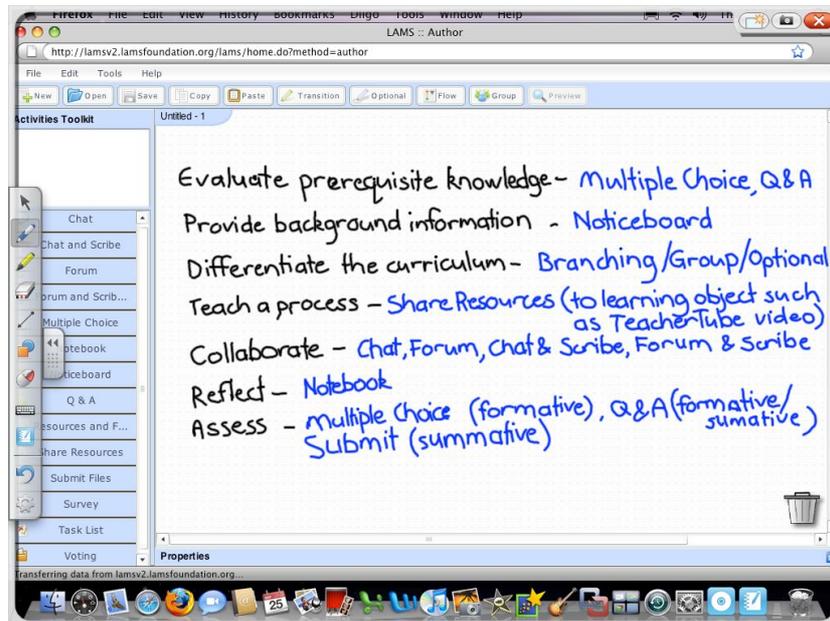
Observations to this point indicated that several students were struggling with this design issue.

At this point students were asked to stop their individual work, remove their thinking from LAMS for a moment, and participate in a discussion about learning design. They were asked:

*In order to meet your learning goals, what are the sorts of educational processes that you will need to facilitate?*

Students volunteered suggestions such as “activate prior knowledge”, “evaluate student prerequisite knowledge”, “provide explanation”, and “have students discuss content”. These were pedagogical activities abstracted from any technology. However, after each of these was proposed, students were then encouraged to identify tools (in this case from within LAMS, but the approach could be applied to any comprehensive suite of learning technologies) that would allow them to facilitate the processes they suggested. Various students immediately propose the “Noticeboard” tool for activating prior knowledge, the “Multiple Choice” tool for evaluating prerequisite understanding, the “Share Resources” tool for providing explanation, and the “Chat” tool for having students discuss content. Identifying that the information was pertinent, the teacher asked the class to pause while he wrote their contributions on the whiteboard. As the conversation continued, student appropriations of

technologies for different pedagogical processes were captured. The information resulting from this brainstorming session is summarized in Figure 1.



**Figure 1 – Student suggested pedagogies and corresponding technological appropriations**

Even though this was a brief discussion, it can be seen from the Figure 1 that students often volunteered more than one tool for each educational process. This was then used to promote discussion of the circumstances under which one technology might be selected over another, thus further refining the sensitivity of their design awareness. For instance, in order to conduct the pedagogical process “assess”, students identified the way in which the Multiple Choice tool offered an effective way to assess factual knowledge and provide appropriate feedback. They noted that the Q&A tool enabled more extensive, open ended responses to be contributed that could either be used to check formative understanding or to summatively assess the acquisition of more conceptual knowledge. They agreed that the Submit tool was most useful to facilitate upload of creative products, allowing for summative assessment synthesis and application skills. However it was acknowledged by students that these were generalizations and that under some circumstances tools may be used at different stages. For instance, the Submit tool could be used by a teacher to enable formative assessment of progress on students’ major project.

Following this discussion the concept of ‘affordances’ (Gibson, 1979) was briefly introduced, described as “attributes of a technology – what the tool allows you to do”. Students were then encouraged to explain what it was about a particular tool that made them suitable for a particular process. One student identified how the Noticeboard tool afforded teacher presentation of predetermined information but not student contribution, whereas the Chat tool afforded the real-time exchange of ideas between students (and thus was obviously better for facilitating collaboration). However another student pointed out that the Noticeboard and Share Resources tools could be used to transmit images and multimedia whereas the Chat tool only allowed text to be exchanged (and thus chat was potentially not as good for visual information). Another student also made the critical point that there were probably no set rules for when and how to use tools based on affordances, but that appreciating them could help them think about which tools to use and when.

At the conclusion of the discussion students were asked to carefully consider how the pedagogical design should ideally proceed the technology selection and sequencing process. They were encouraged to use their understanding of how the capabilities of technologies could meet pedagogical requirements of the tasks in order to make technology appropriation

decisions. After this students were able to engage with the design process without hesitation or confusion about which tools to use and when.

## **A 'pedagogy-first' approach to teaching learning design**

Although not pre-planned, this learning incident demonstrated (at least to the author) the value of a 'pedagogy-first' approach to teaching learning design.

Firstly, a 'pedagogy-first' approach to teaching learning design emphasises the way in which technology is a mediator of learning rather than its driver. Trainee teachers are encouraged to concentrate on applying the educational theory they are learning rather than focusing on the technology as the primary concern. This allows them to design their lessons based on grounded and relatively stable sets of educational principles rather than the particular nuances of ever-changing technologies.

Secondly, the 'pedagogy-first' approach relies upon a concrete context in order to teach learning design skills. Rather than providing students with generalized frameworks for how to design using technology, a specific technological system is rudimentally explored before design begins. In this way students can actually practise the learning design process within a context so that they are applying the skills that they are learning rather than merely reading them as abstract concepts. This supports stronger definition and retention of learning design skills.

Thirdly, because the pedagogy is emphasized above the technology, the 'pedagogy-first' approach facilitates abstraction of learning design concepts. Students are not bound to a particular technology or technological system to apply their learning design skills – they are using their pedagogical understanding and then applying them to a technological context. This is similar to what will be expected in the workforce, and enables them to be more flexible, adaptable, and generalist learning designers.

Fourthly, by requiring students to explicitly identify the features of the technologies that lend themselves to different purposes they are developing the concept of "affordances", how to distinguish between them and use them to inform design decisions. This process develops a more subtle appreciation of the similarities and differences of tools and the context in which each might be deployed. For instance, the tools selected for a communicative task will depend on the type and amount of information being shared and whether the teacher or students are to be the main contributors. Accounting for the different communicative and cognitive requirements of tasks is critical to the learning design process, and understanding the affordances of tools allows them to be selected appropriately.

It is important to note the advantages of the 'pedagogy-first' approach are not intrinsically tied to LAMS. It was not the process of selecting appropriate LAMS tools that was considered most valuable in the incident recounted in this paper, but the way in which the relationship between learning design and technologies was drawn to the forefront of students' consciousness. However, LAMS, with its vast array of structured tools provided an effective means of facilitating this. Less featured systems or more specific applications require teachers to start with the technology because there is such a limited amount of pedagogical approaches that can be implemented. The wide range of tools available in LAMS means that students can start by determining the pedagogy they wish to implement and be confident that the system will possess the tools to match their requirements.

## **Building on the approach – using LAMS to ground learning theory**

In subsequent lessons the students and teacher were able to reflect upon the pedagogical approaches they were applying in their LAMS sequences, thus grounding learning theory in their own situated practice. For instance, students were asked to categorise LAMS tools as either more behaviourist, socio-constructivist, or cognitive-constructivist in nature. Discussions then ensued regarding why students felt that the Multiple Choice and Q & A tools

were more behaviourist, the Chat & Scribe and Forum and Scribe were more socio-constructivist and the Notebook was more constructivist in nature. Considering how tools were more or less aligned to particular pedagogical perspectives encouraged students to situate their own learning designs in the context of different educational approaches at the same time as they reinforced their understanding of learning theory.

As well, Anderson & Krathwohl's (2001) levels of knowledge were discussed. Students felt that the Multiple Choice tool was more suited to addressing declarative knowledge, the Task List tool was more appropriate for procedural knowledge and the Q & A tool was apposite for conceptual knowledge. Different levels of teacher dominance were also discussed, and how transmissive approaches were those that were more Noticeboard driven, teacher-guided processes may tend to use the Voting and Q & A tool more frequently, and student-centred approaches would use tools such as Scribe and Submit. Once again, the pertinence of the episode was not the outcomes (aligning LAMS tools within the context of particular educational literature and approaches) but the process of interpreting the implications of using different technologies with reference to the educational theory they were learning.

There are obviously many more possibilities for using LAMS to concretize learning theory (and for using learning theory to reflect upon LAMS). For instance, how do the tools in LAMS relate to the different components and systems of Activity Theory (Engeström, 1987)? How do LAMS tools align more or less with the levels of Anderson & Krathwohl's (2001) revision of Blooms Taxonomy? How would you use LAMS to implement Reigeluth's (1999) spiraling sequencing of episodes as opposed to topical sequencing? To what extent does the latest version of LAMS facilitate Laurillard's (2002) conversational approach to tertiary education? Tasks such as these would encourage students to reflect upon the nexus between the attributes of educational technologies and contemporary learning theory.

Because a 'pedagogy-first' approach to design had been adopted, students were more inclined to relate their approaches to educational theory, and found it easier to do so. After the critical incident the nature of in-class discussion changed from a focus on technological matter to an emphasis upon objectives based design. Students enjoyed being able to concretize their developing understanding of learning design and felt a sense of mastery in being able to relate their approaches to the theoretical frameworks (an ability that even quite accomplished teachers sometimes lack).

## Conclusion

Learning technologies are changing at an ever increasing rate, which means that only teaching students how to design with particular tools limits their capacity to be effective designers over time. However teaching learning design by starting with instructional design models may stifle the design process and remain abstract until students have a concrete understanding of the tools at their disposal. A 'pedagogy-first' approach which focuses on students identifying their pedagogical aims and selecting and sequencing tools based upon a concrete understanding of the capacities of those tools provides a flexible yet situated approach to teaching learning design. It is hoped that the process proposed herein may be utilized for educational gain in other learning design teaching settings as well as provide an impetus for future research.

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Please cite as: Bower, M. (2008). *A 'pedagogy-first' approach to teaching Learning Design*. In L. Cameron & J. Dalziel (Eds), Proceedings of the 3rd International LAMS & Learning Design Conference 2008: Perspectives on Learning Design (p.p. 35-42). 5th December 2008, Sydney: LAMS Foundation.  
<http://lams2008sydney.lamsfoundation.org/papers.htm>

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### Biographical notes

Matt's work spans the fields of Computer Science Education and Technology Based Learning. After several years of high school teaching specialising in Mathematics, he returned university to complete his Master of Education (Online Education) and a degree in computing. Matt designed, built and lectured in the online Graduate Diploma of Information Technology course for the Division of Information and Communication Sciences at Macquarie University. He is now an Information and Communication Technology lecturer for the School of Education at Macquarie University and has recently completed his thesis entitled "Designing for Interactive and Collaborative Learning in a Web-Conferencing Environment".

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