Using Learning Activity Management Systems (LAMS) with pre-service secondary teachers: An authentic task

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Within an authentic learning framework, second year pre-service teachers were introduced to LAMS (the Learning Activity Management System) as part of one of the information and communication technology (ICT) units they are required to complete as part of their course. Using case study methodology, the students returned some interesting results: LAMS helped the students plan all aspects of their lesson and allowed them to preview their lesson from the learner's perspective. Additionally, the software provided a visual overview of the lesson which assisted them to identify the learning styles that were addressed with the activities employed. Students also saw the benefit in the production of standardised templates of activities that could easily be modified for future re-use.

Keywords: LAMS, authentic learning, pre-service teachers, learning design, lesson plans

Introduction

There has been a global movement to implement modern education technologies in universities (Oliver, 2001) but the uptake of evolved assessment has not been as widespread. Strategies that promote high quality learning are not reliably integrated into practice and many students are dissatisfied with key aspects of tertiary teaching (Department of Education, Science and Technology, 2002). There has been a call for new standards of university teaching assessment to assist academics in the design of courses that integrate online technology (Laurillard, 2002). This study attempted to address these issues by introducing ICTs in an authentic task.

There is a now a body of literature supporting activities within an authentic learning environment (Herrington & Kervin, 2007; Herrington & Oliver, 2000; Herrington, Reeves, & Oliver, 2006; Herrington, Reeves, & Oliver, 2007). Authentic activities can be defined as the kinds of activities "that people do in the real world, that are completed over a sustained period of time, rather than a series of shorter disconnected examples" (Herrington & Kervin, 2007, p. 223). Authentic tasks have real world relevance as well as providing opportunities for students to be able to examine the task from numerous perspectives while using a variety of resources. Students are provided with the opportunity to collaborate and reflect (Herrington, et al., 2006). Authentic tasks involve the student being engaged, with the technology providing cognitive tools for both information seeking and knowledge construction (Herrington, et al., 2006).

Authentic learning allows learners to explore a resource that has all of the complexity as well as uncertainty of the real world (Herrington & Kervin, 2007). Authentic tasks are not always used in regular classrooms as it is easier to use more manageable and easier to teach activities on a daily basis (Herrington, et al., 2006). In this study, ICT skills were embedded into a second year pre-service teacher's task to design a learning activity, thereby creating an authentic learning environment.

The context

The pre-service teachers in this study are likely to be teaching in classrooms that have very different access to technology to those they experienced in their own schooling. Teachers need new skills and understandings in order to successfully educate their 21st century students (Sanford & Hopper, 2001). The next generation of learners are often referred to as "millennial learners" (Dede, 2005). This group of students has been heavily influenced by ICT and research suggests that millennial learners need to be taught using the technology with which they are familiar (Oblinger, 2003). This study surveyed 19 second year pre-service teachers.

In this study, an alternative to the traditional time-consuming, but necessary, skill of teachers: lesson documentation (the lesson plan) was introduced. Pre-service teachers are advised to provide very specific details in their lesson plans to enable them to have a very clear understanding of every aspect, and the sequence, of the lesson. Lesson plans usually document lesson outcomes, appropriate learning activities sequenced in a logical order, assessment tasks and lesson evaluation criteria (McCutcheon, 1980). Written planning is required of most teachers but particularly those new to the profession (Moyles, 1995) because it ensures teachers are better prepared for instruction; enables them to consider different options and to be more flexible; assists with evaluating instruction; and helps teachers build up confidence in their teaching (Marsh, 2004).

As there is perhaps no other single function that a teacher must perform that threatens to take as much time, effort, and energy outside of the classroom as the writing of a lesson plan (Kelly, 1997), the question that pre-service teachers inevitably ask is, "Does writing a lesson plan really make my lesson any better in the classroom?" Whilst many experienced teachers may not create formal lesson plans before every lesson they teach, to the pre-service teacher lesson plans are an essential planning tool (Capel, Leask, & Turner, 1997). The value of a lesson plan as an organisational tool is highly regarded by many teacher educators but from a pre-service teacher's point of view, they often produce little more than "documentation", hence their reluctance to undertake them.

In a recent study at Macquarie University, teacher educators set out to review the benefits, if any, of creating lesson plans using a computer-based graphical interface over writing traditional lesson plans. In the study pre-service teachers were asked to create lesson plans using LAMS (Learning Activity Management System) software that were not simply "documentation" but fully operational lessons. In our context, this represented ICT integration in an authentic task.

LAMS is a relatively new tool for designing, managing and delivering online collaborative learning activities. These activities could range from individual tasks, small group work or whole class group activities based on both content and collaboration. The software provided our pre-service teachers with a highly intuitive visual authoring environment for creating sequences of learning activities that was simple to use and easily learned by even those of our students who were technologically challenged.

Background

The previous study involved 255 pre-service teachers over 4 semesters in the 2006 and 2007 academic years, see Cameron (2008). In that study, each student was asked to construct a learning sequence using LAMS software and to write a justification for the design and pedagogy used in his/her sequence. They were required to use the literature to support their approach and activity choices. The main purpose of that assignment was to establish students understanding of the pedagogical concepts involved in their lesson design. As with the students in the new study at The University of Notre Dame Australia, no one who took part in the study had had any previous experience with the LAMS software.

To provide the students with some experience with LAMS before they were asked to author their own sequence, tutors in the initial study delivered selected course content via LAMS sequences on four separate occasions and gave them an opportunity to de-construct LAMS sequences selected from the LAMS Community website (www.lamscommunity.org). Tutors then provided students with basic LAMS instruction in authoring. Following this, class time was provided so students could begin their sequences under the supervision of their tutor, but students were encouraged to collaboratively work through issues as they arose with their peers. Before final submission, students were given a further opportunity in class to workshop their sequence with their peers during which time they were encouraged to collaboratively work through any perceived difficulties.

The initial trial at Macquarie University using LAMS as a scaffold for lesson planning produced extremely positive results. These students created well-documented lessons that illustrated a level of detail and a variety of activity that is often missing in the written lesson plans of pre-service teachers. The combination of the pop-up windows asking for specific activity detail plus the coloured graphic interface enabled those students to preview and overview lessons in a way not possible with traditional lesson plans. Additionally, LAMS creates these lessons in a standardised template that can be easily modified for future re-use. The ability to readily re-use lessons presents new possibilities for increasing the quality and variety of teaching and learning within an e-learning context (Cameron, 2008). The new study at The University of Notre Dame Australia was an attempt to verify those results, specifically with secondary pre-service teachers.

Methodology

The study aimed to explore the learning design process through the use of LAMS as a scaffold for lesson planning with pre-service teachers in an authentic activity. Throughout the process of designing a lesson, the pre-service teachers were prompted by the software to think about all aspects of their lessons in detail. This included a Preview mode which enabled the pre-service teachers to experience the lesson themselves (as their students would) before using it in the classroom.

A pre and post questionnaire was completed by 19 students from our group of secondary pre-service teachers. The brief pre-questionnaire focused on students' opinions on creating written lesson plans. The research questions in this study focused on whether LAMS facilitated the creation of the pre-service teachers' lesson plans in the following four areas:

- planning all aspects of their lesson;
- previewing their lesson from the learners' perspective;
- providing a visual overview of the lesson to identify the learning styles addressed with the activities employed; and
- creating a standardised template of activities that could be easily modified for future re-use.

The post-questionnaire focused on these four areas and included questions such as:

- Did the amount of detail required to complete a LAMS sequence help you construct this lesson, or do you think you would have covered all the steps regardless?
- Would you consider using LAMS to design a lesson again?
- LAMS has the facility to record online and offline tasks so it could be used as a lesson plan creator. Would this be preferable to you than manually writing/typing your lesson plan?
- How effective did you find the ability to preview your lesson from a student's perspective?
- Was the workshopping of the sequences a worthwhile experience?
- Did having the LAMS activity tools on the screen help you choose the learning activities for your sequence?
- Did you find being able to overview your whole sequence in Author influence your choice of activities or the lesson flow?
- Do you think the coloured icons used in LAMS might influence the design of your lesson in the future?
- Assuming you have the facilities, do you think you might re-use your LAMS sequence in the future?
- Can you see any advantages / disadvantages to re-using a LAMS sequence over re-using a written lesson plan?

As with any ethnographic study, it was important to analyse the data gathered in a systematic and continuous manner (Burns, 1994). Data was examined and themes explored through the use of categories relating to the research questions. Once the categories were assigned, the analysis relied heavily on description rather than inference. Analysis of how student responses have informed the results and discussion.

Results and discussion

The results reported above confirm that using LAMS to plan lessons has a number of advantages over writing a traditional lesson plan.

Students were asked three questions in the pre-questionnaire: The first one asked the students if creating a lesson plan was an important aspect of learning to be a teacher. Of the 19 student's responses to this

question, 18 students stated that it is important. One student commented that "traditional lesson plans can be too structured". Other comments were positive about using lesson plans. Other students commented:

> I believe that in the first few years lesson planning is important as it ensures that you teach all the required content and the syllabus outcomes. However, it isn't practical to write a lesson plan for every lesson.
>
> It gets you to think about the multi-faceted aspects in a class. It gets you prepared in a way. As starting teachers, it's valuable but as you gain more experience you don't need them.
>
> When a student teacher creates a lesson plan it enables them to get their thoughts in order and teach an effective lesson.

The students were asked if from their practice teaching experience lesson plans generally go according to plan. Eighteen students stated that yes they do go according to plan. The final question the students were asked is what things they can do to assist the lesson going according to plan. There were a variety of responses to this, including "know your content" (five responses), and "have resources ready" (seven responses) and "rehearse the lesson" (four responses).

The following themes emerged in relation to the research questions:

- LAMS helped student plan all aspects of their lesson;
- It allowed the pre-service teachers to preview their lesson from the learner's perspective;
- LAMS provides a visual overview of the lesson which can identify the learning styles addressed with the activities employed, and;
- It creates a standardised template of activities that could be easily modified for future re-use.

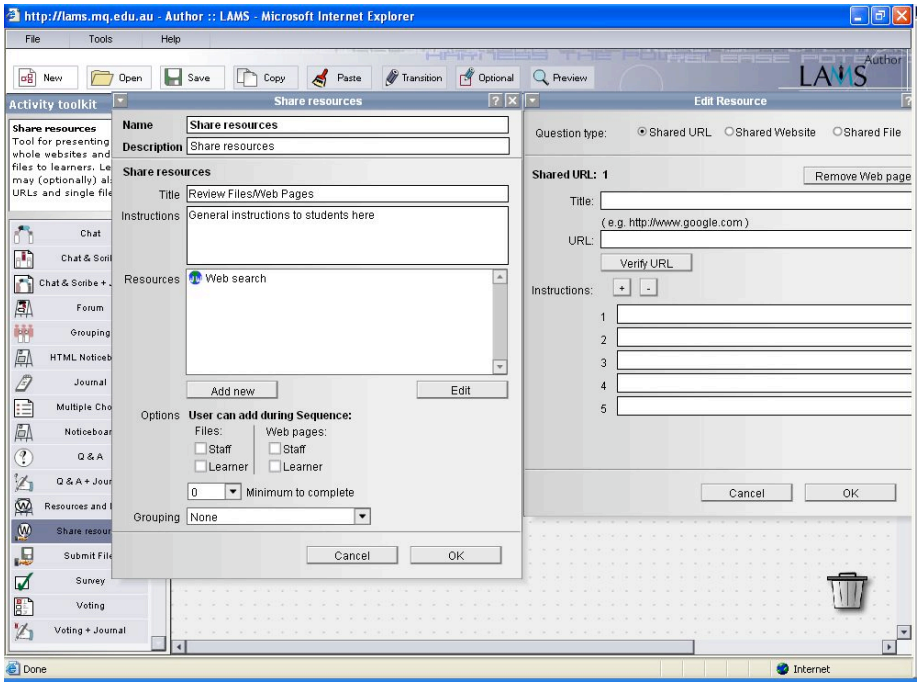

Figure 1: An example of the information required to activate a LAMS activity tool

LAMS helped students plan all aspects of their lesson

From the 19 responses, 18 stated that they would use LAMS again. One student stated that LAMS is "innovative and creative and different from everyday classroom activities".

Another student commented that LAMS "encourages me to think in terms of the structure of my lesson and the different activities I can use". This suggested that LAMS is assisting with the way this student teaches in the classroom and how they are implementing lessons.

Other comments included:

> LAMS is a useful tool to use in my teaching, it's interactive and entertaining, but still a constructive way to learn.
>
> It caters for a range of different learning styles, covers a range of ideas and tools that is very, very useful and coherent.
>
> It is a way to create engaging learning.

LAMS allowed the pre-service teachers to preview their lesson from the learner's perspective

The LAMS visual environment readily allows users to design their own online lessons and immediately "picture" how they will appear to the learner. It enables them to experience the lesson themselves from a learner's perspective before using it via a Preview mode exactly as the learner would see it. In this way, the pre-service teacher experiences the lesson and can identify any difficulties with it before trialling it in the classroom.

Although none of the students had previous experience using LAMS and were given limited time using it prior to completing the questionnaire, the students gave some interesting responses to support this. These include:

> If you couldn't review you wouldn't find any problems or work out if it made sense.
>
> Very effective, to know if it's understandable, too hard/easy.
>
> It enables you to find out whether more instructions/less instructions are needed etc.

Awkward sequencing is frequently picked up at this point and because LAMS sequences are simple to edit, the lessons can be readily modified. The sequencing of activities can often be vital to the success of a lesson and within the LAMS authoring environment, explicit sequencing is simply achieved. Conversely, some of the participants enjoyed providing their learners with a choice of activity order, and this often empowered the learner, making the sequence more enjoyable. One student responded "it was an interesting insight [meaning the preview] and actually made me change some aspects of my lesson", while another commented that "it enabled a quick overview of functions of LAMS".

The Preview function also gave the pre-service teachers the opportunity to trial a variety of possible activities. The feature provided them with the ability to work through these alternative approaches and decide which works best or give the learner the option of choosing their own preferred path.

LAMS provides a visual overview of the lesson which can identify the learning styles addressed with the activities employed

The LAMS graphic interface enabled the pre-service teachers and their tutors to "visualise" lessons providing an instant "picture" of the lesson and its content with clarity that is not available in other lesson plans. 58% of those surveyed agreed that being able to overview their sequence influenced their choice of activity or lesson flow. As each type of LAMS activity is represented by a unique icon, its location in the lesson sequence and its frequency can be quickly identified. Student comments included:

> It helped because I had an oversight of everything and could evaluate how successful the lesson would be.
>
> It made me think about whether the order of the sequence was relevant.
>
> I liked the flow of the first one, but as I get the opportunity to play around with it I will definitely come up with my own lesson flow.
>
> It influenced my lesson flow because I wanted the activities to compliment each other.

It is interesting to contrast the screen shot of a LAMS lesson plan below, to the more traditional lesson plan (refer to Figure 1 and Figure 2).

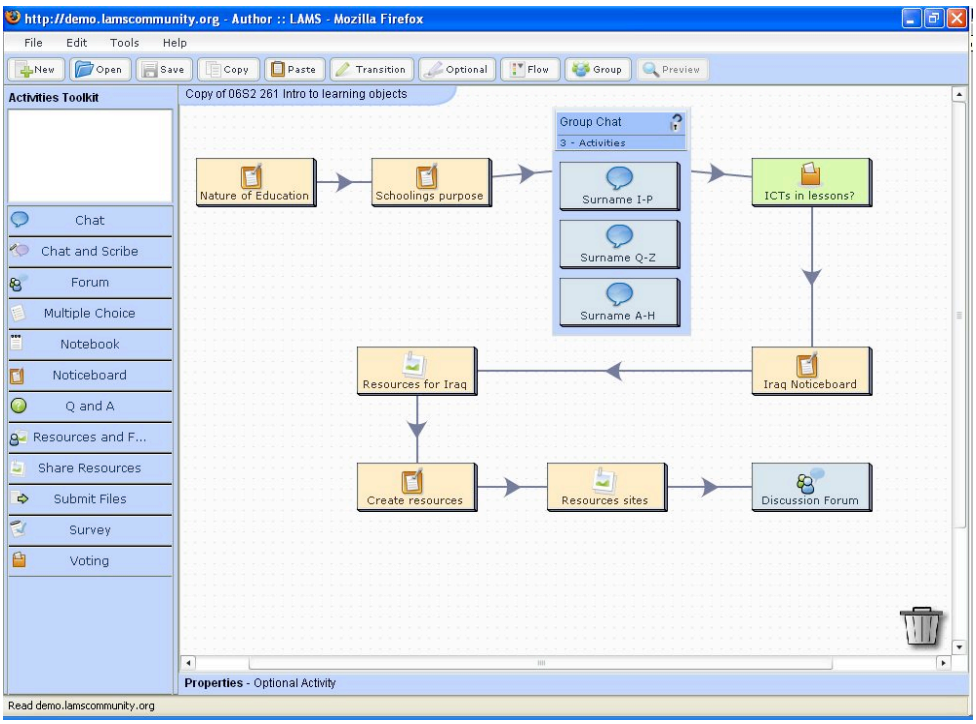

Figure 2: A lesson in LAMS Version 2

A visual approach to lesson planning has previously been successfully trialled using concept maps. Fullan & Miles (1992) reported the concept mapping approach helped the pre-service teacher go beyond a mastery of content and examine how best it can be transmitted, toward an appreciation of pedagogy and how understanding can be variously constructed by student. It provided a concrete, practical tool that related directly to the everyday operation of their classrooms. This study similarly found the students moved their focus to pedagogy when constructing their LAMS sequence.

LAMS creates a standardised template of activities that could be easily modified for future re-use

Beetham (2006) sees re-use as the way of the future: Lesson designers will want learning design tools that will support the following:

- The ability to adapt designs responsively;
- The ability to collectively author and share designs;
- Explicit representation of underlying approaches or pedagogies to support their own personal development.

When the Macquarie University students visited the LAMS Community website (www.lamscommunity.org) and trialled lessons that worked but were not in their subject area, they could see how simply the content could be modified and the sequence made to work for them. Bennett, Lockyer, & Agostinho (2004) propose that "generic" lesson plans could serve as a pedagogical framework to support teachers in creating learning experiences, with the teacher adapting the learning design, specifying the particular activities and choosing or creating the resources and supports needed to suit his/her students. In the study conducted at The University of Notre Dame Australia, like the earlier one at Macquarie University, we have shown that our students believe LAMS is up to the challenge.

The students in this study felt that by re-using LAMS lessons they "saved time" and they could re-use resources. One student stated "LAMS is a program that allows students to work at their own pace and I can re-use my lessons for later years".

Overall the results from using LAMS with this cohort of pre-service secondary teachers were very positive. This is supported by one student's comment "It takes the pressure off the teacher, is very student centred, and allows you to do most of the work at home".

Traditional Written Lesson Plan Example

Class: 9 **Date:** 27/6/06 **Period:**3/4 **Period End:** 1:14 **Period Start:** 10:39	
Topic:	Statistics
Syllabus Outcomes:	DS5.1.1 groups data to aid analysis and constructs frequency and cumulative frequency tables and graphs.
Student Outcomes:	Can recognise different types of data graphs (column, frequency, step, scatter plot, dot plot, box-and-whisker, line). Can represent data using different graphs. Can use a graphics calculator to display data as a histogram or a box plot.
Link with Previous Learning:	Data collection, pie charts, step graphs, stem-and-leaf plots, mean mode & median.
Resources:	Worksheets * 30 – chalk
Assessment:	Homework, class exercise observation, questioning.

Lesson Plan

Stage:	**Teacher activity:**	**Student activity:**
Revision 20 mins	Introduce yourself! Mark the roll and set the rule of name before answer! Summarise what they remember of data representation. For each graph using numbers 3, 5, 6, 8. 8 display on the board.	Students can represent data using frequency histograms, step graphs, scatter plot, dot plot, box-and-whisker, and line graphs and know which is applicable to one variable which is useful for 2-var!
Worksheet 15 mins	Hand out the worksheet to do the exercise on the sheet. In the last two minutes go through the answers.	Start answering the questions on the worksheet with the given data set.
Graphics calculator 25 mins	Hand out the calculators and instruction sheets.	Get started on using the calculator following the instruction sheet!
Homework 15 mins	Exercise from textbook, doing every second column.	Quietly writing homework in their homework book ☺
Homework: text book ( ) ☺		

Figure 3: A "traditional" lesson plan

Conclusions

Authentic learning allows students to experience real world complexities by completing authentic tasks (Herrington & Kervin, 2007). In this study, authentic learning allowed these students to explore a resource (in this case, LAMS) so that they experienced all of the complexity, as well as the uncertainty, of the real world. Using an authentic learning framework, second year pre-service teachers were introduced to LAMS as an alternative method to create lesson plans. As was found in the study on which it was modelled, the students who used LAMS really felt they benefited from its use. They reported that using the software helped them to plan all aspects of their lesson. The students also found that LAMS provided a visual overview of the lesson that allowed them to identify the learning styles addressed by the activities they had designed. Additionally, LAMS created these lessons in a standardised template that can be easily modified for future re-use. The ability to readily re-use lessons presents new possibilities for increasing the quality and variety of teaching and learning within an e-learning context.

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