A COMPARISON OF LAMS AND MOODLE AS LEARNING DESIGN TECHNOLOGIES – TEACHER EDUCATION STUDENTS' PERSPECTIVE

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Abstract
As open-source educational systems both LAMS and Moodle provide a range of tools that can be used to support the development of pre-service students' learning design capabilities. Sixty-eight teacher education students were surveyed to gauge their perceptions of each of these systems as frameworks for designing learning experiences. Responses indicated that the majority of students appreciated that different tools were suitable for different purposes. An unexpected outcome of the research was the different levels of learning design understanding that the survey questions revealed, ranging from highly developed to misconstrued.

1. Introduction

The Learning Activity Management System (LAMS) provides an open-source platform for designing, managing and delivering online learning sequences (LAMS International, 2009). These features allow LAMS to be effectively used to develop pre-service teachers' learning design capabilities (Bower, 2008; Cameron, 2006, 2007; Kearney & Cameron, 2008). The system provides students with a rich array of tools with which students can create their learning sequences, including chat, forum, wiki, share resources, Q&A, multiple choice, and voting activities. LAMSv2.3 also includes a range of preinstalled plugins for web-conferencing, mapping exercises, image creation,

spreadsheet tasks and more which enable students to integrate a variety of new activities into their learning designs.

Similarly, the Moodle Learning Management System (Moodle community, 2009b) provides another platform with which educators can design and deliver online learning experiences, and thus offers another possibility for developing education students' technology-based learning design skills. It is currently used by well over a million teachers around the world to structure their online courses (Moodle community, 2009b), and like LAMS it also offers the ability to create chats, forums, wikis, online quizzes and disseminate resources. It does not come with the same range of pre-installed plugins as LAMS, however it does have a strong development community offering over five hundred modules and plugins that can be installed at the administrator's discretion. Thus pre-service teachers are provided with a wide range of tools with which to develop their learning design capabilities.

Providing novice learning-designers with the opportunity to develop learning designs and reflect upon them is an effective means of developing their learning design understanding and confidence (Masterman, Jameson, & Walker, 2009). This paper reports on pre-service teachers' perceptions of Moodle and LAMSv2 as tools for creating learning designs, based on their experiences designing with the two tools in the subject "EDUC261 – Information and Communication Technology and Education" at Macquarie University in Semester 1 of 2009. In particular, the following research question is investigated:

> What are pre-service teachers' perceptions of the advantages and disadvantages of LAMS and Moodle as systems for instantiating learning designs, and how does this influence their intended use of these tools?

2. Related literature

Cameron (2006) surveyed 60 pre-service teachers as to their perceptions of the first version of LAMS. The survey posed questions about specific aspects of the system. In response to the question "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?" 82% of respondents agreed that LAMS provided assistance. When responding to the question "How effective did you find the ability to preview your

lesson from a student perspective?" 97% of students provided a positive response. As well, 93% of students felt that providing a visual overview supported their learning design composition process, and 98% indicated that they would reuse their sequence in the future. These questions provide insight into teacher-education student perceptions of specific features of this earlier version of LAMS. However students did not have the opportunity to discuss the advantages and disadvantages of LAMS in an open-ended fashion. Because respondents were education students rather than practising teachers, they were less likely to have a point of contrast upon which to base their evaluation.

Levy, Aiyegbayo and Little (2009) used more open-ended interview techniques to elicit practising teachers' perceptions of LAMSv2 as a tool for implementing inquiry-based learning approaches. Participants generally found the system simple to use regardless of their level of technological expertise. The ability to easily share and reuse learning designs was regarded as an advantage of the system. Some users identified the positive potentials of being able to structure the learning pathway, however others found this constrained the inquiry-based learning process. In general, LAMSv2 was perceived by these practising teachers as a tool for designing tightly structured learning episodes involving relatively high levels of teacher control. Even though one participant identified that the structure of a sequence 'depends how the sequences are written' (Levy, et al., 2009, p. 246), LAMSv2 was not used to create strongly student-led, open-ended or extended approaches to inquiry-based learning (Levy, et al., 2009).

Some educators have explored the idea of offering Moodle spaces to learners for design purposes. In a 'Moodle, Web 2.0 and social-networking' course Mealor (2008) provided each student with their own Moodle course space to develop as a Web 2.0 based social networking site. Evans (2008) discusses the efficacy of repurposing Moodle to create online communities whereby members have greater capacity to contribute to and design the environment. Yet it is remarkably difficult to find research that focuses principally upon designer perceptions of using Moodle, let alone for teacher education purposes.

Teacher perceptions of LAMS and Moodle have been integrated into the same study. Masterman *et al*. (2009) investigate experienced teachers' initial perceptions of learning design as a conceptual framework for practice through its instantiation in either LAMSv2 or Moodle. In this study participants' perceptions of 'learning design' as a

practice were examined based on experience designing in one or other of the tools, with a general consensus that such approaches were useful for structuring learning, catering to a range of abilities and motivating students. Walker and Masterman (2006) have examined the issue of learning design reusability based on participant use of either LAMS or Moodle, with attitudes towards reuse being more favourable than the extent to which designs were resused in practice. The final report of the ALeD (Authoring Using Learning Design) project (Joint Information Systems Committee, 2007) concluded that LAMS and Moodle were both effective for designing and facilitating online learning where there is a strong emphasis on sharing, collaboration and reflection. However none of the three aforementioned studies directly compared perceptions of LAMS and Moodle as tools for designing and instantiating learning designs, but rather considered them as generally homogeneous tools for implementing learning experiences for students.

Even though Moodle and LAMS are both open-source, interoperable tools to support online learning design (Ghiglione, Rodríguez Aliberas, Vicent, & Dalziel, 2009; Moodle community, 2009a), they differ in at least two key respects. Firstly, whereas LAMS is designed to operate more at the level of individual lessons Moodle is designed to structure courses. Secondly, LAMS more tightly defines the sequence with which resources and activities are accessed whereas Moodle offers more student control over the order in which resources and tools are used. This has the potential to affect teachers' (both pre-service and practising) perceptions of the utility of these tools for the design and development of online learning resources.

This study analyses pre-service teachers' open-ended feedback about LAMS and Moodle as platforms for developing their learning design capabilities and for developing learning experiences for their students. It is acknowledged by both students and the authors that different tools are appropriate for different contexts and requirements. However analysing student perceptions of these platforms not only sheds light on these systems as tools for developing students' learning design skills, but also provides insight into the nature of pre-service teachers' conceptions of technology-based learning design.

3. Method

3.1. The unit of study

"EDUC261 – Information and Communication Technology and Education" is an optional second year teacher education subject offered at Macquarie University. The unit of study incorporates 12 one-hour lectures that cover topics such as affordances, multimedia learning principles, collaborative learning theory, digital literacies and frameworks for learning design. The subject also included a 2 hour lab-based tutorial each week where students could put into practice the concepts that they had been learning in lectures. In Semester 1 of 2009 students were required to complete two technology-based learning design tasks. Each of these tasks was worth 25% of their total assessment grade (the other two tasks were a discourse analysis and an examination).

The first task required students to design a one-hour lesson using LAMS version 2.1 based on a learning outcome or outcomes that students selected from a NSW Board of Studies syllabus. Students were also required to write a 750 word justification explaining the rationale underpinning their designs. The second task required students to work in groups of two or three people to create a mini-course on a topic using Moodle version 1.9.4. The lecturer decided the members of each group, however as for the LAMS assignment, students could choose which learning outcomes from a NSW Board of Studies syllabus their learning design would address. Once again each student was required to submit their own 750 word rationale for their design.

Students enrolled in the unit were from a wide variety of backgrounds and include both mature age and recent high school graduate students. Several weeks before each task was due students were provided with a two-hour guided workshop on the use of each system. In these workshops the functionality of the core tools were introduced and related to the learning design concepts that had been discussed in lectures. At the end of each of these introductory workshops students were encouraged to adopt a 'pedagogy-first' (Bower, 2008) approach to designing their learning activities, whereby they should start by identifying the underlying pedagogical requirements before selecting the tools to instantiate their designs. Students were also afforded one two-hour

workshop for each task where they could work on their projects and ask for assistance if necessary. The rest of each assessment task was completed out of class time.

Seventy students completed the course and sixty-eight students provided responses to survey questions relating to their perceptions of LAMS version 2.1 and Moodle version 1.9.4 as tools for creating learning designs.

3.2. The survey

The survey instrument comprised eleven questions, six of which are pertinent to the study being reported. These six questions were:

1. What are some of the *advantages* afforded by **LAMS** when it comes to designing and implementing learning experiences for students?
2. What are some of the *advantages* afforded by **Moodle** when it comes to designing learning experiences for students?
3. What are some of the *limitations* of using **LAMS** when it comes to designing and implementing learning experiences for students?
4. What are some of the *limitations* of using **Moodle** when it comes to designing and implementing learning experiences for students?
5. Did you *prefer* creating online learning activities using **LAMS** or using **Moodle**? How come?
6. In the *future* do you think you would be more likely to use **LAMS** or **Moodle**? How come?

The survey was issued in class in the final week of classes with the intention of encouraging students to reflect on their technology-based learning design experiences. The LAMS Q&A tool was used to administer all survey questions. Students were informed that their responses would in no way impact upon their grades and that all responses would be reported anonymously. Students were provided with approximately 5 minutes on each question to type their responses.

Responses to each question were then categorised using a grounded theory approach. Each distinct reason provided by a respondent was counted, meaning that a response to one question could increase the frequency of several different categories. Both researchers independently classified responses to question one in order to provide a measure of reliability. Although the second researcher constructed more categories

than the first researcher, after merging some of the second researcher's categories the categories themselves and the frequency of observations between the two researchers were similar. Categories and frequencies are reported in the results section below. The categories and frequencies have been formed by both researchers working together to merge the categories formed by the second researcher. Representative and pertinent student comments have also been included. These not only further reveal students' perceptions about the two systems but also their conceptions of technology-based learning design.

3.3. Results

Question 1 – Advantages of LAMS

The frequency of responses to the question "What are some of the *advantages* afforded by **LAMS** when it comes to designing and implementing learning experiences for students?" with a count of two or greater are shown in Figure 1. The three most frequently cited advantages of LAMS relating to enabling groupwork, determining learning pathways and monitoring student performance were sensible and may have been anticipated. However, some of the less frequent responses deserve attention because they reveal a poorly formed understanding of the role of technology in learning design. For instance, three students felt that the system "allows students to construct knowledge" and two believe it "makes meaningful learning take place". This indicates a disconnection between educational principles espoused in the students' courses and what technology can achieve – depending on how technology is used it is quite possible that surface, non-meaningful learning takes place.

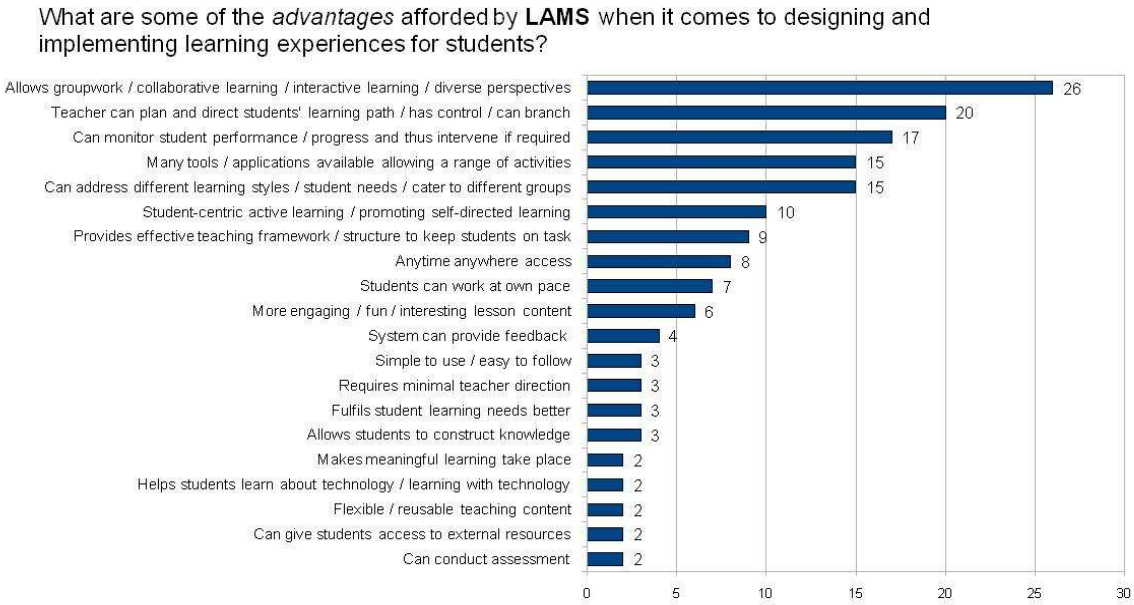

Figure 1. Pre-service teachers' perceptions of the advantages of LAMS.

Categories with a frequency of one were not included in the bar-chart. These categories were: "allows changes during lesson", "allows for different teaching approaches", "allows student review of material", "forces teacher to incorporate instructional approaches", "LAMS lesson plan more effective", "metacognitive learning teamwork", "some tools use multiple learning theories", and "able to create a sequences of activities that could be used in achieving the desired learning outcomes". Again, these less frequent responses are revealing. The first three categories are important advantages of LAMS which deserved to be mentioned more frequently. The last five reasons were at best poorly explained and at worst incorrectly assert that technology in itself guarantees quality learning will occur.

Question 2 – Advantages of Moodle

Figure 2 illustrates student perceptions of the advantages of Moodle. Most of the responses speak for themselves. It is curious that the most popularly cited advantage of Moodle was the range of tools or activities it afforded whereas this was only the fourth most cited advantage of LAMS; LAMS contains a number of tools not available in Moodle. Another notable disparity related to more students identifying anytime-anywhere accessibility as an advantage of Moodle as compared to LAMS, even though they are both available online. Reasons for these perceptions may be based on the fact

that Moodle is more often used to facilitate asynchronous access to a wide range of resources and activities whereas LAMS is designed especially to facilitate synchronous access by groups of students to particular tools.

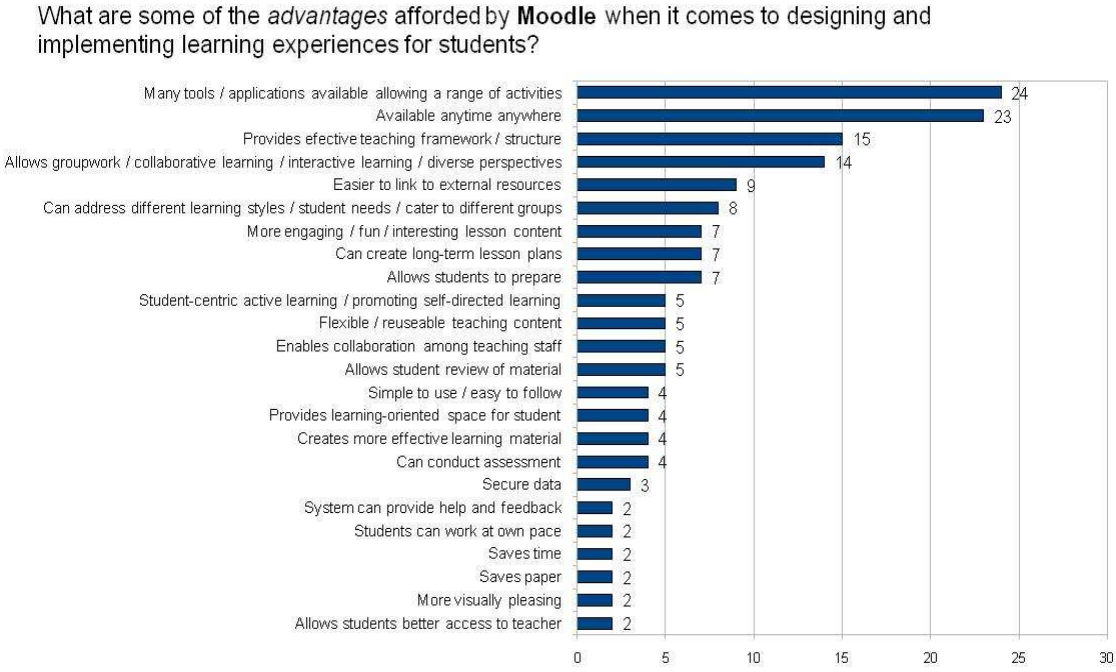

Figure 2. Pre-service teachers' perceptions of the advantages of Moodle.

Respondents identified that Moodle enabled longer-term learning plans to be produced, and that the open layout of resources allowed student-initiated preparation, learning pathways, and revision. To this extent respondents perceived that Moodle supported the development of independent learning skills. However once again, some of the less frequent responses provided insight into students' misconceptions of the role of technology in education. Four people felt that Moodle "creates more effective learning material".

The three categories with a count of only one were "helps students learn about technology and learn with technology", "more control of teaching", "allows for situated learning", the last of which is clearly not enabled by the technology itself.

Question 3 – Limitations of LAMS

Student perceptions of the limitations of LAMS for designing and implementing learning experiences are shown in Figure 3. The second most frequently cited advantage

of LAMS was also the second most commonly identified disadvantage – LAMS structures the learning pathway. Taken together (and considered in conjunction with later questions) these responses relate more to identifying a feature of LAMS that may be an advantage or a disadvantage depending on the aims of the learning design. Similarly, that students may be left behind, students have no physical interaction, and that it requires technologically literate students are all by-products of attempting to engage synchronous collaboration online rather than limitations of the tool itself.

There were several responses that indicated misconceptions about the functionality of LAMS. For instance, some respondents indicated that the inability to change lessons in progress and revisit past sequences were limitations of the system, even though both of these are possible in LAMS. Similarly single category responses such as “lacks forum”, “no opportunity for student feedback about class” and “difficult to tell if students are participating” demonstrate a misunderstanding of the tool and how it can be used.

Some responses raised pertinent points, such as typing skills restricting the ability of some learners to participate, and the system not being suitable for special education. Relevant single frequency responses included not easily being able to cater for students with a verbal learning style, and only being suitable for single lessons or shorter sequences. Other single-response categories included: “cannot control student engagement”, “does not cater to all students needs”, “LAMS design may distract from pedagogical outcomes”, “only effective when full group is present”, “requires good literacy skills”, “students may not be spontaneous in electronic chat”, and “teacher may become too dependent on LAMS”.

As for LAMS, technical limitations were the most frequently cited disadvantage of Moodle (see Figure 4). In a similar manner, just as the openness and accessibility of resources had been identified as an advantage of Moodle, it also was the basis of the criticism that the top-level access to such a wide variety of resources could overload the user.

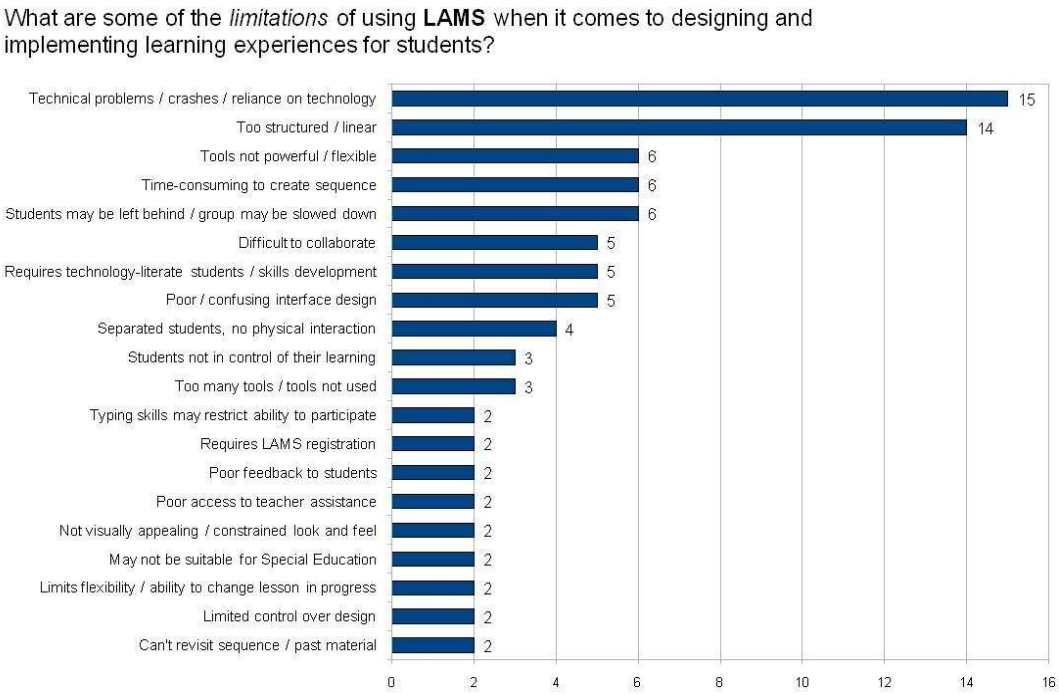

Figure 3. Pre-service teachers' perceptions of the limitations of LAMS.

Some limitations were cited in roughly equal proportions for LAMS and Moodle, including "time consuming to create a sequence", "requires technology-literate students", and "poor or confusing interface design". Categories with a frequency of one included "module templates too rigid", "not all learning experiences can be on-line", "less authentic than physical contact", "copyright issues with material", only the first of which relates to Moodle itself as opposed to online learning generally.

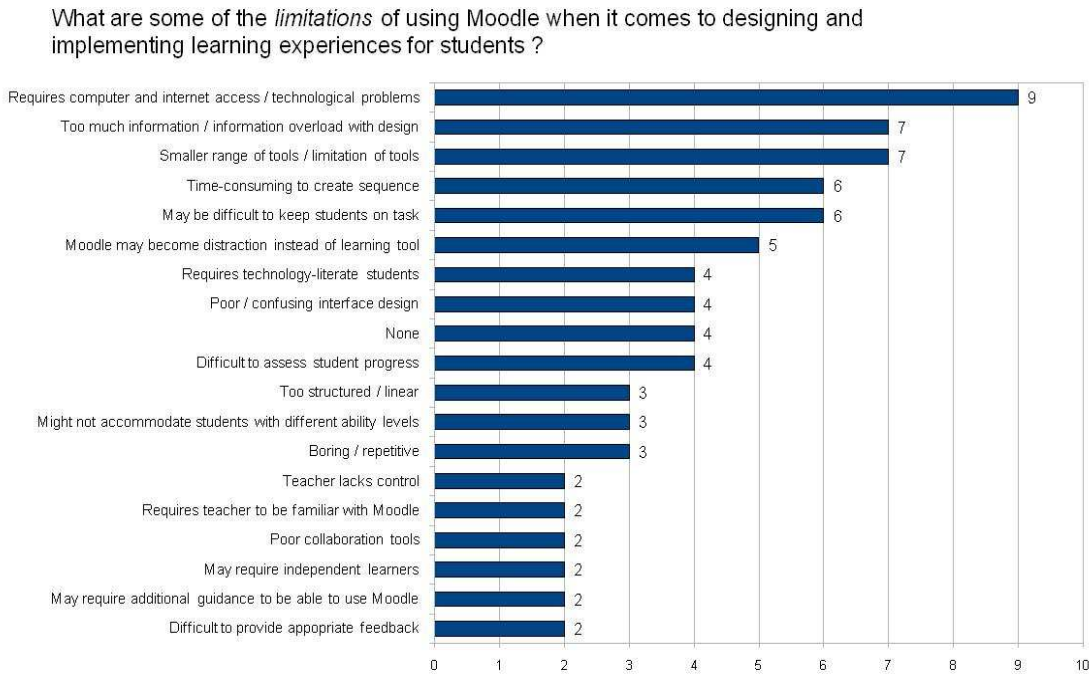

Figure 4. Pre-service teachers' perceptions of the limitations of Moodle.

Question 5 – Preference for LAMS or Moodle

Respondent reasons for preferring one system over the other are summarised in

Table 1. It is interesting to note that some students provided the same reason for preferring one system as other students provided for preferring the other system. Moreover, there was often a correspondence between reasons respondents preferred one technology over the other. For instance many respondents preferred LAMS because it was good for a single lesson while others preferred Moodle because it facilitated longer-term planning. Some preferred LAMS because it offered a more guided learning experience while others preferred Moodle because it enabled students to more flexibly navigate the learning materials and activities.

Table 1. Reasons for preferring LAMS or Moodle.

Prefer LAMS		**Prefer Moodle**	
Reason	**fx**	**Reason**	**fx**
Good for single lesson	5		
Provides better guidance or focus	3		
For younger students	1		
More realistic learning experience	1		
Easier to use or better interface or layout	7	Easier to use or better interface or layout	14
Can host many different resources	3	Can host many different resources	12
More structured or organized	5	More structured or organized	3
More fun or engaging	4	More fun or engaging	3
Integrates well with educational theories	2	Integrates well with educational theories	1
Requires less development time	1	Requires less development time	1
		Better for long-term lesson plans	12
		More flexible or less linear	11
		More collaboration	2
		Fewer technical problems	2
		For older students	1
		More interactive	1
		More accessible (temporally or spatially)	1
		Server upload not required	1

As a per-person tally, 15 people indicated a preference for LAMS, 45 indicated a preference for Moodle, and 7 indicated that both were good or that it depended on the situation. It should be noted that the order of using the tools and the timing of implementing the survey may have influenced student responses; Moodle was the second system that students used so they were both more familiar with learning technologies when they went to learn it and had used it more recently.

Question 6 – Preference for future use

Table 2 summarises students' expectations for future use of LAMS and Moodle and the reasons for their choices. As a person-by-person tally, 9 individuals indicated a preference for LAMS, 38 for Moodle, and 16 who indicated that they would use one or the other or both, depending on the context. Most reasons are self-explanatory. Again

some students provided the same reason for preferring one system as other students provided for preferring the other system. However responses generally revealed that students perceived how LAMS was more suitable for shorter learning episodes while Moodle was appropriate for organising larger bodies of work. Students also based their preferences on their future design needs. Respondents who would be teaching younger students appreciated the more structured and controlled learning environment that LAMS provides, while several respondents who would be teaching older students valued how the more flexible nature of the Moodle framework could be used to facilitate more student-directed learning.

Table 2. Reasons respondents were more likely to use LAMS or Moodle in the future.

More likely to use LAMS		**More likely to use Moodle**	
Reason	**fx**	**Reason**	**Fx**
Better for short lessons	10		
For younger students	8		
Less work	1		
Provides access via LAMS server	1		
Supportive LAMS community	1		
More structured or organized	1	More structured or organized	8
Easier to use	2	Easier to use	5
More fun or engaging	1	More fun or engaging	4
Better for collaborative learning	1	Better for collaborative learning	1
		Better for larger bodies of learning material	13
		Student-directed	6
		For older students	5
		Many tools or resources	4
		Interactive	3
		More flexible	3
		Better spatial or temporal affordances	2
		Better collaboration	1
		More adoption by schools (at this point)	1

4. Discussion and conclusion

Generally speaking pre-service teachers understood Moodle to be an organisational tool for managing course-level units of work, with the power to conduct standard educational tasks like assessment. They also appreciated its flexibility, but noted that it did not come with any set approach out of the box and thus required great attention to pedagogy. Many pointed that it allowed for more student-directed learning, which meant it was better suited for more mature students.

Respondents generally perceived LAMS as more appropriate for lesson-level learning design, to facilitate the teaching of a particular concept or concepts. Its sequence-based structure was seen to provide more control for the teacher and make it easier to keep students on task, so was better suited for younger years. It was seen to offer a range of tools for collaboration, though the utility of those tools was observed to depend somewhat on the literacy and technological capabilities of student users. They also felt that LAMS was not suitable for structuring courses, which is in line with the intentions of the designers.

Preferences for future use were in many cases guided by the participants' anticipated teaching context. Many who preferred LAMS indicated that it was because they expected to be designing individual lessons or for younger students, while those who preferred Moodle often expected to be designing courses or for older students. Elements of system quality such as the interface, structure of the system, degree of engagement afforded and the ability to facilitate collaboration also influenced anticipated future use. However not only was there discrepancy between individual perceptions of these elements with some people preferring one system over another for the exact same reason, but there were also cases where one system was preferred for the same reason that other people did not prefer the system (for instance some pre-service teachers preferring LAMS because it provided more guidance whereas others preferring Moodle because it allowed more flexible learning pathways).

The pedagogical thinking reflected in student responses was at least as interesting as the issues they raised about the technologies. For instance, there was a clear distinction between responses that placed emphasis on the functionality of the tools and those that placed emphasis on the pedagogy that was enabled. Some of the reasons that respondents provided were revealing in that they were obviously erroneous.

Common examples included attributing changes in learning or pedagogy directly to the technology, such as believing that a tool in itself would allow more meaningful learning to take place. There were also several examples of respondents not understanding the functionality of the system. This highlights the need to not only spend time developing pre-service teachers' understanding of how the tools operate but also their appreciation of technology as a mediator of learning rather than its source.

The more frequent response categories were of course interesting in so far as they provided an indication of the most popular reasoning. In most cases these aligned with conventional wisdom. For instance, respondents' perceptions of the highly structured nature of LAMS sequences aligned with perceptions of experienced teachers as identified by Levy *et al*. (2009). However, some of the less frequently arising response categories were often also valuable for the critical insights they provided. For instance, only two people cited the reusability of learning designs as an advantage of LAMS. Only one student pointed out that an advantage of LAMS was that it allowed a range of different pedagogies to be applied.

Encouraging education students to think critically about the tools that they use to create their learning designs is essential so that our teachers of the future can develop the capability to appropriately match learning tasks to learning technologies. Students need to understand the affordances and limitations of learning technologies, and which learning effects are attributable to pedagogy as opposed to technology. This study indicates that both LAMS and Moodle are appropriate tools to facilitate developing students' critical thinking in the area of technology-based learning design, and by comparing and contrasting the two systems most students were able to develop an understanding of the advantages and limitations of each. The study also revealed the utility of performing such an analysis from a diagnostic perspective; not only did the study provide insight into nature of the technologies, but also into the thinking and misconceptions of the students themselves.

Technology is constantly evolving and with new toolsets comes a range of new opportunities for instantiating learning designs. The release of LAMS 2.4 and Moodle 2.0 may mean adjustments or developments in student perceptions of the learning design potentials embedded in these systems. Future research will allow teacher

educators to monitor how changes in tools impacts upon students' understanding of the role of technology in learning.

Note

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References

Bower, M. (2008). A 'pedagogy-first' approach to teaching learning design. In *2008 LAMS and Learning Design Conference* (pp. 35-42). Sydney: LAMS Foundation.

Cameron, L. (2006). Picture this: My Lesson. How LAMS is being used with pre-service teachers to develop effective classroom activities. In *First International LAMS Conference 2006: Designing the Future of Learning* (pp. 25-34). Sydney: LAMS Foundation.

Cameron, L. (2007). Using LAMS to facilitate an effective program of ICT instruction. In *2007 European LAMS Conference: Designing the Future of Learning* (pp. 39-49). Greenwich: LAMS Foundation.

Evans, P. (2008). Establishing sustainable communities. Paper presented at the MoodleMoot Moodle Australian Conference. 2-3 October, Brisbane.

Ghiglione, E., Rodríguez Aliberas, M., Vicent, L., & Dalziel, J. (2009). Using Moodle activities within LAMS. Paper presented at the 2009 European LAMS Conference. 6-9 July, Milton Keynes.

Joint Information Systems Committee (2007). *Authoring using Learning Design (ALeD) Project Final Report*.

Kearney, M., & Cameron, L. (2008). Students as designers. Paper presented at the 2008 LAMS and Learning Design Conference. 5th December, Sydney.

LAMS International (2009). LAMS: Learning Activity Management System home page Retrieved 29th August, 2009, from http://www.lamsinternational.com/

Levy, P., Aiyegbayo, O., & Little, S. (2009). Designing for inquiry-based learning with the Learning Activity Management System. *Journal of Computer Assisted Learning, 25*(3), 238-251.

Masterman, E., Jameson, J., & Walker, S. (2009). Capturing teachers' experience of learning design through case studies. *Distance Education, 30*(2), 223-238.

Mealor, S. (2008). Social Networking in Moodle. Paper presented at the MoodleMoot Moodle Australian Conference. 2-3 October, Brisbane.

Moodle community (2009a). Moodle.org: Modules and plugins Retrieved 8th September, 2009, from http://moodle.org/mod/data/view.php?d=13&rid=1569&filter=1

Moodle community (2009b). Moodle.org: open-source community-based tools for learning Retrieved 13th January, 2009, from http://www.moodle.org

Walker, S., & Masterman, L. (2006). Learning designs and the development of study skills: Reuse and community perspectives. In *Proceedings of the First International LAMS Conference 2006: Designing the Future of Learning* (pp. 89-98). Sydney: LAMS Foundation.