

Designing LAMS templates for medical education

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The School of Medicine at the University of Western Sydney is currently designing curriculum for years three to five of a new undergraduate medical degree. Part of the student workload is expected to be online in the form of nine 'Scientific Stream Modules', which will be made available from 2009. Learning design templates, designed in LAMS, are being used to aid content experts who are otherwise unfamiliar with eLearning, to insert their content straight into an online learning environment. The templates are also designed to show them the range and extent of online activities that are available through LAMS. The first modules are now starting to take shape, and LAMS has been useful for the iterative development of the templates and content through the LAMS preview feature. The templates have been used as a starting point and as an inspiration for the module design, but are not restricting new ideas.

Keywords: Learning design templates, Medicine, LAMS

Introduction - eLearning in medicine

The uptake of eLearning has varied amongst the medical schools of universities worldwide, but it is generally acknowledged that computers are going to play more and more of a role in the teaching of medicine in the future. As Kay Mohanna stated recently, "blended learning is the next 'big thing' in medical education" (Mohanna, 2007). This can be attributed to several reasons. Firstly, medical education is now in a phase of great innovation. Many medical schools have made the shift from traditional lectures and tutorials centred around body systems to teaching medicine through problem based learning (PBL) over the last ten or more years (Neville and Norman 2007). This change has been very successful in the teaching of medicine and has generated much research into the specific area of medical education. Most medical schools now have teams of medical education experts investigating innovative educational ideas.

Secondly, many undergraduate medical degrees have dropped from a seven year degree to a five year degree in order to stay competitive. Graduate medical degrees can be completed in as little as four years. Medical schools are now looking for new innovations to help medical students absorb a large amount of knowledge over a shorter and shorter amount of time. Some medical schools have developed their own learning platforms to manage much of their content, and to provide students with quick and easy access to resources and learning topics, for example eMed at the University of New South Wales, Australia (Watson, Moloney et al. 2007), and J@LON in France (Staccini, Joubert et al. 2006). These learning platforms were often developed before general LMS platforms (Blackboard, WebCT, Sakai, Moodle) had become readily available in the education market.

Alongside the LMS platforms, wikis, blogs, podcasts and assessment tools that are available to all educators, there are many systems that target specific areas of medical education, for example simulations of trauma and patient care (SimSuite from the Medical Simulation Corporation). There are also many websites centred on specific medical areas, for example, resources and information about cancer such as OncologySTAT created by Elsevier publishing.

Some problems faced in medical education

Clinical placements – educational role

Traditionally, medical students need to spend a large amount of their medical degree (years 3 to 5 in an undergraduate degree) in clinical placements, usually in nearby hospitals, specialist clinics, general practice clinics and community health services. This is an important exposure for students to real patient situations, and an opportunity to have experienced practitioners guide them through specialist areas. Normally, students are in different clinical areas to their peers according to what resources are available.

This could mean that at any one time, ten students are in a cancer clinic, six students are in obstetrics, twenty students are in surgery, and so on.

At the same time, the students need to continue learning the basic sciences that underpin each of the diseases and conditions that they are being confronted with. In some medical schools, students return to the university on certain days of the week for lectures in these areas. This creates problems of being away from the clinical setting when it may be more educationally useful to have remained. For example, a specialist is conducting a ward round, or reviewing a particularly intriguing patient. In addition, the lectures, which are performed on mass for the whole student year, may not always be relevant to what the student is learning in a clinical setting. A lecture on the anatomy of the eye may not be stimulating to a student on placement in a psychiatric ward.

Continuing education in medicine

As well as the education of undergraduate students, the continuing education of qualified doctors is also a necessary consideration (Wutoh, Boren et al. 2004). Medicine is a rapidly changing field as new research uncovers the complexities of human disease, and it is no longer true that a doctor will have learnt everything about a disease in medical school (Whitson, Chuong et al. 2006). Scientific research is creating vast areas of new knowledge, for example, the mapping of the human genome (Venter, Adams et al. 2001). With such an increase in the body of information for clinicians to be aware of, there has been a corresponding change in the way that clinicians have to learn. There is more need for them to assess scientific evidence as it emerges and assess the relevance to their own medical practice, than it is to know 'everything'. The onus is on the medical practitioner, as an adult learner, to gain medical knowledge, off-site, and after hours. This has spawned a whole new branch of medical literature and education, called Evidence Based Medicine (or Evidence Based Practice).

The most common way that doctors access new information is through online journal articles, research databases (e.g. The Cochrane Library) and through conferences. Doctors can also apply to specialist colleges to further their education, and courses are commonly provided through online learning modules (for example, The Royal Australian College of General Practitioners - www.gplearning.com.au).

The education of the undergraduate medical student needs to therefore prepare the students for this adult learning style as well as provide the flexibility needed while they are in a clinical placement. The qualities of eLearning become very attractive in this instance; the self-paced style of eLearning can fit around other commitments, the content of the course can be kept up to date easily and the presentation of different topics can be made to be stimulating for a single learner. Online learning can also connect people with similar interests and foster a collaborative community of new doctors who exchange ideas through techniques such as blogs and wikis.

eLearning and learning design in a new medical degree

The University of Western Sydney's School of Medicine is a very new one. This year, 2007, has seen the first intake year of new students in a five-year undergraduate Bachelor of Medicine degree. The newness of the degree provides exciting opportunities for innovation in eLearning, as well as an opportunity to use learning design to both help structure and control the quality of content development.

When the current cohort of students reaches the third year of their degree in 2009, they will mostly be off campus and on clinical placements. All of the content for the 'scientific basis of medicine' learning areas will be provided online for the students in a series of nine modules, which can be completed at any time during the year. Students will access the modules through a single login via their normal LMS, WebCT CE6 and they will have to complete three of the nine modules per year between years three to five. As well as the online modules, students will have two conference weeks a year, which will be held on campus. These conference weeks will focus on topics that are not easily taught in clinical placement or by online learning. This model of teaching for medical students is not usual; most universities continue to bring in their students for lectures on a weekly basis throughout the final years of their degree.

It was decided that design of the modules would need to be complimentary to the learning styles that the students have used in their face-to-face learning, that is, problem-based or case-based learning. Use of a case-based tutorial format that focuses on evidence from medical literature has been shown to be an

effective format for teaching medical students (Dorsch, Aiyer et al, 2004). The modules therefore encourage several principles of medical education, as outlined by Kaufman (Kaufman, 2003): the module should encourage active learning – the involvement of the learner in the learning process to encourage them to apply the new information that they have learned; the learning should closely relate to solving real life problems – case based learning; learners should use self-direction in their learning; and learners should be given opportunities to reflect on their practice.

While there are many content experts available to the UWS School of Medicine, there are not many that are familiar with designing or presenting a teaching module, and even fewer who are used to teaching online. Also, as these modules have never been created before in any form (as face to face teaching or online) there was a need to create an idea of how the modules should look, the amount of information needed and the types of activities that could be accomplished with online learning. This led naturally to the concept of learning design templates using a range of activity structures into which the content experts could insert their content. This would help create a starting point for the content experts, assist them to utilise good pedagogical designs, and allow some *commonality* between modules. Students would have some idea of what to expect from module to module, and there would hopefully be no disadvantage to attempting one module over another in the earlier years – remembering that the nine modules can be attempted at any time during the final three years of the degree.

LAMS templates

The concept for creating online modules for the scientific stream was decided before any commitment had been made to use a particular eLearning system. The school was already using WebCT Campus Edition to present all of its online content and discussion boards to the first year students, but it was not thought that this system would be suitable for the sharing of learning design templates, as sequences of activities in WebCT are not able to be exported, shared, re-used and adapted as learning designs. In addition, WebCT CE does not easily provide a sufficiently linear environment to scaffold the development of ideas and concepts and intersperse them with formative assessment tasks (for example, while WebCT can present a structured list of tasks, students can jump to any task at any time, rather than being stepped through a series of tasks in a deliberately scaffolded structure). The school adopted LAMS as a possible solution to the requirements of providing a linear scaffolded environment and sharing of learning design templates. In addition, as LAMS is soon to be integrated into WebCT CE, learners only have to log into one eLearning system and can then access their LAMS modules through a familiar environment.

The learning design templates were therefore created in the authoring area of LAMS. This helped to create a visual feel for the learning design, as well as narrow the types of activities in the design to those that were suitable for delivery through LAMS. The LAMS software and templates were then presented to a group of content experts at a curriculum-planning workshop. The presentation was followed up by a half day workshop for groups of content experts to decide what sorts of issues would be covered in the scientific stream modules. The content experts did not have direct access to LAMS at this point.

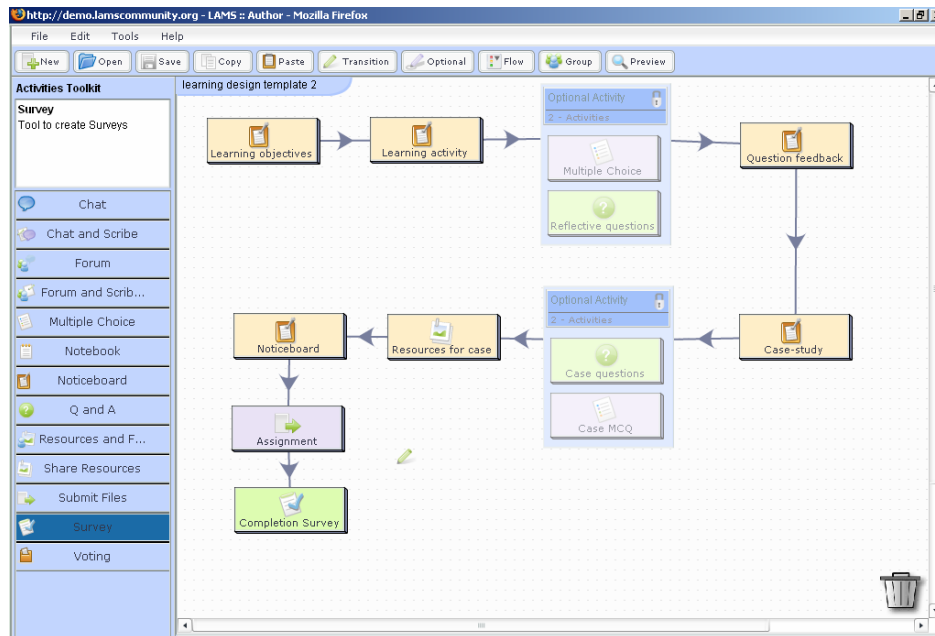


Figure 1: LAMS template for Scientific streams modules at the University of Western Sydney

Figure 1 shows one of two LAMS templates that were shown to the content experts at the curriculum design workshop. The template consists of the following activities:

- 1) Learning objectives (Tool: Noticeboard)
- 2) A learning activity or topic introduction (Tool: Noticeboard)
- 3) Questions about the learning activity (Tool: Multiple choice or Q&A)
- 4) Possible question feedback or model answers (Tool: Noticeboard)
- 5) A patient case study – presenting symptoms with possible video, picture or audio content (Tool: Noticeboard)
- 6) Questions about potential diagnosis (Tool: Multiple choice or Q&A)
- 7) Resources about disease, including journal articles, websites, PowerPoint slides, Word files, audio files (Tool: Share Resources)
- 8) More patient data or medical results (Tool: Noticeboard)
- 9) Further questions or detailed assignment (Tool: Submit files)
- 10) A place to indicate completion of the module (Tool: Survey)

Where there is more than one case study to present, the content experts can repeat steps five to nine and insert further cases. Content experts were instructed to provide 25 hours of learning for the students per module, which is a significant amount of learning. Breaking the module into around five case studies would enable the students to reach natural ‘respite or break’ points in the sequence after the completion of each case.

After the curriculum design workshop, content experts were given the option to write their content (or indicate resources) in a Word document under the template headings, or to write their content straight into LAMS by gaining access to a demonstration LAMS account along with a small tutorial on how to author in LAMS.

Early uptake of LAMS by content experts

There was early engagement with the task to create content by three of nine content experts (nominated leaders of content groups), who all expressed a desire to work straight into LAMS. Two modules need to be finished by May 2008 for an Australian Medical Council presentation, and the rest need to be finished by the end of 2008, so some early content creation was expected in the May presentation groups. Interestingly, all three content experts were keen to use LAMS by themselves, rather than rely on a

LAMS expert to upload the content for them. While most of the content developed so far has been centred around patient cases as suggested in the template, this group of content experts are keen to think outside of the template suggestions and follow their own patterns, working straight onto the blank LAMS authoring environment. All content experts have found the “Preview” function in LAMS Authoring important to their module development, as this allows them to see their content immediately from the perspective of learners, and then to iteratively develop this content further. Early exploration by content experts has indicated many more activities per case (compared to the templates) and good uptake of collaborative activities such as Q&A, voting and survey, even though the modules will be in an asynchronous environment.

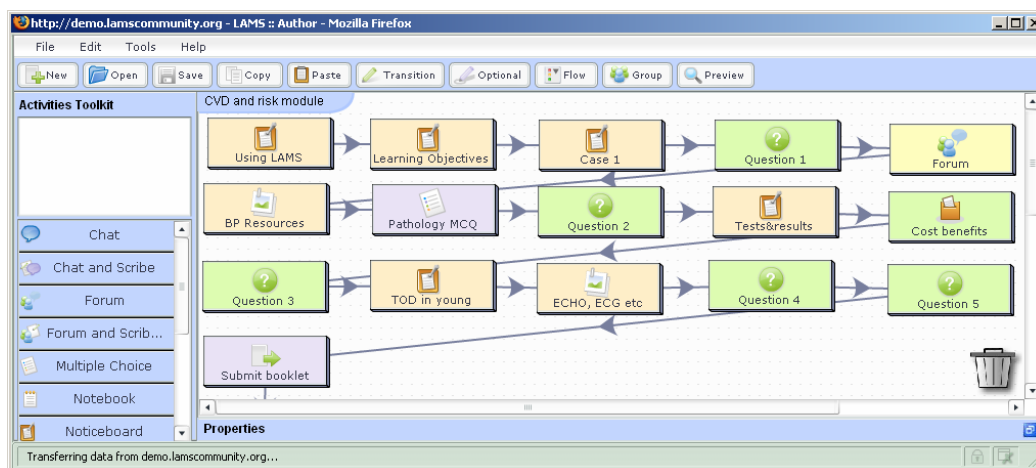


Figure 2: LAMS sequence for ‘Cardiovascular disease and Risk Factors’ Scientific Stream module – first of five case studies.

Other content experts who are engaging in the task more slowly have not yet expressed a wish to work in LAMS. The author has noticed informally that those experts who are not using the LAMS template presented in workshop as a basis for their content development are more likely to encounter hurdles when they come to put their content online. For example, there is some desire to create “choose your own adventure” style case studies, where students chose between a different diagnosis or treatment path for a patient, resulting in different outcomes for that patient. This type of complex branching activity cannot yet be supported in LAMS, and may lead to frustrations for the content expert when they want to start putting their module into an online format assuming a “choose your own adventure” style of delivery.

Discussion

The use of the templates is at an early stage in the development of online scientific-stream modules. The templates were designed as a starting point for the content experts to get an idea of how LAMS could present the modules. As the experts start to prepare their content and explore different combinations of the content structures and layout, the templates will likely go through several iterative patterns to create a better fit with what the content experts want and what constitutes good pedagogy. These new ‘improved’ templates will then be of importance to motivate and help those content experts who are less technologically (and educationally) proficient, and help to act as a quality control as the modules are developed.

The Helmholtz-Institute for Biomedical Engineering at Aachen University in Germany, went through a similar process in their creation of a framework for the development of web-based medical education (Wu, Zimolong et al, 2006). They found that creating Learning Object Classes (similar to our Learning Design templates) for instructors to insert content into was useful in maintaining consistency of the course, efficiency in the development phase and achieved good useability and quality of the end products. However, the user-friendly LAMS environment has managed to side-step some of the major issues faced by Wu and colleagues, namely, the use of technical experts to render the content into a browser (HTML) script language. LAMS is allowing the content experts to work directly into the interface (authoring and

preview) that will ultimately be used as the presentation of the learning resources and the content experts seem to enjoy the opportunity to work directly with LAMS, rather than a template outline in MS Word (that does not have the ability for dynamic preview).

Conclusions

A subject expert can draw up a learning resource (tutorial/case etc) in a predefined pattern and populate with multimedia resources as appropriate. A content engineer can then convert it to the correct format, User (teacher) friendly software is slowly becoming more easily available... (Choules, 2007).

Learning design templates have proven to be useful in creating some structure to the “blank canvas” of creating an entirely new component of a course in a new medical degree. LAMS has provided a user-friendly environment for both content experts and elearning experts to use in planning and discussing the shape that the scientific stream modules will take. So far the content experts have used the templates as inspiration for their work and have not felt restricted by them. This is partly due to the Author environment in LAMS, which allows activities to be moved around, deleted and added to with a simple drag-and-drop interface. It will be interesting to see the final form that the modules take in 2009 and compare them to the original ideas outlined above, and also the extent to which the refined templates are used directly or are rather used as a basis for inspiration.

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