

LAMS, Forums and Learning Design

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In the following paper, the perspectives of learner-learner and learner-teacher interaction, knowledge construction and social presence will be used to illustrate the different ways of approaching the evaluation and analysis of the teaching and learning that takes place in asynchronous online forums in a higher education context. This will be combined with a discussion of some Learning Design¹ issues that have arisen as a result of the implementation and use of forums within the LAMS (Learning Activity Management System) environment. We will end by suggesting that to successfully implement collaborative forms of teaching and learning, it is important to have an understanding of the nature of learning as it takes place in forums as well as an awareness of how the structural position of forums in LAMS sequences can potentially contribute to improving the educational value of forums.

Keywords: Learning Design, asynchronous online forums, collaborative learning

1. The educational context

LAMS is currently being implemented at the School of Medicine at our University for third, fourth and fifth year medical undergraduate students to provide basic science curriculum to students while they are on their clinical rotations (Dalziel, 2007). The three domains of scientific knowledge that have already been developed and shaped into LAMS educational designs are Oncology, Cardiovascular Disease and Risk (henceforth, CVD & Risk) and Immunity & Infection (henceforth, I & I). Moreover, seven further domains are currently being developed and these are: Nutrition and Metabolism, Neuroscience, Genes, Growth & Development, Trauma & Critical Care, Technology & Testing, Indigenous Health and Addiction Medicine. Each domain is divided into around five case studies that reflect different concepts particular to that area of science.

It was noted that the learning designs for certain case studies in CVD & Risk and I & I were highly collaborative, involving group work and forums, which dominated the learning design in comparison to less collaborative approaches used in other modules. Given that there is a growing amount of literature focussing on collaborative learning in an online setting (Hiltz et al, 2000; Bennett, 2004; Ghislandi & Job, 2005) we decided to look more closely at the learning that occurred within these sequences. In addition, we analysed the impact of changes that we made to improve student learning outcomes after the first implementation of the more 'collaborative' sequences.

2.1 Learner-learner and learner-teacher interaction

Henri's (1992) model allows us to analyse relationships among postings and threads. The model differentiates between three types of messages:

- **Explicit** (messages in response to a question or commentary on a message)
- **Implicit** (includes a response to a commentary but does not specifically refer to a particular message)
- **Independent** (unconnected messages unrelated to previous messages)

¹ In this paper the terms 'learning design' or 'Learning Design' in capitals' will be used interchangeably and will broadly pertain to the definition found in [Dalziel](#) (2003: 594)

These three types of interactions are illustrated in the following examples taken with permission from a LAMS sequence about HIV and AIDS.

What is the most likely route of exposure to HIV infection in Robert's case? In your answer, discuss the routes of transmission of HIV, and apply this to the Australian setting.

Explicit message

The first message (necessarily independent) is followed by:

“...As Bob stated, 'male-to-male sex is the predominant route of HIV transmission' in Australia. As he does not have a high risk of occupational exposure to HIV, he lives in Australia hence the likelihood of acquiring HIV from blood products is less than 1 in 500,000, it is most likely that he has acquired the virus sexually, although that is not the only possibility.”

Implicit message (by facilitator)

“...I'm not aware of any cases of non-Health Care Worker occupational exposure in Australia. The incidence of HIV transmission amongst IVDUs remains very low in Aust. It would be very unusual for a male of this age to recently take up IVDU. So male-to-male sex is by far most likely risk factor in this setting.”

Independent messages, on the other hand, do not refer to other posts and therefore indicate the presence of low levels of interaction.

Independent messages

“The routes for HIV infection are via sexual contact and blood to blood contact. The most common form of infection in western society is via male-to-male sex and IV drug use. But as he has denied any of these risk behaviours the route of infection for him would probably be via a less likely mode. It is possible that he could have got it from a blood transfusion or from sex with his partner who may have HIV herself. The risk of getting it through an open wound is very remote but not impossible.”

“The most common form of transmission in Australia is male-to-male sex (70%), then heterosexual contact (18% - especially with partners from countries of high prevalence) and IVDU is also a risk. In this man I would be extremely suspicious of his sexual contacts. His family situation would make him hesitant to reveal any extramarital activities.”

It is possible that lack of interaction illustrated by numerous *independent* messages may lead to a lack of cohesion at the affective or cognitive level and this could have an impact on collaboration and levels and depth of knowledge construction. Some reasons for poor levels of interaction have been suggested:

- The questions themselves might be too limiting therefore constraining the knowledge construction that can potentially take place. The initial trigger questions might also be too expansive which might also have the effect of creating parameters for discussion that are too broad (see [Schellens & Valcke \(2004\)](#)).
- The group might be too small or large. Schellens and Valcke (2004) suggest an optimal group size of 10 – 12.
- There has been insufficient scaffolding to guide the student through the activity (Reiser, 2004).
- Poor facilitation might also be a contributing factor to the lack of interaction.

Based on the feedback, when the cases were released to the students it was found that some of the forum questions were either too expansive or too limiting and this appeared to cause anxiety (and procrastination) amongst students. In one particular forum on the definition of hypertension, the first few answers were standard textbook explanations and the questionnaire feedback suggested that students felt they had nothing else to add. The facilitator in turn became frustrated by the repetition of rote textbook answers, without evidence of deeper learning (see section 2.3 for discussion on ‘deep’ learning). On further questioning of her intent, we discovered that the facilitator wished the students to

talk about their own experiences in their clinical attachments (i.e. about the patients that they were seeing) and how these experiences related to the forum question. However, she had not been explicit in articulating this expectation and this led to a mismatch between the facilitator's expectations and the quality and type of responses from students. When the case was released the next time, we asked the facilitator to provide guidance early in the discussion and to articulate the requirements of the task more explicitly. This guidance from the facilitator is given in the quote below.

Facilitator response

“Hi guys welcome, there is ample opportunity here for you to relate the contextual matter here to cases you have seen in the last term and cases you are seeing currently. Bring those experiences to the table and enjoy....”

Other changes included setting stricter time limits around forum discussions so that discussion occurred in a less asynchronous environment and encouraged better flow and more focused facilitator attention. Whereas previously there were up to twelve separate discussions happening, there was now a maximum of four within any two week period. Students reported much more satisfaction with managing their time in the forums and whilst overall student satisfaction according to survey feedback with forums was no greater (it being the highest rated activity in the case for both iterations of the sequence) we did notice less procrastination. However, we still feel that more thought needs to be put into creating parameters or scaffolding around forum questions so as to increase the educational value of forums.

2.2 Knowledge construction

Gunawardena et al's (1997) model of knowledge construction is another perspective which helps us analyse certain features of online discussions. They propose that knowledge construction progresses through five stages:

1. Sharing and comparing of information
2. Discovery of dissonance or inconsistency
3. Negotiation of meaning
4. Testing and modification of constructed synthesis
5. Application of newly constructed knowledge

Some of these dimensions are illustrated in the following examples taken with permission from a forum from the CVD & Risk module.

Discuss the physiology of blood pressure control. Define the difference between peripheral and central mechanisms

Sharing information

“Hey guys, firstly well done!! I was overwhelmed with information. Just a bit more on the baroreceptor reflex”

“Well a lot has been discussed about the baroreceptor reflex (short term control) and the hormonal (long term) control of blood pressure. There are two other ways that blood pressure can be increased that come to my mind.”

Discovery of dissonance or inconsistency and negotiation of meaning

“Agree completely with Bob and Jane about the adaption of baroreceptors to a new "set point" in chronic hypertension but I don't think we should necessarily assume this is going on in Ms GM, i.e. that her hypertension is chronic. The clinical information we have is that she's presented once with a concerning complaint (headache) and has had a high BP at that point. For all we know this could be an isolated acute hypertensive event, (who isn't stressed about new headaches which are bad enough to go to the doctor) which could very well be mediated by beta adrenergic sympathetic response -> increased CO and vasoconstriction.”

“It wasn’t mentioned in the patient’s history, but it would probably be important to consider gestational hypertension since the patient is 27 and could be pregnant.”

“Good job on thinking up that differential Jackie, but I would like to add a point that preeclampsia is usually something that presents in the third trimester of pregnancy. I would expect her to know about her pregnancy by then (although there have been cases where women have been unaware that they have been pregnant for that long).”

Testing and modification of constructed synthesis and application of newly constructed knowledge

“My train of thought is about what would I do next if I had GM sitting in front of me. My main concern would be what questions to ask and what physical signs would I be looking for on examination?”

For this, I think BP control is achieved by the combined action of 4 main body systems: CV, neurological, kidneys & endocrine --> therefore problems in any of these systems could cause secondary hypertension. So, I think with my current rudimentary understanding, I’d be going through each of these systems asking about any risk factors/possible problems and then examining each of these systems. I think the other important thing to ask about would be medications/recreational drug use. What does everyone else think? Is that a reasonable approach?”

The examples above illustrate how students have moved through the different stages of the knowledge construction process and how the exploration of inconsistency and negotiation of meaning can drive online discussions. More analysis needs to be carried to be able to be clearer about the elements of *sustainable* forums but one hypothesis based on the forums that we have analysed is that sustainable and more educationally rewarding forums are likely to revolve around more higher-level explorations (e.g. negotiation of meaning and inconsistency) rather than the mere sharing of information.

2.3 Knowledge construction and cognitive processes

Two types of learning have been identified by Gerbic and Stacey (2004) in their work on knowledge construction and cognitive processes in online forums. Based on the work of Entwistle and Waterson (1988), Henri (1991) and Newman (1997) these two forms of learning have been identified as *surface* and *deep* learning.

Surface learning is characterised by participation that reflects a reproducing approach to knowledge that stays inside course boundaries. It is also indicative of participation that reflects a fear of failure where motivation is driven by extrinsic rather than intrinsic factors. Deep learning, on the other hand, is characterised by looking for meaning, relating ideas and seeking coherence, use of evidence and logic and intrinsic motivation.

Surface learning – reproducing knowledge

What is the most likely route of exposure to HIV infection in Robert’s case? In your answer, discuss the routes of transmission of HIV, and apply this to the Australian setting.

“Epidemiology

- World-wide, major route of transmission (>75%) is heterosexual
- Rate of vertical transmission ↑ in developing countries (25-44%) than industrialised nations (13-25%)
- In developed nations, because of routine antibody screening, likelihood of acquiring HIV from blood products <1:500000, and arises from donors in seroconverting phase of infection
- In Australia, male-to-male sex is predominant route of HIV transmission”

In the above example, knowledge about the route of exposure to HIV infection is not contested and this example illustrates a *reproducing* approach to knowledge. Deep learning, however, reflects the application of skills such as evidence and logic to content.

Deep learning – evidence and logic

“I guess the simple answer to the question is that Robert is most likely to have acquired HIV through same-sex intercourse (based on epidemiology, particularly within Australia). As Gill mentioned it could have been acquired from heterosexual intercourse, but the prevalence of that method of transmission within Australia is 18% and more than half of these cases were from intercourse with partners from high prevalence countries (ie: not Australia). In this regard you would need to question Robert further as to his sexual history and whether he has been involved in same-sex intercourse and/or extramarital affairs.

The other ways he could have acquired the virus have already been mentioned in the first post (parenteral inoculation, eg: IVDU, transfusion with infected blood products; and perhaps via vertical transmission). Thus you would need to question him further regarding drug use.”

2.4 Social presence

The importance of building social presence in collaborative, online learning communities has been highlighted by Hew and Cheung (2003) where social presence, they argue, can lead to more engaging levels of interaction as well as contributing to internal student motivation. On a practical level, social presence in a forum context broadly reflects the register and tone of the interactions which in turn contributes to the level of trust that is felt between participants. There was initial concern that students had not participated formally in online forums prior to the extensive use of forums in some designs. We then recognised that students had participated in an intensive Problem-Based Learning (PBL) program for the first two years of their degree and this emphasis on small group work had therefore allowed for strong social scaffolding to develop, which was evidenced by student willingness to participate in online discussions and put forward new ideas. In a different context, or with more evidence that students were hesitant in participating in forums we would have had to incorporate course work into the preceding years to help build up the social scaffolding necessary to build the confidence and social presence that is so important to healthy forum discussions.

3. Role of the facilitator

The role of the facilitator is crucial in helping to facilitate healthy levels of knowledge construction, social cohesion and to support learning objectives. Based on the feedback from students in this case study, students appeared to be appreciative of expert clinicians who function as *validators* of the knowledge that is gained, shared and constructed during online interactions. This validation can take the form of a final response to a forum question.

Facilitator response

“Good work team. A very comprehensive answer. I have nothing to add. “

Facilitation in an online context, however, is a skill that needs to be learned and this has been recognised as a bottleneck in the provision of high-quality, discursive and collaborative online discussions (see Sargeant et al, 2006; Lockyer et al, 2006; Sandars, 2006). In this context, Salmon’s model (2000) can function as a useful starting point because it emphasises the way in which the dimensions of the online learning experience such as knowledge construction, social presence and learner-learner and learner-teacher interaction represent key components of the asynchronous, online experience and how the role of the facilitator is crucial in linking these dimensions together. It is also worth noting that if some of these factors such as social presence are already present this can take some of the pressure off the facilitator by alleviating certain aspects of their workload.

4. Student feedback on forums

Students were asked in a questionnaire ‘What type of activity aided your learning the most?’ When we compared the sequences with facilitated forums and compared them to those sequences where forums were unfacilitated and perhaps used inappropriately (e.g. a limited question which did not have enough potential for generating discussion) we found a marked difference in student appreciation of the educational value of forums. In the facilitated sequences, forums were ranked as the top activity in every case (between 45 to 60 % of students voted ‘forum’, see Fig. 1 for example), with positive student feedback about deeper learning generally added in the student comments. Unfacilitated and limiting forums on the other hand received fewer votes (average 10%, see Fig. 2 for example) in student feedback. Overall, the response to forums was positive and students acknowledged how forums can help promote learning strategies such as looking up information and applying it to the context in question.

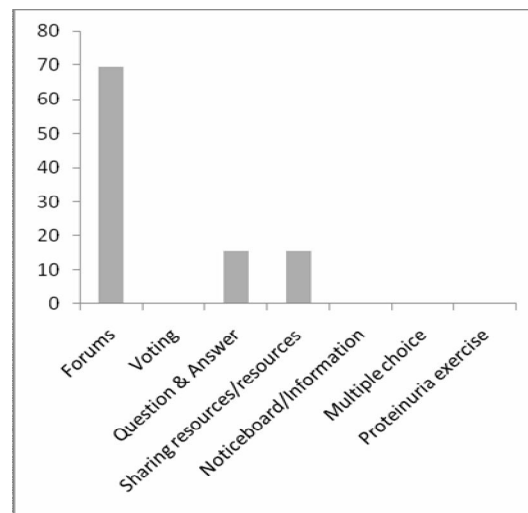


Figure 1. Percentage of student votes for ‘What type of activity aided your learning the most?’ from case with facilitated forum.

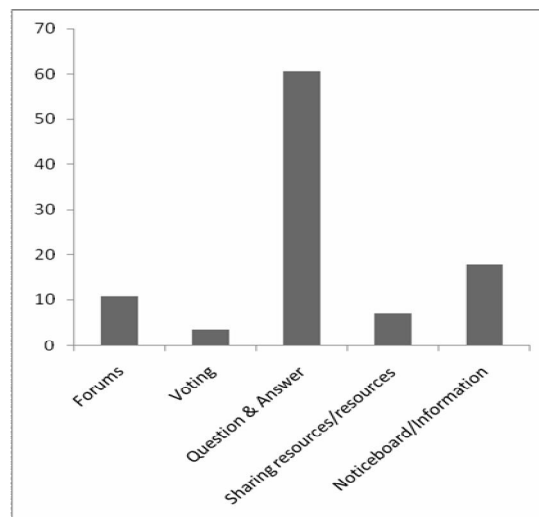


Figure 2. Percentage of student votes for ‘What type of activity aided your learning the most?’ from case with unfacilitated forum.

5. LAMS, Forums and Learning Design

Thus far we have been analysing participation in the forums under review using three different but interrelated perspectives. This has yielded some insights into the nature of learner interaction, social cohesion and levels of knowledge construction in various forums. From the student feedback that has

been received, however, it is clear that although participation in forums is likely to be contingent on the continued presence of these dimensions, there are other factors that contribute to healthy levels of interaction. These specifically relate to the type of LAMS collaborative tool that is employed and the *position* of the tool within any particular LAMS sequence.

LAMS constitutes an integrated approach to the construction of learning designs. It allows the designer to create learning sequences using a range of pedagogical approaches to meet educational goals. The *sequential* nature of activities in LAMS is an important feature because it reflects one of the key affordances of LAMS, namely, the idea that learning activities can be seen as building blocks in an educational scaffolding process (Wertsch, 1985) where key concepts and ideas are introduced and used as stepping stones to the educational distribution of more complex forms of knowledge. In this sense, forums can function as a learning activity towards the end of a learning sequence where key concepts and ideas can be applied and discussed in tasks that are less structured than those that have preceded it. The placement and *position* of forums in learning sequences, therefore, can be seen as equally as important as the facilitation and interaction that drives the learning process.

One issue that has arisen as a result of feedback from students can be traced back to the position of forums in LAMS sequences. The combination of self-paced and self-directed learning activities together with more collaborative, group-based learning activities poses a challenge for learners because some learners will reach forum-based activities before others and unless the *chronological* aspects of the learning experience are managed well, the three dimensions of the online learning experience that we have discussed are likely to suffer. Student feedback has illustrated this problem with forums placed in the middle of sequences sometimes failing to create high levels of interaction due to the chronological asymmetry of the learning experience as students engage with sequences at different rates and at different times during the day.

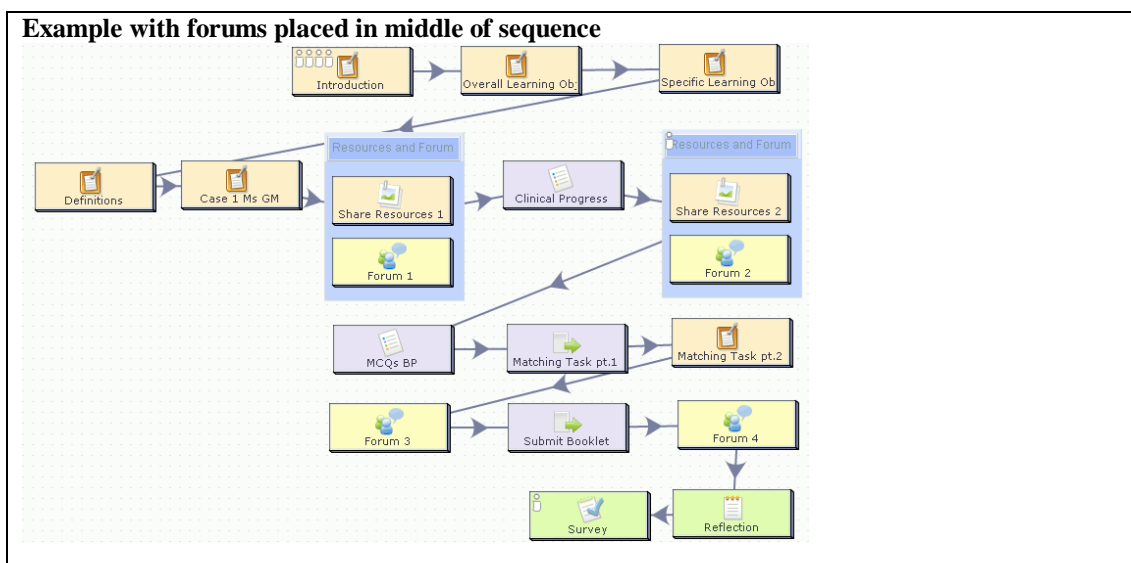
Some typical student responses

“While the concept of this activity is good, the practicality of having 5 people write an answer and then all agree is the issue. If one or two members decide not to answer questions early in the first week, the rest of the group is left waiting - for almost 2 weeks in our case - until they can continue. It is not that the task is difficult, but just that it requires 5 people to be coordinated in their activities - which proved exceedingly difficult this time.”

“I had an afternoon free to really get into the module, but got up to the forum section and had to wait 3-4 days before a scribe was assigned. It was difficult to liaise with a group when you don't know who is in your group until halfway through the week...”

This problem, of course, could be resolved if stop points were used during sequences thus allowing participants to catch up and to engage with each other as a group during forum activities. We, however, addressed this issue by more tightly controlling the availability of the forums over time. Instead of students being able to participate in 25 hours of content over a period of 12 weeks, we restricted access to the content into blocks of 5 hours over a 2 week period. Students had to finish the content within that time or face penalties. These restrictions helped address the chronological asymmetries that were impeding constructive forum discussions and, based on the feedback, there was a more positive reaction to forums in general among the second group of students to access the content.

Another issue that has arisen from some of the student feedback relates to the *Forum and Scribe* tool. Students have often mentioned that some students reach activities before others in their prescribed groups and that significant time is wasted in waiting for other group members to catch up.



To alleviate this problem, forum-based activities could be placed at the end of learning sequences. This can potentially serve two goals. It serves the educational goal of utilising the scaffolding potential of LAMS where activities move from structured assessment tasks (MCQs, Q & As etc.) to more ill-structured tasks embodied in forum activities. Additionally, if forums are placed towards the end of sequences, the dimensions of forum-based learning are likely to be enhanced as students are less likely to be held up in forum and scribe activities. This also allows facilitators to specify when they would like students to complete the more self-paced components of a sequence and to nominate a range of days for online discussion.

6. Discussion

As we have seen, forum interactions can be examined using a variety of perspectives and one of the goals of this paper has been to review and apply these perspectives to the context in question. Although this has yielded interesting insights regarding the levels of interaction, social presence and knowledge construction occurring among the community of students in question, none of these perspectives explicitly address the question of the *position* of forums within a learning design and it is one of the aims of this paper to begin this discussion. This question can be explored from two possible angles.

From the feedback that we have received it is clear that the management of collaborative activities within sequences needs to be examined. For example, the position of *forum and scribe* activities within sequences has sometimes had a negative effect on student learning as these activities can sometimes break rather than enhance a student's progress through a particular sequence. As is evidenced by some student feedback, this negative effect can be traced back to the way in which students move through collaborative activities at different times and at different rates.

Another reason to examine the position of collaborative activities within sequences is that it allows us to exploit one of the affordances of LAMS, namely, the potential of learning sequences to scaffold up to forum-based tasks. Rather than merely being a question of providing students with the possibility of completing tasks effectively from the perspective of *time management*, the question now becomes how can we integrate the three perspectives of forum-based learning (interaction, social presence and knowledge construction) with a fourth dimension, namely, that of learning design? The question of the position of collaborative activities within sequences now becomes a pedagogical issue rather than just a question of the effective management of time.

In many ways this fourth dimension represents an approach to forum-based analysis that reflects the importance of understanding the interplay between facilitators as agents of learning and learning design. One of the tasks in the next phase of the project will be to understand this relationship in greater depth as we modify some of the more highly collaborative learning designs to reflect an understanding of this interplay. We will then be in a better position to examine and understand in

greater detail how the position of collaborative activities within learning sequences combined with the participation of skilled facilitators can contribute to engaging and educationally rewarding online learning experiences.

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