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# Online Collaborative Learning in Health Care Education

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## Abstract

At our University, the Faculty of Health, Social Care and Education has delivered a variety of undergraduate and postgraduate courses via flexible distance learning for many years. Distance learning can be a lonely experience for students who may feel isolated and unsupported. However e-learning provides an opportunity to use technology to motivate students to interact with each other and their tutors and work together towards common goals. If done properly, this provides distance learners specifically with a sense of learning within a community and therefore enables them to learn more effectively. Five years ago, the Faculty of Health, Social Care and Education started using a virtual learning environment (VLE) to expand and develop our materials and provide a variety of resources to support our students. In the postgraduate Magnetic Resonance Imaging (MRI) course this was further developed by implementing several collaborative learning initiatives where students work together online. The purpose of this was to attempt to improve the student experience of distance learning. The aim of this review is to analyze the effectiveness of three online collaborative tools used in the postgraduate distance learning MRI course and make recommendations for the implementation of similar initiatives throughout health care education.

**Keywords**: collaboration, e-learning, distance learning, education, radiography, online.

## Introduction

Distance learning is a pedagogy implemented remotely and therefore benefits students who may not normally be able to study in the traditional way (Gulati, 2008). It offers learners the opportunity to study flexibly and for some students it provides an opportunity to enroll on courses not available in their country. However it may not be appropriate for students who prefer the more traditional classroom learning strategies. Distance learning can be a lonely experience for students who may feel isolated and unsupported. However it is possible to use technology to motivate students to interact with each other and their tutors and work together towards common goals. If done properly, this provides distance learners specifically with a sense of learning within a community rather than on their own and therefore enables them to learn more effectively (Jeffries, 2006).

E-learning is a broad term that refers to the use of the Internet to deliver knowledge and skills (Santy and Smith, 2007). Internet based technologies are usually networked so that they are available to more than one person at a time. All students and tutors may participate and contribute to the learning activities from any geographical location, and a variety of educational opportunities can be continuously shared and retrieved. Many educational institutions use a virtual learning environment (VLE) as a portal for learning and assessment. A myriad of different media are used including documents, podcasts and presentations. E-learning has numerous advantages particularly for health care education. In areas where there are rapid medical and technological advances material can be updated in real-time and students can share their experiences with each other and their tutors. E-learning pedagogies also allow the implementation of innovative clinical problem solving scenarios in non-clinical environments (Santy and Smith, 2007).

The Faculty of Health, Social Care and Education has delivered many undergraduate and postgraduate courses via flexible distance learning. We have been using a VLE to expand and develop our materials and provide a variety of resources to support our students. In the postgraduate Magnetic Resonance Imaging (MRI) pathway this was further developed by implementing several collaborative learning initiatives where students work together online in groups. The purpose of this was to improve the student experience of distance learning.

The aim of this review is to evaluate the effectiveness of three online collaborative initiatives used in our postgraduate distance learning MRI pathway. The objectives are to;

- evaluate three online collaborative learning initiatives in the postgraduate MRI pathway.
- assess the effectiveness of these initiatives in improving the student experience.
- make recommendations for the use of online collaborative learning in health care education.

# Online Collaborative Learning

Collaborative learning is broadly defined as a pedagogy in which people come together in groups and learn from each other through cooperation. Each student takes responsibility for the learning of other students in their group as well as their own and they help each other to be successful (Gokhale, 1995). Historically, traditional classroom collaborative learning groups achieve higher levels of thought and retain information longer than students who work alone as they are more likely to engage in discussion and become critical thinkers (Barkley et al, 2005).

Before the development of the Internet many studies advocated collaborative learning pedagogies to increase the quality of students learning and the delivery of the course (Gokhale, 1995). These assertions were however based on students working face-to-face where the interactions between students are personal and where verbal and visual cues are evident. In an online environment these cues are not present and delays in replying to posts or emails reduce the spontaneity of the interaction between students and the tutor. However Curtis and Lawson (2001) suggest that effective collaboration can take place in an online context as long as the students and tutors use the VLE effectively. They also suggest that the success of online collaborative learning initiatives rely on the tutor's ability to use new media tools to develop and enhance student's ability to learn (Clark and Mayer, 2011).

At our University, three different online collaborative initiatives were implemented with 19 first year students studying the Scientific Principles module on the MSc MRI course. The initiatives were developed to enable students to work together towards a common goal and thereby improve their overall learning experience. In addition qualitative data in the form of a questionnaire from the University modular assessment process was used to ascertain students' experience of these initiatives. This is a pro-forma University-wide online questionnaire but module specific questions may be added. In this case the students were asked to comment specifically on the online collaborative tasks. As this is a retrospective review, the University Faculty Ethics Panel judged the subsequent study exempt from ethical approval.

The Scientific Principles module was selected because students commonly find this a challenging subject and, as it is the first module students undertake on the course, they are not yet acclimatized to the distance learning environment and the use of the VLE. Although all students possessed either a BSc or equivalent, student demographics included a wide variety of countries and therefore their experience of distance learning was very varied. Several resources had been implemented in previous years to improve student's academic performance on this module but many students persistently failed to perform well. Students appeared to struggle adapting to studying in isolation, failed to grasp what the learning outcomes meant and did not appreciate the breadth and depth of learning required at postgraduate level. It was felt that introducing collaborative online learning tasks might help bring students together to focus on key issues, whilst reducing their sense of isolation.

During development of these collaborative online tasks, we drew upon previous research and expertise in e-learning, specifically Salmon (2003) who advocates the following five-stage model for delivering effective learning online;

- access and motivation (setting up the VLE)
- online socialization (familiarization and bridge-building)
- information exchange (facilitating tasks, using learning material)
- knowledge construction (facilitating conferencing)
- development (supporting further learning).

This model was used to instigate our online collaborative initiatives. The premise was that students on the MSc MRI pathway would benefit from the implementation of structured collaborative learning tasks and, if these addressed specific problems that had previously inhibited effective learning, this would also improve students learning experience. The initiatives specifically focused on stages two, three and four of Salmons' (2003) five stage model.

## Salmons' Model Stage 2: Online Socialization

The first online collaborative activity involved early socialization of students in small groups. Salmon (2003) argues that for e-learning to be successful, students must work together towards a common goal. In order for this to happen to any degree, students must get to know each other so that they can explore common interests. In a distance learning environment there are particular challenges as students rarely meet face-to-face. The online environment plays a very important role therefore in socialization and the tutor must play a significant role in encouraging this (Kreijins et al, 2003). To motivate students to participate and to ensure that socialization leads to effective learning later on, the tutor should provide a framework for students to interact with each other with specific instructions on how to do this. Tutors also need to consider ways to motivate students to contribute by emphasizing the benefits and by providing clear instructions and deadlines (ibid).

The first online collaborative activity took place in the first week of the course and lasted for seven days.

Students were put into groups and asked to discuss a common theme with other people in their group. All 19 students were put into four groups - three of which had five members and one had four members. The choice of group size has been identified as an important factor in the success of socialization and collaborative face-to-face learning. According to Barkley et al, 2005 small groups may limit diverse thinking, reduce the degree of group expertise and reduce the amount of collective decision making. However in larger groups it is difficult to ensure that all members participate. Another consideration was the geographical location of students within a group. An attempt was made to place students in groups in a similar geographical time zone so that live (synchronous) chat discussions were possible.

Students were required to open a discussion thread in the VLE, introduce themselves to the rest of the group and provide specific information about themselves. The tutor supplied detailed instructions on the form this introduction should take and gave the students a time frame in which to do so. It was hoped that students would be honest and forthright about providing the required information and "hook up" with other students in their group. Once the group introductions had taken place, students were asked to view the introductions made in other groups and contact anyone they knew. The aim was to create four online learning communities where a small group of students could learn together but also develop relationships within the cohort as a whole (Garrison et al, 2004).

## Salmons Model Stage Three: Information Exchange

The second online collaborative activity involved students using the discussion boards and the chat rooms in the VLE to discuss particular elements of the module. According to Santy and Smith (2007), the most important components of a VLE are the discussion boards as they allow interaction and the exchange of information between students and tutors. Although there are studies that suggest that the use of discussion boards and chat rooms provide inadequate opportunities for in-depth discussion, if used appropriately they can lead to meaningful learning opportunities (Sit et al, 2005). Students must though be motivated to participate and given clear instructions on the purpose the discussion, the elements that need to be addressed and a timeframe.

One of the areas identified as a cause of previous student failure of the Scientific Principles module was a lack of understanding of the learning outcomes. Students were reminded to refer to the learning outcomes when planning for and constructing their assessments in podcasts and e-presentations. Despite this however, many students continued to perform badly in the assessment. In order to address this problem, students were required to work in the same groups as for the socialization activity and use the discussion boards and the chat rooms of the VLE to discuss what they thought the learning outcomes of the Scientific Principles module meant and what topics they referred to. Specific chat rooms and discussion boards were set up for each group.

This activity was implemented in week two of the semester and took place over a 10 day period. The tutor intervened only to stimulate the discussions and to monitor whether all students were participating in the task. The tutor contacted "lurking" students (those that had logged into the activity but who were not contributing) to encourage their participation. At the end of the discussion period, each group was asked to nominate a group leader. The role of the group leader was to summarize the discussions of the group and briefly outline the group's experiences of the task. The tutor then wove these summaries into a single document that was posted on the VLE that clarified the conclusions of each group.

## Salmons Model Stage 4: Knowledge Construction

The third online collaborative activity required each group to create an assessment document for the Scientific Principles module. This module is assessed via word-limited worksheet that is usually produced by the tutor and posted on the VLE four weeks before the submission deadline. In previous years many students performed poorly in this assessment. This is due in part to the difficulty of the material and the inability of the students to grasp the depth of answers required. The premise of this activity was that by requiring students to devise their own questions, it would force them to engage with the content, learning outcomes and assessment criteria of the module.

This activity took place in week 5 of the semester and lasted for 14 days. The students worked in the same groups as before but this time Google Documents was used. A Google document is a free secure online document where contributors can upload material and edit and share it in real time (www.docs.google.com accessed 09/02/11). It is therefore an ideal online tool for collaborative learning exercises. The tutor created four Google documents, one for each group, and invited the members of each group to their respective documents. Each student was required to contribute at least one question and provide an outline answer and mark to their group Google document. They were encouraged to discuss what type of question each student should produce beforehand to ensure a good range of questions. Students were directed to familiarize themselves with the content and the learning outcomes of the Scientific Principles module before deciding the type of question to contribute. They were then instructed to reflect upon the appropriate use of questioning words in their contributions. When providing outline answers to their question, they were advised to focus not only on the scope of the answer, but also on its depth and to link this to the question they had composed. Students were reminded to ensure that the question they contributed could be answered within the word limit. Students were also required to allocate marks to each

question and to each part of the answer provided.

After each student had made their contribution they were required to critically assess the quality and appropriateness of questions provided by other members of their group and insert comments under the questions and answers of their fellow students in their group document. They were encouraged to engage in constructive criticism, to be honest with each other and help each other in this task. The final part of the activity involved the students in each group using the discussion boards, chat rooms or email to decide on which questions they wished to put forward to the final worksheet. Following these discussions, each group leader was required to highlight the chosen questions and provide a feedback on the task.

# Discussion

Many authors advocate that collaborative pedagogies create a framework for meaningful learning and that the online environment supports as much construction and sharing of knowledge as traditional classroom group activities. It has also been suggested that online discussions enable more reflection by students than in face-to-face interaction (Dillinbourg and Sneider, 1995; Corich et al, 2004; Rovai and Jordan, 2004). Others however question these assertions, suggesting that online interaction may not be as meaningful and sociable as the more traditional methods (Ravenscroft, 2004; Curtis and Lawson, 2001). The purpose of this study was not to evaluate the value of online collaborative learning versus classroom collaborative learning, but rather to evaluate whether the introduction of collaborative activities in a VLE enhanced the experience of students on a distance-learning course. Whilst a postgraduate MRI course was selected, it is felt that the issues raised here would have resonance in other health care education scenarios.

The first activity was implemented to encourage students to form an online identity and to get to know other students in their group before learning took place. Salmon (2003) is an advocate of early socialization and how online environments offer great opportunities for networking. However she also emphasizes the importance of active intervention of the tutor in this process along with a thoughtful approach to the design of conferencing systems in the VLE. As in face-to-face environments, students are more likely to interact with their peers if they trust and have mutual respect for others in their group. The tutor plays a very important role in developing these qualities and ensuring that students are motivated to socialize (ibid).

Eighteen students (95%) participated in this task. All students followed the instructions correctly although only five students fully completed the task. This may have been due to students not yet feeling comfortable enough to reveal information to the rest of the group at this early stage. Compliance may have increased if the tutor had intervened and encouraged contributions. However the tutor decided that such intervention may have been too intrusive at such an early stage and deterred students from participating in future activities.

This activity provided encouragement to participate in the subsequent collaborative tasks. Seventeen students (89%) participated in subsequent tasks and such a high continuation could be attributed to successful early socialization. This supports Salmon's (2003) notion that unless socialization takes place early on, students find it very difficult to learn collaboratively later. Gulati (2008) suggests that students will not contribute regularly to online discussions unless they feel an emotional connection with others in their group. Therefore the tutor continued to encourage social interaction between the students after the task had finished. This involved the tutor advising students seek advice from each other on practice related issues and sometimes intervening to stimulate this interaction.

The second activity involved students within each group using discussion boards and live chat rooms to investigate the learning outcomes of the module. Seventeen students (89%) participated in this task. Most groups used the discussion boards but two groups also collaborated synchronously in the live chat rooms. The task revealed that many students misunderstood the meaning of key words in the learning outcomes. The tutor was able to rectify these misunderstandings and redirect the discussions on a more appropriate course. The discussions were very active, with over 140 posts being made during this activity. Some students were more dominant than others in that they posted very detailed and lengthy posts whereas others said less. However the lengthier posts were often quite vague and tended to wander off topic. The tutor was able to intervene when this happened and reiterate the importance of being concise. The feedback from this activity via the University modular assessment questionnaire was very good. There were some criticisms, in particular the additional time pressures it placed on students and the difficulty of getting a discussion going. Interestingly group leaders recognized the fact that despite these problems, useful discussions had taken place and these had been educationally meaningful.

The third activity involved students working in the same groups as the second task to produce questions with outline answers for the module assessment. Seventeen students (89%) participated in this task but this was not an identical group to the second activity participants (two students participated in activity two or three but not both). Although most of the questions supplied were on topics relevant to the module content, the contributions made by all 17 students revealed that they had not fully grasped the requirements of postgraduate learning as they produced questions that could not be answered to the required depth in the word limit. Most responses were mainly descriptive rather than analytical and there were some factual errors. However this activity provided the tutor with an opportunity to formatively feedback to students at an early stage enabling them to address these shortcomings in time for the final

worksheet.

It was evident that some students recognized the wide variety of experience and expertise within their group. They appreciated that this experience may be different from their own and that group discussion, particularly around the selection of questions and outline answers, could inform their own learning in a positive way. Gokhale (1995) contends that group diversity in terms of knowledge and experience contributes positively to the learning process. Collaborative learning strategies particularly improve problem solving because the students are confronted with different interpretations of the problem (Barkley et al, 2003). One group was particularly active in critical analysis of their group's contributions. The tutor encouraged this by asking these students to give reasons for their comments and reflect upon the criteria used in making these judgements. Generally, peer critiquing worked well in this group with one student commenting that the ability to admit that the outline answer he submitted was flawed helped him reassess his understanding of the module content.

# Conclusion

The implementation of three online collaborative initiatives into the delivery of the Scientific Principles of MRI module has enhanced student socialization and has enabled students to work together to understand the learning outcomes and to learn from each other in the development of an assessment. In addition the University Modular assessment questionnaire showed that students valued these activities and improved their experience of distance learning. However some students commented on the time taken to complete these tasks and felt that they detracted from rather than added to their learning. This indicates that the tasks may need to be modified in future so that they take less time to complete without affecting their educational value.

The implementation of similar online collaborative activities may therefore be justified in other learning environments, both distance and blended. There is a huge variety in the types of tasks that could be used in the online collaborative environment including those with theoretical, clinical and educational foci. Health care educationalists should therefore consider this pedagogy (Santy and Smith, 2007). However there are some important considerations. Tutors involved in e-learning must be supported and provided with training. For example, the tutor spent a significant amount of time moderating discussions and providing feedback and this could have been done in a more efficient way. Salmon (2003) stresses that different types of collaborative exercises warrant a different approach to moderation and feedback. Tutors need a different skill set to more traditional teaching methods and therefore specific training with support from e-learning experts is usually required (Clark and Mayer, 2011). In addition the unconstrained nature of e-learning where there may be no clear start and finish times can pose time management problems. Tutors must ensure that this is anticipated and planned for (ibid).

There is great scope for further research in this area. Issues such as group composition and size, differences in collaborative learning styles associated with ethnicity and gender and the optimum strategies for managing and moderating online collaborative activities all merit further investigation.

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