

# **ONLINE PROBLEM-BASED CONFERENCING: SUCSESSES AND CHALLENGES**

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## **ABSTRACT**

This paper discusses an initiative in which a form of online problem-based conferencing was employed with a group of off-campus students studying a science course in an undergraduate nursing program. The focus is on the impressions of a student (the second author) and a lecturer (the first author) on the approach as a group process, suggesting improvements for problem-based learning that is technology-driven to work more effectively for students. Mezirow's critical reflection in adult learning was used to evaluate the initiative. Findings revealed an overall satisfaction with the new approach in teaching some aspects of the clinical science course. Online problem-based conferencing provided ample opportunities for knowledge and skill acquisition.

## **INTRODUCTION**

As new models for learning in higher education are continually being developed, emphasis is also placed on the functionality of technology in maximising learning opportunities for students. Although there are many new strategies being proposed for

designing effective web-based learning environments, it is important that the learning strategies be engaging, interactive, and collaborative (Oliver & Omari, 1999). Students need to be engaged with the content, lecturer/facilitator, and peers to achieve their full learning potential (Ryle & Cumming, 2007).

The University of South Australia has a long involvement in distance education and flexible delivery, with online courses or components being available to internal, external, or mix-mode type of students. E-learning has expanded the range of the university's contexts and roles, and vastly extended the institution's catchment area. The university has utilised new information and communication technologies to enhance the quality of teaching and allow students greater accessibility, flexibility and interaction. This is particularly pertinent for external learners who may be geographically disadvantaged. Various technologies supporting synchronous and asynchronous communications, such as e-mail, voicemail, videoconferencing, pod casting, web-based course materials, discussion pages, weblogs ('blogs'), and wikis, have been explored, with varying degrees of success, to allow an approximation of face-to-face contact.

A case in point is a form of online conferencing using problem-based learning (PBL) approach introduced recently to a group of off-campus students who were enrolled in a science course in an undergraduate nursing program. This initiative was undertaken for off-campus students to foster greater student engagement and make possible collaborative and interactive learning activities in the study of Pathophysiology and Pharmacology, covered in the clinical science course.

While PBL is not new, its enhancement and support by online technologies is relatively new for this course and there is a need to evaluate its introduction into courses (Ward & Hartley, 2006). In accordance with university best practice in teaching, it is important that academics continually evaluate each innovation that they undertake and determine its impact in order to optimise its application. Mezirow's critical reflection was used for the purpose of evaluating the initiative.

## **BACKGROUND**

PBL is an instructional methodology that allows the attainment of knowledge and skills through real practice situations (Williams, 2001). The learners are immersed in the PBL context, requiring them to learn the complexities of an authentic problem, search for connections across different bodies of knowledge, recognise what they know and what

they need to know about a problem, and suggest solutions to a given problem derived from the workplace (Oliver & Omari, 1999; Gonzalez & Salmoni, 2008). In the PBL process, students are assigned to small groups and presented with a problem and associated questions which serve as a catalyst to explore a specific content area. They go through various stages, such as formulating explanations, clarifying personal understanding, critiquing resources, identifying gaps in knowledge, and synthesising what has been learnt and how best to approach the problem (Williams, 2001).

PBL was implemented online and applied specifically to a clinical science course. The primary aim of the course was to increase students' understanding of altered health states in order to inform nursing care decisions and interventions. The course required students to pass a case study assessment. The students were to group themselves and deliver personally or via telephone brief presentations about a patient suffering a particular condition. Anecdotal accounts from past students revealed, however, that the case study presentation delivered face-to-face or via telephone was problematic for a number of reasons. The limited time available for responding to questions, minimal benefit to other students who were not part of the presentation, reduced interaction with students other than group mates, and the intimidating and anxiety-provoking experience while being queried about the topic were some of these reasons. Hence, another strategy, online problem-based conferencing, was initiated.

## **ONLINE PROBLEM-BASED CONFERENCING**

The online problem-based conferences used discussion forums, which are part of the interactive learning objects that make up the UniSAnet online learning environment and are developed in-house at our university. The discussions were threaded so that learners could follow successive postings to a nominated topic. Various files could be uploaded also to support the discussion or share information. The interface was web based and data were stored in a structured query language (SQL) database.

For this compulsory assessment, students grouped themselves and chose a real-life scenario with problems and corollary questions. A scenario typically reported on a client presenting to the hospital with various medical complaints, including the past medical and family history, investigations, and treatments (Ward & Hartley, 2006). Students attempted to solve the general problems of explaining disease processes and rationalising the medical and nursing interventions. The lecturer posted the scenarios in the appropriate discussion group forums (one forum for each scenario), which served as a learning space where students interacted and built knowledge (Arbaugh, 2000;

Martyn, 2005). The culmination of the group process was a student-created product – a PowerPoint presentation which was to be presented to the lecturer and entire class during an online conference.

Online conferencing is a meeting in cyberspace conducted synchronously at first and, later, asynchronously in our case. Particular dates and times for each group to present their scenario via online conferencing were assigned early in the study period. The lecturer and presenting students met during the time scheduled for the PowerPoint presentation, and the rest of the class were invited to participate also. During the one-hour presentation and discussion, there was opportunity for synchronous communication as the students presented the scenario and responded to questions from the lecturer and other students who were online at the time.

More interactions occurred after the presentation as more questions were received from the lecturer and the other students who joined the conference later, and ideas were critiqued, misconceptions corrected, and solutions challenged by the lecturer as well by these other students. Presenting students were given the chance to search for follow-up information and return to the discussion page for the next three days or until such time as the topic had been fully covered, and solutions had been exhausted. Asynchronous communication occurred as students came back and forth to engage in the discussion forums. The discussion forums allowed the documentation of the discussion, presentation and conference, making the exchanges available and accessible to all class members. Finally, the lecturer assessed the performance of the groups, with some students providing feedback.

## **METHODOLOGY**

Both authors engaged in critical reflection to evaluate the online problem-based conferences. Reflection has been used extensively in nursing and education. Mezirow (1995, p. 44) defines reflection as the act of “intentional assessment” of one’s actions, while critical reflection involves deliberation of the nature and consequences of one’s actions and also the related circumstances that gave rise to them. Critical reflection is a process of internally examining and exploring an issue which creates and clarifies meaning and results in a changed conceptual perspective and frame of reference (Mezirow, 1998; Williams, 2001).

Mezirow distinguishes three types of reflection – content, process and premise reflection (Kitchenham, 2008). These types of reflection impact on transforming the meaning schemes, defined as the “concept, belief, judgement, and feeling which shapes a particular interpretation”, and perspectives, defined as the “structure of cultural and psychological assumptions within which our past experience assimilates and transforms new experience” (Kitchenham, 2008, p. 109). All three types were used in this study to assess, interpret and give meaning to the experience of online problem-based conferencing. Content reflection, which involves thinking back to what was done before, may cause transformation of meaning schemes. Process reflection, which may also transform meaning schemes, challenges the person to consider the cause of actions. Premise reflection requires the person to see the bigger picture of what is operating within his/her value system, and so transforms perspective rather than scheme (Kitchenham, 2008). Content, process and premise reflection asks ‘what’, ‘how’, and ‘why’ questions, respectively (Williams, 2001).

The authors carefully considered the learning that transpired using Mezirow’s framework. The student’s content, process, and premise reflections were respectively guided by the following questions:

- What did I achieve with online problem-based conferencing, given my knowledge and past experiences?
- What were the positives and negatives in undertaking online problem-based conferencing?
- Why is online problem-based conferencing important to me at this time in my study?

The lecturer reflected on similar questions:

- What did I achieve with online problem-based conferencing, given my knowledge and past experiences?
- What were the positives and negatives in undertaking online problem-based conferencing that will assist me in future planning for the course?
- Why is online problem-based conferencing important to me at this time in my teaching, when I could use other strategies that I have used in past years?

Note that critical reflections happened after the student had successfully completed the science course; hence, there was neither undue pressure nor dependent relationship between the lecturer and student.

In addition to critical reflection, a class survey was conducted to evaluate this initiative at the conclusion of the study period. All 46 off-campus students enrolled in the course

were invited by e-mail to participate in the survey. A ten-item anonymous Likert-type questionnaire, followed by four open-ended questions, was administered via web-based TellUs2. Students were asked to indicate the extent ('strongly agree' to 'strongly disagree') of their agreement with statements describing their experiences with online problem-based conferencing. Other items explored students' general perceptions, what they liked most and least in the approach, and suggestions for improvement.

## FINDINGS

Following critical reflection, both authors wrote about their experiences of problem-based learning as an educational approach to learning clinical science and the use of online discussion groups. The table below summarises their reflections.

| <b>Reflective Questions</b>                                       | <b>Student's Critical Reflection</b>   | <b>Lecturer's Critical Reflection</b>   |
|---|--|---|
| <b>Achievements with online problem-based conferencing</b>        | <ul style="list-style-type: none"> <li>• PBL broadened my knowledge base.</li> <li>• It encouraged me to examine topics more deeply.</li> <li>• It allowed me to demonstrate my knowledge.</li> <li>• Online conferencing facilitated communication between students and the lecturer.</li> <li>• It allowed me to view other group sites and learn from their scenarios.</li> </ul> | <ul style="list-style-type: none"> <li>• PBL is an effective learning and teaching approach for distance students.</li> <li>• It challenged students' thinking.</li> <li>• It provided opportunity for self-directed learning.</li> <li>• It provided flexibility and immediate feedback.</li> <li>• This approach was user-friendly.</li> <li>• Presentations and discussions were available online at any convenient time.</li> </ul> |
| <b>Positives in undertaking online problem-based conferencing</b> | <ul style="list-style-type: none"> <li>• I gained knowledge on various medical conditions.</li> <li>• I learnt to become resourceful.</li> <li>• I learnt about teamwork.</li> <li>• I honed my communication skills.</li> <li>• I learnt to synthesise vast</li> </ul>  | <ul style="list-style-type: none"> <li>• The approach allowed students and lecturer greater interaction.</li> <li>• It provided opportunity for self-directed learning, collaboration, reflection, and high quality presentations.</li> </ul>   |

|   |  |   |
|---|--|---|
|   | <p>amounts of information.</p> <ul style="list-style-type: none"> <li>• I was able to follow discussions online.</li> <li>• My knowledge was affirmed and clarified.</li> <li>• The approach allowed me to clarify what was expected of me.</li> <li>• It was a good and effective way to learn.</li> <li>• I felt in contact 24/7 with students and lecturer. I was not alone.</li> </ul> | <ul style="list-style-type: none"> <li>• It afforded the opportunity for students to witness how group members constructed knowledge, and engaged with each other at a deeper level.</li> <li>• It energised interactions as more students were involved in the presentations.</li> </ul>   |
| <b>Negatives in undertaking online problem-based conferencing</b> | <ul style="list-style-type: none"> <li>• I was unsure about the requirements and how the course would be delivered.</li> <li>• The duration of the conference (3 days) was too long.</li> <li>• It was difficult to achieve the required level of close coordination.</li> </ul>   | <ul style="list-style-type: none"> <li>• Some students experienced difficulty with technology.</li> <li>• More time was required for good organisation and coordination</li> <li>• Some students failed to participate in others' presentations and conferences.</li> </ul>   |
| <b>Importance of online problem-based conferencing</b>            | <ul style="list-style-type: none"> <li>• Online problem-based conferencing is a way of gaining information and solving problems now and in the future.</li> <li>• It allows participants to keep up with evidence-based information pertinent to nursing practice.</li> <li>• The importance of communication and teamwork is stressed.</li> </ul>   | <ul style="list-style-type: none"> <li>• PBL fosters greater understanding of medical conditions and their management.</li> <li>• It enhances the ability to solve problems and present the scenario and solutions in a logical and coherent manner.</li> <li>• Online conferencing allows students to witness and experience how other students and the lecturer think.</li> </ul> |

*Table 1. Critical reflection based on Mezirow's content, process and premise reflection*

These reflections were corroborated by the results of the class survey, where 17 students, out of 46 enrolled in the course, responded (Penman & Cook, 2009). Survey results showed that online problem-based conferencing: assisted students' learning of the topics (83%), was an effective way to learn (77%), facilitated collaboration with peers (77%), and interaction with the lecturer (71%). The students reported that the approach was innovative (71%), and a good substitute for classroom experience (71%). The students perceived that learning was more comprehensive and less anxiety-provoking, but they needed more familiarity and clear guidelines with the new initiative.

## **DISCUSSION**

This section expands on the achievements, positives and negatives, and importance of online problem-based conferencing. The discussion examines the ways in which the initiative has helped or otherwise in the learning and teaching of a science course for off-campus nursing students, the extent to which it has contributed to the quality of the students' learning experience, the leadership required in its implementation, and improvements necessary to extend its application.

### **Achievements in the use of online problem-based conferencing**

Distinction is being made in the achievement gained in using PBL and in delivering PBL online through discussion forums.

PBL did enhance the learning of science concepts and development of various skills, including communication, teamwork, and problem-solving skills. It provided students opportunities to examine scenarios in-depth, analyse problems and questions, affirm and challenge knowledge, pursue individual learning, explore alternatives and other ways of thinking, and build, process, and apply knowledge to real practice situations.

However, more benefits are achieved in enhancing PBL with online technology. The formation of a virtual classroom, an online learning space where students and lecturers interact synchronously (and asynchronously) was achieved (Santy & Smith, 2007). Students received and developed the content and communicated with the rest of the class via the same technology. Synchronous and asynchronous communication between students and lecturer afforded greater connection and deeper engagement between the individuals involved. The virtual classroom facilitated student contact and interaction, gave them flexibility and control over their learning with regard to time and place, and

caused less anxiety and pressure as they had more time to prepare questions and responses. It energised the delivery of presentations as presenting students were able to demonstrate clearly their understanding of the topics and respond promptly to questions, while other students participated in the discussions by sharing personal experiences and seeking clarifications. The virtual classroom provided also a chance for the lecturer to guide the students to the most critical areas for learning and to demonstrate how she thought and solved problems.

The goal of such learning context changes mediated by technology is to enhance student learning and university experience through improving the quality of course delivery. The second author's testimonial provides evidence that this was achieved. She spoke about broadening her understanding of Pathophysiology and the management of various medical conditions and extending her knowledge to include her classmates' topics and not just the topic assigned to her. Online problem-based conferencing improved the quality of the course by providing opportunities to learn more content and skills, which were transferable and, hence, useful for future practice.

### **Positives and negatives in undertaking online problem-based conferencing**

Overall, the authors' general perceptions of online problem-based conferencing were positive, and the other students surveyed gave a similar appraisal. This pedagogical innovation was viewed positively because it fostered student learning, improved skills, and facilitated interactions between students and between students and lecturer.

Several comments, relating to period of adaptation, conference duration, and guidelines to observe during the conference, are worth highlighting for future consideration. The student reflected on her initial difficulties, which related to her unfamiliarity with the approach, unclear instructions, and the length of the online conference. The lecturer noted the resistance to change and aversion to new technology observed in some students. In short, there was room for improvement and the negatives expressed will need to be addressed.

### **Importance of online problem-based conferencing**

The importance of online problem-based conferencing from the student's point of view related to being able to control her own learning in a virtual learning environment. This valuable experience could not be acquired in traditional didactic lectures and case presentations. The approach enhanced her skills for lifelong learning and future

practice. Mezirow's (1998) transformative learning is evident in this extract from the student's reflection:

This teaching approach helped me relate to others. ... I learnt to consider other people's ideas and way of thinking. This method allowed me to further my knowledge on the subject and improve my skills in communication, teamwork and problem solving. These were honed while working and collaborating ... endeavouring to solve a query, taking into consideration all the issues involved. Whenever I come across a disease in my future work, I will try and work it out with the skills instilled in us. ... It taught me skills needed to complete my degree and to apply in my career as a nurse.

Transformation has occurred in the student's attitude to learning and solving problems, acknowledging the skills required, becoming aware of a wider range of sources of knowledge, and appreciating the value of collaboration in learning.

On the other hand, the significance of introducing learning strategies that not only present knowledge as traditional approaches do, but engage students meaningfully and encourage greater interaction, motivated the lecturer to experiment with online problem-based conferencing. This innovation has features of teaching situations that provide direct and adjunct instruction, facilitate skills for learning as well as social skills, and widen the students' horizons (Hartley, 2007).

In considering the spread of any innovation, whether an idea or a new technology, Rogers (1995, p. 5) explains that its diffusion or uptake is "through certain channels over time among the members of a social system." Rogers (1995) states that various factors such as certain features of the innovation, channels, time, social system, opinion leaders and so-called champions determine the rate of uptake of an innovation. In the case of the online problem-based conferencing, one might expect a quick adoption of this innovation, considering that functionality, compatibility and flexibility were some of its desirable characteristics; the lecturer telling students and students telling students about online conferencing served as diffusers or channels; and the presence of a keen lecturer who championed the new approach to teaching and learning. The online learning space was in-built to the university system and readily adopted in the course homepage. However, the adoption of this innovation was constrained due to a number of reasons, including a lack of readiness and familiarity with the innovation and conference duration.

## **Future possibilities**

In considering the future use of this approach, the lecturer can learn from the recommendations made by students. To work more effectively for students, the lecturer plans to reduce the duration of the conference to two days and allocate some marks for online participation. The importance of providing clear guidelines and explanations is paramount and these will be included in the orientation to the course conducted at the beginning of the study period and reinforced from time to time. Adequate orientation will provide a background on and skills for successful online learning, as well as clear objectives and practicalities, as outlined by Santy and Smith (2007). The innovation will be introduced gradually and students will be strongly encouraged to participate in the online conferences.

Only last term, the lecturer trialed a revised approach with a group of on-campus students with good effect. The lecturer in continuing to use PBL and PBL online will endeavour to develop further this approach with its planned conversion to Moodle. She will be guided by Sansoucie's (2000) recommendations to continue developing strategies that boost learning, minimise hindrances to distance learning, enhance interactivity, and maintain academic rigour.

## **CONCLUDING REFLECTIONS**

There is a need to persevere in examining courses offered externally to determine best practice approaches and to keep improving the quality of courses. Faculty members are urged to maximise the use of technology and elicit thoughtful and engaged student participation (Goldberg, Vroeginday & Burke, 2007). They are encouraged to be selective about software and technology-assisted interactions, which should be interactive, problem-oriented, relevant, and motivating to students (Chickering & Ehrman, 1998).

This study revealed that online problem-based conferencing was feasible for the clinical science course, considering the desirable learning outcomes that were achieved. Findings from critical reflections and class survey revealed overall satisfaction with the new approach in teaching some aspects of the clinical science course, as it served as a learning platform for the construction and acquisition of knowledge and skills. Through Mezirow's critical reflection, it was determined that this pedagogical approach was valuable and supportive in acquiring disciplinary knowledge bases, solving authentic

problems, and facilitating interactions. The difficulties and challenges identified are being addressed.

## REFERENCES

Arbaugh, J. B. (2000). Virtual classroom versus physical classroom: An exploratory comparison of class discussion patterns and student learning in an asynchronous Internet-based MBA course. *Journal of Management Education*, 24(2), 207-227. Retrieved 28 June, 2007, from <http://jme.sagepub.com/cgi/content/abstract/24/2/213>

Chickering, A.W. & Ehrmann, S.C. (1998). Implementing the seven principles: Technology as lever. In Feldman & M. Paulsen (Eds), *Teaching and learning in the college classroom*. Boston: Pearson Custom Publishing.

Goldberg, B., Vroeginday, B. & Burke, B. (2007). Online threaded discussions: The good, the bad, and the ugly. *ASEE Annual Conference and Exposition, Conference Proceedings*.

Gonzalez, M.L. & Salmoni, A.J. (2008). Online problem-based learning in postgraduate medical education – content analysis of reflection comments. *Teaching in Higher Education*, 13(2), 183-192.

Hartley, J. (2007). Teaching, learning and new technology: A review for teachers. *British Journal of Educational Technology*, 38(1), 42-62.

Kitchenham, A. (2008). The evolution of John Mezirow's transformative learning theory. *Journal of Transformative Education*, 6(2), 104-123.

Martyn, M.A. (2005). Using interaction in online discussion boards. *EDUCAUSE Quarterly*, 28(4), 61-62. Retrieved 15 November, 2008, from <https://www.educause.edu/ir/library/pdf/eqm05410.pdf>

Mezirow, J. (1995). Transformation theory of adult learning. In M.R. Welton (Ed.), *In defense of the lifeworld*. New York: State University of New York Press.

Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly*, 48(3), 185-198.

Oliver, R. & Omari, A. (1999). Using online technologies to support problem based learning: learners' responses and perceptions. *Australian Journal of Educational Technology*, 15(1), 58-79.

Penman, J. & Cook, J. (2009). Off-campus nursing students online for science studies, *Annual International HERDSA Conference on the Student Experience*, Darwin, 6-9 July.

Rogers, E.M. (1995). *Diffusion of innovations* (4th Ed.). New York: Free Press.

Ryle, A. & Cumming, K. (2007). Reflections on engagement in online learning communities. *International Journal of Pedagogies and Learning*, 3(3), 35-46.

Santy, J. & Smith, L. (2007). *Being an E-learner in health and social care*. Oxon: Routledge.

Sansoucie, D. (2000). Technology: Applications for nurse practitioner education and practice. Medscape Portals, Inc., Retrieved 17 May, 2005, from <http://www.medscape.com/viewarticle/424119?src=search>.

Ward, K. & Hartley, J. (2006). Using a virtual learning environment to address one problem with problem based learning. *Nurse Education in Practice*, 6(4), 85-91.

Williams, B. (2001). Developing critical reflection for professional practice through problem-based learning. *Journal of Advanced Nursing*, 34(1), 27-34.