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The affordances of web conferences in online pre-service mathematics education

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In their books 'Teaching the digital generations: No more cookie cutters' (2008) and 'Windows on the Future' (2001), Ted McCain and Ian Jukes discuss the change that is necessary in education to respond to technological change. Web conferences are emerging as an important pedagogical tool for pre-service teacher education. In this study pre-service mathematics teachers shared their views of the benefits and limitations that web conferences offer. The collection of data for analysis was from students experienced in web conferences and was obtained by, appropriately, a web conference where questions were presented on the web conference whiteboard and responses and discussion were given using the text, talk, polling and whiteboard tools embedded in the web conference software. This paper will provide a synthesis of the findings and explore the implications for online pre-service teacher education programs.

Keywords: Web conference, online learning, student evaluation, pre-service teachers, teacher education.

Introduction

It could be argued that the venue and structure of a mathematics class has changed little over the last one hundred years. The advent of increased technology into our society and the impact that will have upon a mathematics class is hard to predict. Online possibilities are plentiful but changes to incorporate this into schools have not been universally accepted. A person entering a mathematics class in the 21st century may see very little outward difference from the class of the 20th century and perhaps even the 19th century (McCain & Jukes, 2001). Other professions have changed radically in both equipment, style and environment (consider a doctor's surgery). The plethora of new technologies that can be utilised in a classroom are perhaps still 'hiding under a bushel'. Mathematics classes can still be viewed as a place where information is just transmitted and received (McCain & Jukes, 2008). The task to consider all of the new technology that could or should be incorporated into a new pedagogical approach for mathematics teachers would be enormous. This study considered a case study involving pre-service mathematics teachers at the University of Tasmania who had studied at least one secondary mathematics education unit online. The students were asked to discuss the benefits and limitations of web conferences that were experienced using Blackboard Collaborate Live (consisting of interactive chat, whiteboard, instant polling and live discussion) which had been used as part of their online secondary mathematics education units. The terms 'web conference' and 'webinar' will be used synonymously in this paper as both are used frequently by the participants. Pseudonyms have been used in this paper for the direct quotes from participants.

Literature review

The consideration that webinar and online class offerings may be an integral part of all classrooms in the future should not be ignored. Conclusions made after a trial of web conferencing software by the University of Queensland indicated that Blackboard Collaborate can enable new ways of teaching and learning as well as encouraging innovation pedagogical and collaborative teaching methods (Reuschle & Loch, 2008). An online professional development program for mathematics teachers in the United Kingdom (de Pomerai & Tripconey, 2009) received feedback about the use of Blackboard Collaborate for instruction. The collaborative nature and accessibility were seen as significant advantages whereas the lack of class type demonstrations and technology concerns were highlighted as disadvantages of this program. The individual tools within Blackboard Collaborate such as the audio, the shared whiteboard and application sharing were mentioned but not analysed or compared. A study of synchronous and asynchronous online learning (Ichinose, 2010) indicated that synchronous online activities were effective in teaching and learning mathematics. Previous studies (Collinson, Elbaum, Haavind and Tinker, 2000; Cox, Carr & Hall, 2004) saw the asynchronous nature of online learning to be a leading motivator for course participation. The capacity of Blackboard Collaborate to be able to be used

synchronously and asynchronously (as a recorded class) could provide a good balance.

Web conference questions

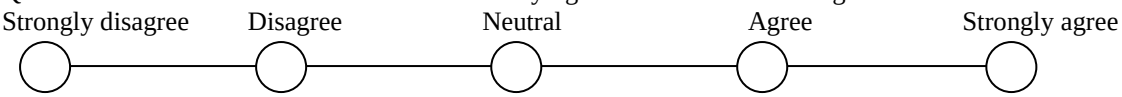
The starting point for the research was a web conference where a semi-structured interview was initiated with the participants. The whiteboard, polling/voting, talk and chat tools were used with the participants in the web conference to record the responses for the four qualitative and two quantitative questions. The category of research was expected to be predominately descriptive and a qualitative analysis of the descriptive responses would be conducted. Questions using the polling tool obtained some Likkert data for quantitative analysis. The audio recording of the web conference was used to procure data for the study.

Qualitative questions

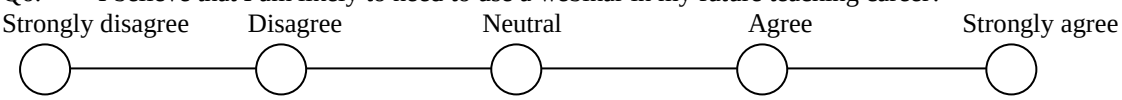
Q1. In what ways do you consider the webinar class different to a face to face class for studying techniques and knowledge about mathematics teaching?
Q2. What do you consider are the benefits of studying mathematics education in a webinar class?
Q3. What do you consider are the limitations of studying mathematics education in a webinar class?
Q4. Which of the tools in the Collaborate program do you consider most useful in being able to study the teaching of mathematics?

Quantitative questions

Q5. Web conferences were beneficial to studying of mathematics teaching?



Q6. I believe that I am likely to need to use a webinar in my future teaching career?



Methods

Research site and the participants

This research study took place at the Faculty of Education at the University of Tasmania. The University of Tasmania is a mid-size university in Australia catering for approximately 15 000 full time equivalent students. The faculty has an enrolment of approximately 1900 full time equivalent students. The students who participated in this study were enrolled in at least one of three units in secondary mathematics education that form a part of the Master of Teaching course during 2011. These three courses are usually studied sequentially over an 18 month timeframe and are compulsory units to qualify as a teacher of mathematics at high school level. For this study, six students volunteered to provide in depth feedback on their experiences with web conferences. The web conference to obtain the data for this research was held on Wednesday July 4th, 2012. The web conference was recorded and verbal responses were later transcribed. . The verbal responses and the text responses formed the majority of the data for analysis.

Findings

The students in the study indicated that web conferences provide a positive connection between both the students themselves and the lecturer. It was readily apparent that isolation was a common theme when online courses did not include web conferences for these participants. The personal nature and connectedness that were important features of the web conferences and that had been identified in other studies (Reuschle & Loch, 2008; den Exter et al, 2012). A comment from one of the students typified their views:

> Being an online student you can feel very isolated. The webinars have been really helpful in feeling connected. The feeling I have is that the setting is more intimate than a large lecture, with more interaction than in a regular setting. This has made learning the content more interesting and hence easier to assimilate. Also you can ask questions or participate without feeling like everyone

> is looking at you. (Mark)

Students who had completed online courses in the Master of Teaching program that did not have web conferences as a component commented on a feeling of isolation. There is evidence that a connection is established with the use of weekly synchronous web conferences (den Exter et al, 2012; Heirdsfield et al, 2011). It is generally agreed by researchers that knowledge is founded in discourse in social interactions and not just in the minds of individuals (Hrastinski, 2008). This capacity to connect with discourse and social interaction must be an important component of not only face to face classes but also of any online class. To support any online education, online participation must be encouraged and developed (Hrastinski, 2008). The design of the learning environment is important to encourage this participation and needs to support interaction from all participants using synchronous and asynchronous learning tools. Synchronous tools such as the web conferences have been successfully used with small and large classes to allow instant communication and promote collaborative learning (den Exter et al, 2012). Evidence that collaboration was used effectively was highlighted by one participant: "The webinars were definitely a step up from just having an online course. I liked having a 'room' where we as students could also meet at other times – we used it in the organisation of group planning assignments" (Jan). With the ability to meet in the 'web room' at any time the students had unlocked a potentially powerful collaborative student-to-student tool. The advantage of students being able to use a synchronous tool such as the web conference without the lecturer as well as the asynchronous use with the recording was further reinforced with comments from students such as

> The webinars have been great in the ability to offer distance students more collegial experiences than units that do not utilise them. The units that do not use them would benefit distance students by utilising them or at least by recording tutorials so that online students can observe (Peter).

Another communication benefit seen by students was the openness and freedom that the synchronous nature of the web conference allowed. This was well articulated by a student who stated that: "The webinar format allows you the freedom to question and discuss any areas of concern, and to use the whiteboard to clarify the issue" (Scott).

Although web conferences were seen as beneficial the connection to future teaching was not considered by some of the students interviewed. All of the students interviewed agreed that web conferences were personally beneficial with the majority strongly agreeing. Some benefits that were listed by students were related to classical distance education issues such as providing access for rural and isolated students. One of the students reported that

> I think the idea of a teacher standing up the front and talking to a set group of students may change in the future. Rural or isolated students would benefit. Being able to do special classes in a regular school would be cool. (Jan)

Some of the drawbacks that currently are preventing the use of web conferences such as technology were outlined in comments such as "teaching mathematics might be more challenging but only because I find using a mouse/trackpad gets in the way of drawing, writing, etc. As a student it might be harder to communicate ideas, or show working" (Scott) and "as it stands now though, you can't assume that every student is going to have the means, facilities, or even technical knowledge to be able to be able to study like this" (Peter). Such comments clearly indicate that there are still hurdles in place preventing the acceptance of web conferences as part of learning for the future with teachers in schools. This is well articulated by Heirdsfield et al., (2011) with the recognition of the one of the hurdles is that staff need more training and support in order to see opportunities to incorporate new and innovative technologies into existing practice.

Conclusions

The use of web conferences as a valuable tool in online teacher education has been demonstrated in numerous studies (den Exter, 2012; Heirdsfield et al, 2011; Reuschle &Loch, 2008) and has been reaffirmed in this study. The comments in regard to the collaboration, interactivity and removal of the feeling of isolation that were made by participants in these earlier studies resonated with comments by students in this study. Comments from participants in Reuschle and Loch (2008) such as "The Elluminate events were a highlight of this course for me. I enjoyed the interaction and hearing the fellow learners' voices. It added a degree of humanness to the virtual environment." voiced similar views to this study. Terms such as 'intimacy', 'connectedness' and 'collaboration' were frequently used by the students in this research. The reduction of the isolation that is often associated with

online learning was identified by Reuschle and Loch (2008) and was a common theme in the responses given in this study. The increased communication and collaboration possible in the web conferences were highlighted with the web conferences lauded as the closest possible replacement for on-campus tutorials. This view was supported by comments expressing the view that ”face to face is probably the best way to study any subject, but this excludes people in remote areas. I believe that the webinar is the next best thing” (Anne). Learning and teaching are changing rapidly and features that are available for web conferences continue to increase. Teachers of the future will need to be prepared to teach in a variety of ways and are likely to include the use of web conferences. With the rate of online education growing much faster than 'bricks and mortar' education (Chau, 2010) it is appropriate to implement and model collaborative tools such as web conferencing in pre-service teaching programs to equip the teachers of the future. Teachers need to be prepared to teach in an ever changing technological landscape and teacher educators need to consider new approaches to online teaching and be given the support to model and manage new and innovative approaches (Downing & Dyment, 2012; Saltmarsh & Sutherland-Smith, 2010). Web conferences are an ideal vehicle to provide the collaborative and interactive tools needed to support current and future teacher educators as they prepare for imminent pedagogical and technological change.

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