SYNCHRONOUS WEB CONFERENCING: TOWARDS A PEDAGOGICAL MODEL FOR EFFECTIVE LEARNING

YEUNG Sze Kiu
SIM University

Pedagogy supported by synchronous web conferencing is the topic of this research study. While pedagogy for asynchronous online learning has been widely studied, there is little coverage in the literature on a coherent pedagogical model that guides teaching and learning practices in a synchronous web conference environment. The study undertaken here aimed to address this gap by investigating if learning with synchronous web conferencing offered a benefit over learning in the traditional face-to-face mode. The action research methodology based on the mixed methods of combining quantitative and qualitative analyses was adopted to investigate (a) students’ course achievement, (b) the formation of pedagogical patterns, and (c) the development of a pedagogical model. Overall, the study revealed that there was no significant difference in students’ achievement in terms of their examination results in two of the three semesters studied.

Keywords: Synchronous web conferencing, pedagogy, action research

BACKGROUND

Synchronous web conferencing is a system of teaching and learning that takes place in real-time, supported by online technology, between the instructor and students who may or may not be in the same location. This form of communication is used to emulate face-to-face classrooms with its use of instant messaging, white boards, and audio and/or video conferencing (Johnson, 2006). Like face-to-face classes, synchronous communication emulates real-time communication, reducing student proximity because of real-time immediacy as compared to asynchronous communication, which lacks immediacy (Liu, Magjuka, Bonk, & Lee, 2007). This study investigated student achievement and pedagogical issues associated with synchronous web conferencing (web conferencing from here on) in the teaching and learning context of SIM University (UniSIM). The idea and motivation behind this topic stem from Athabasca University's (AU) cohort-based model of delivering distance education to students worldwide. In particular, the synchronous element involved the instructor and learners participating in teaching and learning activities in real-time via a web-conference system. Specifically, this research study investigated the technological and pedagogical challenges encountered and attempted to create a suitable pedagogical model for web conferencing. From a theoretical perspective, the study also aimed to make a contribution towards a body of research on pedagogy for web conferencing, a topic that has limited coverage in the literature (de Freitas & Neumann, 2009).
LITERATURE REVIEW

The literature review covers the technological and pedagogical aspects of web conferencing, in general, and the practice of teaching and learning undertaken via this kind of synchronous learning environment in two institutions in particular. In addition, relevant pedagogical theories, which informed the practice of teaching and learning undertaken in this study was also reviewed. A comparative study of various synchronous technologies was conducted by Karabulut and Correia (2008). They reviewed four web-based conferencing systems: Skype, Elluminate, Adobe Connect, and iVisit. Both Elluminate and Adobe Connect were found to offer functionalities more suitable for web-conference learning than Skype and iVisit because they provided an audio-and-video-graphics environment that supported the delivery of and interaction with learning contents in both text and multimedia formats.

Studies on Teaching and Learning via Web Conferencing

In relation to teaching and learning, Montgomerie and King (2006) conducted a research for the Northern Alberta Institute of Technology (NAIT) to evaluate the use of IP videoconferencing in an apprenticeship training course. Two models of delivery were examined: (a) the NAIT DATE (Distance Apprenticeship Training and Education) model, and (b) the “two-classroom” model. In the former model, students received their training in their local community (instead of going to the technical college to attend face-to-face lessons) via videoconferencing from the instructor who was based in the NAIT main campus, while the latter involved a “two-classroom” arrangement in which the instructor and one class were located at the NAIT main campus linking up via video conferencing with another class at a remote campus. In both models, the study concluded that “the students were successful and able to access their training from their home community” (p. 73).

In another study on the deployment of web-conference systems at the University of Southern Queensland (USQ) (Reushle & Loch, 2008), Elluminate was found to be “the preferred choice of web conferencing software because of its cross platform functionality … and because it appeared to offer all that other commercial tools offer plus more features” (p. 21). These additional features included application sharing and recording as well as the standard functions (i.e., whiteboard, audio- and text-based chat). USQ conducted two phases of trial Elluminate deployment: Phase 1 included lessons conducted by two USQ faculty-members via Elluminate for two fully online postgraduate courses in the Faculty of Education and one undergraduate course in Mathematics; Phase 2 extended this trial to encompass two introductory training sessions endorsed by the USQ management plus a number of additional sessions to give staff members practice in using Elluminate. Many positive feedback statements were obtained from the students in the two trials with “interactive and collaborative opportunities, enhanced social presence and a sense of community” (p. 23) being identified as the most beneficial experiences of learning for students. Feedback from faculty members who participated in the trials was also positive. In particular, Reushle and Loch (2008) reported that “their use of the software to invite guest speakers from across the globe to contribute to their students’ learning experience” (p. 25) was most beneficial.
**Blended Online Learning Design**

In their study on the advantages and disadvantages of Blended Online Learning Design (BOLD) for graduate-level course design and delivery in two Canadian universities, Power and Vaughan (2010) provided a conceptual framework relevant to this study. Defined as “a combined asynchronous-mode … and synchronous-mode learning environment” (p. 22), BOLD is a concept that promotes the blending of synchronous online learning with the more widely practiced form of asynchronous learning management system (LMS)-based learning. According to Power and Vaughan (2010), BOLD represents “a completely online, course delivery system” (p. 23). The BOLD framework is shown in Figure 1.

<table>
<thead>
<tr>
<th></th>
<th>ON-CAMPUS</th>
<th>ONLINE</th>
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<tbody>
<tr>
<td>ASYNCH</td>
<td></td>
<td>Blended Online</td>
</tr>
<tr>
<td>SYNCH</td>
<td>Instructor-led</td>
<td>Learning Design (BOLD)</td>
</tr>
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</table>

Figure 1. The Blended Online Learning Design (BOLD) Framework (Adapted from Power and Vaughan, 2010).

**The Conversational Framework**

While action research provided a mechanism for investigating pedagogy, Laurillard’s (2002) Conversational Framework offered a theoretical framework for action researchers “to design and test an optimally effective learning experience” and “to harness technology to the needs of education” (Laurillard, 2008, p. 1). The Conversational Framework viewed “learning as a relationship between the learner and the world, mediated by the teacher” (Laurillard, 2002, p. 86) and offered a teaching strategy for any learning situation based on the following characteristics:

- it must operate as an iterative dialogue;
- it must be discursive, adaptive, interactive and reflective; and
- it operates at two levels: discursive and experiential.
Community of Inquiry

The Community of Inquiry (COI) model offered a theoretical framework on the three essential elements that are fundamental to higher education in computer-mediated-communication (CMC) and computer-conferencing environments (Garrison, Anderson, & Archer, 2000). These three elements, known as “presences,” include (1) cognitive presence, (2) social presence, and (3) teaching presence. When an instructor and his/her students experienced these three presences in a CMC-based educational setting, a Community of Inquiry is said to have formed, fostering “a worthwhile educational experience” (Garrison et al., 2000, p.88). The COI model is illustrated in Figure 2.

![Figure 2. The Community of Inquiry (COI) Model](Adapted from Garrison et al., 2000).

The pedagogical practice of establishing teaching and social presence in this study was informed by Garrison, Anderson, and Archer’s (2000) Community of Inquiry model, while reflection by the instructor and students as a form of teaching and learning strategy was supported by Laurillard’s (2002) Conversational Framework. In addition, Power and Vaughan’s (2010) BOLD framework provided the theoretical motivation for this study.
RESEARCH PROJECT

Research Aims

This project investigated the implementation of web conferencing within the context of UniSIM’s teaching and learning environment. A group of students from the DMS Information Systems for Business course (BUS017) were invited to participate in web conferencing. The aims were to investigate the following research questions:

1. In the context of SIM University, what are the differences in student achievement between students experiencing synchronous web conference instruction and those experiencing traditional classroom-based instruction?
2. What are the features of an effective pedagogical model that can be adopted in a synchronous web conference context?

Procedure of Study

For each semester that commenced on 1 October 2012, 1 January 2013, and 1 April 2013, students from a class taking the BUS017 course participated in the use of web conferencing. The Information Systems for Business course (BUS017) in the Diploma in Management Studies (DMS) programme was chosen as its lab-based component had a situational problem that could be overcome with web conferencing. The lab sessions were problematic because

- The instructor had to repeat the same lab session twice.
- The instructor was not available to answer student questions when he/she was in the “other” lab.
- The labs were scheduled on different floors of the campus building, resulting in the instructor having to move a considerable distance between labs.

The study was conducted over nine months and covered three semesters. In each semester, a class of 60 to 80 students from the BUS017 course was invited to participate, on a voluntary basis, in web conferencing. All the lessons, including those with web conferencing, were conducted by the researcher-instructor who is a full-time faculty member of UniSIM. The BUS017 course had a total of 14 lessons in each semester. These were taught over a seven-week period with two lessons scheduled per week. The duration of each lesson was three hours, resulting in a total of 42 hours (3 x 14) of classroom time for all students. A specific requirement was the provision of lab-based learning with four of the 14 lessons conducted in the lab.

Setup of Web Conference Environment

The Blackboard Collaborate™ web conference system (formerly known as Elluminate) was used. Lab sessions were conducted for all students simultaneously. In each lab session, the
A researcher-instructor would work with two groups of students simultaneously: (1) the face-to-face or control group, and (2) the web conference or treatment group. Students in the control group attended all 14 lessons in face-to-face mode, while students in the treatment group participated in web conferencing in the lab. Each one of the eight web conference sessions was conducted based on a two-classroom model as illustrated in Figure 3.

![Figure 3. Synchronous Web Conferencing: Two-classroom Model.](image)

All the students would see the same instructional contents regardless of whether they are in the control or treatment group. A sample screen-print of a typical web conference session is show in Figure 4.

![Figure 4. Instructional Contents of a Web Conference Session.](image)
Research Methodology

The methodology adopted to investigate web conferencing was based on a combination of quantitative and qualitative approaches. The research methodology that combined both approaches is known as mixed or combined methods research (Spicer, 2004). Pragmatism (Creswell, 2003) is often associated with mixed methods research. Given the practical nature of this study, it was considered a suitable methodology.

Research Question 1: Quasi-experimental Design

The quasi-experimental study, based on the pretest-post-test non-equivalent group design (Figure 5), was set up to investigate the first research question on students’ learning achievement:

- In the context of SIM University, what are the differences in student achievement between students experiencing synchronous web conference instruction and those experiencing traditional classroom-based instruction?

![Figure 5. Symbolic Representation of a Quasi-experiment (Adapted from Campbell and Stanley, 1963).]

The above representation is based on a set of conventions, defined by Campbell and Stanley (1963). The symbolic representations are as follows:

- $X$ represents the exposure of a group to an experimental variable or event, the effects of which are to be measured;
- $O$ refers to the process of observation or measurement;
- $R$ indicates random assignment to separate groups;
- Parallel rows un-separated by dashes represent comparison groups equated by randomization, while those separated by a dashed line represent groups not equated by random assignment.

Among a class of students taking the BUS017 course, all were initially invited to participate in the study on a voluntary basis by a research assistant. Students who agreed to take part were allocated to the treatment group while those who did not agree to participate in the study were classified under the control group. The quasi-experiments were conducted over three semesters on 1 October 2012, 1 January 2013, and 1 April 2013, three treatment groups ($T_1$, $T_2$, & $T_3$) and
three control groups (C₁, C₂, & C₃) were created. According to Campbell and Stanley’s (1963) set of conventions, each pair of treatment-control group was represented as shown in Figure 6.

![Figure 6. Quasi-experimental Design]

(Adapted from Campbell and Stanley, 1963). Reprinted with permission.

A pre-test was then conducted in January 2013 and April 2013 to determine whether those students in the treatment group were academically comparable with their counterparts in the control group. The pre-test comprised of a set of 10 multiple choice questions, which covered the BUS017 course syllabus based on actual past examination questions. Results of the two pre-tests were compiled with two rounds of t-tests. As shown in Table 1 and 2, there was no significant difference in the mean scores between treatment (M=6.95, SD=1.14) and control (M=6.45, SD=1.60); t (40) = -1.14, p = 0.26, for January 2013; and between treatment (M=5.82, SD=1.13) and control (M=6.35, SD=1.57); t (41) = 1.18, p = 0.24, for April 2013, respectively. These results suggested that the two groups of students were comparable in both semesters.

**Table 1**

<table>
<thead>
<tr>
<th>t-test for Equality of Means</th>
<th>t</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>-1.145</td>
<td>40</td>
<td>.259</td>
<td>-.49545</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-1.163</td>
<td>38.053</td>
<td>.252</td>
<td>-.49545</td>
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</table>

**Table 2**

<table>
<thead>
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<th>t-test for Equality of Means</th>
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<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>1.182</td>
<td>41</td>
<td>.244</td>
<td>.52262</td>
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<tr>
<td>Equal variances not assumed</td>
<td>1.266</td>
<td>40.552</td>
<td>.213</td>
<td>.52262</td>
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</table>
Research Question 2 - Pedagogical Action Research

In relation to the second question on pedagogy:

- What are the features of an effective pedagogical model that can be adopted in a synchronous web conference context?

In addition to end-of-course examination results, selected students also took part in semi-structure interviews, comprising of questions ranging from (a) whether they preferred face-to-face learning over web conferencing, (b) which aspects of web conferencing that they liked best/worst, (c) why they disliked web conferencing, (d) the researcher-instructor’s teaching style, (e) the kinds of lesson delivery that they found helpful, (f) the course topics covered for web conferencing, (g) opportunities for discussions, and (h) the use of video by the researcher-instructor. Norton’s (2009) pedagogical action research (PAR) was adopted as it was designed to “systematically investigate one’s own teaching/learning facilitation practice, with the dual aim of improving that practice and contributing to theoretical knowledge in order to benefit student learning” (p. 59). In particular, the cyclical ITDEM model (see Table 3) formed the basis of the action research undertaken.

Table 3

<table>
<thead>
<tr>
<th>Pedagogical Action Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ITDEM Model</td>
</tr>
<tr>
<td>1. Identifying a problem/paradox/issue/difficulty (I)</td>
</tr>
<tr>
<td>2. Thinking of ways to tackle the problem (T)</td>
</tr>
<tr>
<td>3. Doing it (D)</td>
</tr>
<tr>
<td>4. Evaluating it (actual research findings) (E)</td>
</tr>
<tr>
<td>5. Modifying future practice (M)</td>
</tr>
</tbody>
</table>

Adapted from Norton 2009, p. 70. Reprinted with permission.

The mixed methods research ensured that the appropriate data were captured to answer the above research questions. In relation to Question 1 on student achievement, quantitative data based on examination results were statistically processed, while qualitative data obtained from interviews were analyzed to answer the Question 2 on pedagogy.
FINDINGS

Quantitative data in the form of students’ end-of-course examination results were analyzed while qualitative data provided by student interviews were reviewed through content analyses. The following are the findings for each research question.

**Research Question 1 on Student Achievement**

1. *In the context of SIM University, what are the differences in student achievement between students experiencing synchronous web conferencing instruction and those experiencing traditional classroom-based instruction?*

Individual t-tests were conducted to determine if there was a difference in the mean examination scores between the treatment and control groups in the semesters of October 2012, January 2013, and April 2013, based on the following research hypothesis:

- H0: there is no difference in the mean examination scores between treatment and control groups
- H1: the mean examination scores between treatment and control groups are not the same

**October 2012.** As shown in Table 4 and 5, there were no significant difference in the mean examination scores between treatment (M=69.4, SD=9.70) and control (M=68.8 SD= 10.22); t (64) = -0.23, p = 0.82. These results suggested that there was no significant difference in student achievement for students who received instruction in web conferencing (treatment) compared with those who received face-to-face instruction (control) in the October 2012 semester.

**Table 4**

*Mean Examination Scores for October 2012*

<table>
<thead>
<tr>
<th>Student Grouping</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam Scores October</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>35</td>
<td>68.8286</td>
<td>10.2248</td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>69.3871</td>
<td>9.69769</td>
</tr>
</tbody>
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**Table 5**

*T-test of Mean Examination Scores for October 2012*

<table>
<thead>
<tr>
<th></th>
<th>t-test for Equality of Means</th>
<th>Sig. (2-tailed)</th>
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<tbody>
<tr>
<td></td>
<td>t</td>
<td>df</td>
</tr>
<tr>
<td>Final Exam Scores October</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>-.227</td>
<td>64</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-.228</td>
<td>63.682</td>
</tr>
</tbody>
</table>
January 2013. According to Tables 6 and 7, there was no significant difference in the mean examination scores between treatment (M=64.1, SD=11.1) and control (M=62.8, SD= 15.0); t (59) = -0.38, p = 0.71. These results also suggested that there was no significant difference in student achievement for students who received instruction in web conferencing (treatment) compared with those who received face-to-face instruction (control) in the January 2013 semester.

Table 6

<table>
<thead>
<tr>
<th>Student Grouping</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tbody>
<tr>
<td>Final Exam Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>62.8333</td>
<td>14.99047</td>
</tr>
<tr>
<td>Treatment</td>
<td>25</td>
<td>64.1600</td>
<td>11.09685</td>
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Table 7

<table>
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<th>t-test for Equality of Means for January 2013</th>
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<tbody>
<tr>
<td>Final Exam Scores</td>
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<tr>
<td>Equal variances assumed</td>
</tr>
<tr>
<td>t</td>
</tr>
<tr>
<td>-.376</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
</tr>
<tr>
<td>-.397</td>
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</table>

April 2013. As shown in Tables 8 and 9, there was a significant difference in the mean examination scores between treatment (M=73.7, SD=13.5) and control (M=64.5, SD= 10.0); t (54) = -2.94, p = 0.01. These results suggested that there was significant difference in student achievement for students who received instruction in web conferencing (treatment) compared with those who received face-to-face instruction (control) in the April 2013 semester.

Table 8

<table>
<thead>
<tr>
<th>Student Grouping</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
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</thead>
<tbody>
<tr>
<td>Final Exam Scores</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>34</td>
<td>64.4706</td>
<td>10.01585</td>
</tr>
<tr>
<td>Treatment</td>
<td>22</td>
<td>73.7273</td>
<td>13.50902</td>
</tr>
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Table 9

<table>
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<tr>
<th>t-test for Equality of Means for April 2013</th>
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<tr>
<td>Final Exam Scores</td>
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<td>Equal variances assumed</td>
</tr>
<tr>
<td>t</td>
</tr>
<tr>
<td>-2.942</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
</tr>
<tr>
<td>-2.760</td>
</tr>
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</table>
Research Question 2 on Pedagogy

2. What are the features of an effective pedagogical model that can be adopted in a synchronous web-conference context?

Content analyses (Norton, 2009, pp. 115-130) were used to analyze the qualitative data. Overall, the analysis generated three themes:

a. Student learning experience,
   b. Instructor teaching presence, and
   c. Technological issues.

As the findings were consistent for all 3 semesters, the qualitative data for October 2012 that is representative of overall findings is reported.

a. Student learning experience

   Embarrassment about voicing out in class but not in web conferencing was mentioned by Student 6:

   “... it is intimidating to voice out during lectures. We do not have to suffer embarrassments or awkwardness when we voice out through the chat.” (Student 6)

   The problem of shyness was also articulated by other students.

   As mentioned by Student 7, web conferencing provided students with a level of comfort over face-to-face settings when they are required to communicate with their peers and with the instructor:

   “Chat, because answering question through chat makes me feel more comfortable.” (Student 7)

   However, the downside of web conferencing is that participants are being left alone in the labs without instructor supervision. Student 9 admitted to this problem:

   “However, there was also more distraction, mostly from Internet because there was no teacher there who watched us.” (Student 9)

b. Instructor teaching presence

   Students identified empathy, attitude, patience, passion, immediacy of response, organizational skills, and clarity of communication as factors relating to teaching presence.

   “Yes, he makes a module that isn’t the most favorable module and keeps it at an acceptable level. He understands the anxiety and the basic behaviors
of his students in the lab. He then allows the students to let out this ‘anxiety’ by drawing and playing around with the used presentation slides.” (Student 2)

Patience was noted by both Student 3 and Student 6:

“Mr. X’s teaching style is effective for the students who join the synchronous learning. I like Mr. X’s lecture. Because he was very nice in teaching us and patient.” (Student 3)

I think he suits synchronous learning since he is very patient and calm in teaching, so when there’s a problem, he would face it calmly.” (Student 6)

Student 9 spoke about the instructor’s passion and immediacy of response:

“Yes. Actually, I honestly think Mr. X is a great teacher who is really competent and has passion, hence the way he teaches either in class or via synchronous learning was effective. He always checked whether the participants in the lab could understand clearly or not since he was not with us. He also gave quick responses in chat when a student asked questions.” (Student 9)

c. Technological issues

The third area on technological issues (the problem of slow network was encountered by both the instructor and students in all three semesters) covered web conference functions and mobile learning. All participants in the October 2012 semester preferred the use of chat over audio and most have found the recording useful. Some students suggest the use of iPads:

“Chat and recording. Chat allows others to visually see the questions and answers. Recording allows a channel to check back on the lesson.” (Student 1)

“I like chat the most. I don’t like the audio aspect as in we (the students) who have to speak via microphone.” (Student 3)

“If possible using tablet like iPad.” (Student 9)

Pedagogical Patterns

A set of pedagogical patterns for web conferencing was developed iteratively as a result of learning from each phase of the action research undertaken. These patterns are highlighted in Table 10.
Table 10

Iterative Pedagogical Patterns

<table>
<thead>
<tr>
<th>Semester</th>
<th>Pedagogical Patterns</th>
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</table>
| October 2012| • Conducted all web-conferencing sessions with the webcam switched on for authentic learning (for all three semesters).  
• Conducted Orientation with (1) system demonstration and (2) etiquette briefing.  
• Provided personal attention to participants by calling their names.  
• Replicated face-to-face lecturing and tutorial in web conferencing.  
• Uploaded learning contents to Whiteboard as static PPT files.  
• Experimented with Application Sharing for lab demonstrations.  
• Made compulsory audio-presentation by students. |
| January 2013| • Conducted Orientation with (1) system demonstration, (2) etiquette briefing, and (3) free practice.  
• Kept lecturing in web conferencing to a minimum.  
• Focused on facilitating one or two learning activities only.  
• Created a safe and respectful environment for learning.  
• Used “camera/copy/paste” function to build contents on Whiteboard.  
• Conducted tutorial discussions with past examination questions early in the semester.  
• Set interactive tutorial questions and encouraged students to participate by writing/drawing on the Whiteboard.  
• Conducted all lab demonstrations using Application Sharing.  
• Introduced pre-recorded activity as part of the lesson delivery.  
• Encouraged students to use audio but did not make it compulsory. |
| April 2013  | • Continued with the pedagogical practice of January 2013 plus:  
• Included examination briefing with recording as part of the learning activities.  
• Reduced instructor and student login time.  
• Introduced the Personal Learning Assistant for mobile learning. |

Pedagogical Model

A possible pedagogical model for web conferencing would entail a shift from lecture-style presentation to activity-based facilitation and demonstration as highlighted in the above pedagogical patterns. Building a personal connection (through addressing each student by his/her full name) with the students online and encouraging them to express themselves (using chat, whiteboard, polling, emoticons, and audio) in web conferencing are among the strategies that should also be included in the recommended pedagogical model (see Figure 7).
In terms of student achievement, the results indicated no difference between students experiencing web conferencing and those opted for face-to-face learning for both the October 2012 and January 2013 semesters. However, the April 2013 students who learned under a web conference environment performed better than their face-to-face counterparts. The inclusion of examination-based activities with recording for web conference students appeared to be the contributing factor behind their better performance. A comprehensive discussion on pedagogy is covered in the next section.

CONCLUSION

Overall, this study has examined the theoretical position in relation to both the technological and pedagogical aspects of web conferencing. In terms of technology implementation, the Blackboard Collaborate web conference system was found to be quite easy to implement at UniSIM because it is a cloud-based system. The major advantage of adopting a cloud-based
system is that no hardware equipment is required. However, the experience learned from this study revealed that system availability and accessibility are the biggest challenges that could hinder implementation. Continuous testing was the key factor behind the successful implementation of synchronous web conferencing at UniSIM. In particular, for each lesson that involved web conferencing, the system was tested with a lesson plan and learning contents uploaded. Overall, the web-conference system had functioned well and all the students who took part in the study were able to use it in the labs at UniSIM except when the network became slow, at times, which affected students’ learning experience.

Regarding pedagogy, the lesson learned from this study is the importance of orientation, which was necessary in order to provide students with proper learning time to familiarize themselves with the various functions (e.g. chat, hand-raising, and audio) provided by the web conference system. As revealed in the study, the orientation should include both demonstration and hands-on practice of “how to learn” in a web conference environment. From the instructor’s perspective, he/she needed to create a safe and respectful learning environment by getting the balance right between social and teaching presence. Social presence was achieved through empathy with the students about their anxiety with web conference learning, while teaching presence was created through the use of the webcam with recording and focusing on the teaching and facilitation of planned learning activities. The study also found that coverage of examination-related activities was particularly welcomed by the students. In short, these pedagogical practices are not new and they are transferrable between synchronous-online and face-to-face teaching except, in the former environment, students’ learning experience is enhanced by technology, if the system is implemented properly.

Finally, a key feature of the pedagogical model for web conferencing is reflection. As highlighted by the pedagogical patterns obtained from three cycles of action research, documenting the problems and successes encountered in each web conference session on a reflective journal was practiced by the instructor. Extending the practice of reflection from instructor to students would help them to become reflective learners.
REFERENCES


Author

Dr YEUNG Sze Kiu is a Senior Lecturer who works in SIM University's Learning Services department. He recently completed his doctoral studies in Distance Education with Athabasca University. Sze Kiu's research interests include synchronous-online technologies and the pedagogical practices that support
teaching and learning in this kind of technological environment. At SIM University, Sze Kiu teaches and writes courses relating to information systems.