Teaching Using Webinars in Science and Technology Courses

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Abstract - E-learning is now so pervasive that many people think that it is easy to deliver e-learning courses to students. Unfortunately, the reality is very different. This paper gives an account of one e-learning approach which the School of Science and Technology (SST) of the SIM University of Singapore introduced in order to gradually do away with the usual lectures. Didactic teaching using lectures is not that effective with our working adult students because of factors like our students having to rush to classes after their work and the absence of any lecture video recording. By introducing the use of web conferencing software, e.g., WebEx, the SST hopes to encourage independent and self-directed learning by our students. The SST started using the WebEx software to conduct webinars to our students early this year.

Since then, we have acquired some experiences and obtained feedback from our teaching faculty members, our students and our technical supporting staff members. The purpose of this paper is to discuss the use of web conferencing software as an e-learning tool for teaching and learning purposes. This paper will examine what works and does not work well for both the teaching staff members and the students. Certain courses are ideal to be delivered using the webinar approach whilst other courses are unsuitable. Feedback from both the teaching staff members and our students will be discussed. Other than the webinars, the SST also emphasizes active learning during the face-to-face teaching. We need to use the face-to-face approach especially for Science and Technology courses. In developing an effective course, we need to balance the need to have more e-learning courses and the need to have good practical experiences by our students.

Keywords - Web Conferencing, Webinar, Didactic Teaching, Effective Teaching, Self-Directed Learning

1. INTRODUCTION

The purpose of this paper is to discuss the use of web conferencing software as an e-learning tool for teaching and learning. This paper will examine what works and does not work well for both the teaching staff members and the students. Certain courses are ideal to be delivered using the webinar approach whilst other courses are unsuitable. Feedback from both the teaching staff members and our students will be discussed.

A webinar is a seminar which is conducted over the web and the presenter uses a web conferencing software [1]. Participants in a webinar need not be present physically in the same place as the presenter. Unlike an actual video conference, the presenter does not need a technical team in order to launch the webinar. Using a web conferencing software like WebEx from CISCO [2], the webinar presenter can conduct his presentation as well as answer questions from the participants. All he needs is a laptop (with an in-built web camera), a headset with an in-built microphone.

The School of Science and Technology (SST) of the SIM University decided to use webinars to deliver some of the lectures in some courses. One reason for this lecture...
delivery mode is that by resorting to webinars, we make it easier for our working adult students to attend the lectures without having to attend the lectures physically by themselves. Our students normally have to rush to the lecture theatre to listen to the lectures. Even then many of them would be quite tired and their concentration levels would be affected.

SST has a mandate. This mandate requires us to have 50% of all our courses conducted using e-learning approach by 2015. As such, we strategized to have the following targets achieved on a year-to-year basis:

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>14</td>
<td>29</td>
<td>49</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 1

E-learning Targets (%)

SST has a total of 13 undergraduate programmes. Each programme has many different courses. There are a total of 306 courses in all the 13 programmes [3].

Most of our courses are structured in credit units (cu). For example, a 5-cu course normally lasts 6 weeks with a 3-hour seminar conducted every week. In total, a student taking a 5-cu course will have 18 hours (3 hours x 6 weeks) of contact time with the instructor or lecturer.

Typically, a basic Bachelor’s degree requires the completion of 130 credit units; an Honours degree requires the completion of 170 credit units [4].

2. THE WEBINAR PLAN

Previously we have our instructors or lecturers lecture to the students for 3 hours over a period of 6 weeks for a 5-cu course. However, with the e-learning plan, we will have to have half of the course conducted in the eLearning method.

As shown in Figure 1, we plan to phase in webinars gradually over the next three years. So, for a particular course, say, BPM103 (Management of Projects), we will have only one of the 6 sessions conducted using a webinar for the year 2012. The other 5 sessions will still be conducted in the normal face-to-face method.

Subsequently, the number of webinars will increase to two times out of the six sessions when the course is conducted in 2013. By the year 2014, we will have three webinars and three face-to-face sessions. This will satisfy our requirement of achieving 50% of having our courses conducted in the e-learning format by 2015.

At the same time, the SST also introduces active learning [5] during the face-to-face teaching. Active learning is a teaching method that involves students in the learning process rather than seeing them as passive recipients. Students learn best by doing. The purpose of active learning is to improve students’ comprehension, retention and overall learning. Active learning applies to both online and face-to-face courses.

3. EQUIPMENT AND PREPARATIONS

Conducting a webinar does not require much equipment. In our case, we purchased the USB-based headphone set with attached microphone and a web camera for each laptop we intend to use for training and lecture delivery. We did not provide any equipment for our students to use. As equipment like the headphone, microphone and web camera are very affordable nowadays, we feel that the
students can afford them. In addition, many laptop computers now come with the attached web camera and their in-built loudspeakers and microphones are generally of good quality.

As for the web conferencing software, we purchased two types of licenses from WebEx, CISCO [6]. These are for the training type of license and the other one is for use during meetings. In addition, we conducted several training sessions for both the instructors and the students. These were usually held on Saturday mornings.

As for the WebEx licensing costs, these amounted to USD$530.00 per month for 100 participants using the Training Centre Service mode. The other mode is the Meeting Service which is meant for small group meetings. The licensing fee for the Meeting Service mode is USD$59.00 for 25 participants.

As many of our Associate Faculty staff members were doing the webinars for the first time, we got them to make their webinar presentations either in a staff room or seminar room. By doing so, we were able to provide technical and coaching help should the need arise.

4. THE EXECUTION

Table 2 below gives a listing of the various courses in the different undergraduate programmes that were conducted partially using webinars.

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Prac Code</th>
<th>Programme Name</th>
<th>Fif 12</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>BSCS</td>
<td>Artificial</td>
<td>BAS101</td>
<td>48</td>
</tr>
<tr>
<td>3</td>
<td>BSEE</td>
<td>Biomedical</td>
<td>BME109</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>BSED</td>
<td>Environment</td>
<td>BME109</td>
<td>133</td>
</tr>
<tr>
<td>6</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>BSCS</td>
<td>Artificial</td>
<td>BAS101</td>
<td>51</td>
</tr>
<tr>
<td>8</td>
<td>BSE</td>
<td>Vehicle</td>
<td>BME109</td>
<td>51</td>
</tr>
<tr>
<td>9</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>51</td>
</tr>
<tr>
<td>11</td>
<td>BOST</td>
<td>Information</td>
<td>201020</td>
<td>25</td>
</tr>
</tbody>
</table>

Table II
Listing of courses with webinars conducted

Each of the courses listed in Table 2 was of the 5-cu type. This means that out of the 6 sessions, only one of the sessions was conducted using the webinar approach. As shown in Figure 1 above, the instructors in these courses will increase the number of webinars to 2 for next year and then to 3 for the year 2014. These courses were all conducted between July 2012 and September 2012.

5. DIFFICULTIES AND FEEDBACK

Several difficulties were encountered when the webinars were rolled out to the students. Most of the difficulties were due to the unfamiliarity of the webinar platform by our instructors. The following were some of the difficulties encountered:

- Audio setup on the laptop computer
- YouTube video and audio could not be heard when the desktop was shared
- WebEx session crashed unexpectedly
- Showing of practical examples on white board but the webcam could not zoom in
- Difficult to use a Tablet PC
- Students posting question to instructor in “private” mode instead of “all participants”
- PDF file shared in WebEx was 90 degrees anti-clockwise and slanted
- Questions posted by students were not clear and pictures used were too small for students to see

The second type of difficulties was of the pedagogical type. As there was no face-to-face contact with the students in a webinar, the instructor found it difficult to teach a lesson over the web. This is where some briefing on how to reach out to students in a webinar would be helpful. Here are some examples [7]:

i. Test all the equipment before you start the webinar
ii. Introduce yourself before you start the lecture properly
iii. Get to know who your students are (if the class is small)
iv. Have a rehearsal before the actual
webinar
v. Pose questions frequently to the students
vi. Have a short break after speaking for about 45 minutes. vii. Use more visuals
viii. Highlight what you want people to look at on the slides
ix. Avoid slides that you only want to show for a few seconds
x. Have a photo of yourself near the beginning
xi. Conduct the webinar is a quiet room xii. Let people know when you are going to be silent

In a recent webinar conducted by the author, he managed to obtain some qualitative feedback from his class of 10 students. The background of the class is as follows:

• There were 10 students in the course on Information Systems-Role in Organizations and Business.
• All the students were working in the day time and they attend classes from 7 pm to 10 pm.
• All of them were Polytechnic Diploma holders.
• Except for one lady student, the other nine students were all males.
• All of them are competent in using the PC and the Internet

Generally, the feedback from the students has been good. Feedback from the students was gathered using an online survey system based on opinions on the following topics:

i. The learning environment provides real-time instructor-led virtual classroom sessions as if it is in the face-to-face classroom
ii. The learning environment supports student-centred learning which facilitates deep learning
iii. The various interactions between instructor and students; students and students; and students and content are helpful for knowledge construction
iv. The learning activities in this virtual classroom encourage collaborative learning
v. The PowerPoint presentations with detailed instructor explanations are useful for my learning
vi. I can use the platform to post questions and get instant feedback from instructor and students
vii. I can understand the lessons better through projection of visuals (such as still graphics and audio broadcasts)
viii. I prefer virtual classroom than face-to-face classroom
ix. I am able to communicate and collaborate in real time with other participants using either text chat, voice or video
x. I feel comfortable to communicate my thoughts with other participants
xi. I feel safe to interact with other participants
xii. The ground rules for communication and collaboration are clear
xiii. It is easy to use xiv. It is easy to access
xv. It supports file sharing
xvi. It enables sharing of desktop applications
xvii. It enables recording of the virtual classroom session that can be viewed in an asynchronous mode xviii. I don't have any technical difficulties
xix. Help from technical support is sufficient

The following diagrams gave some graphic representations of the qualitative feedback from the students.

The learning environment provides real-time instructor-led virtual classroom sessions as if it is in the face-to-face classroom

Fig 2. Learning environment for webinar - 1
6. WEBINARS FOR SCIENCE & TECHNOLOGY COURSES

Webinars are especially useful when you have working adult students who do not need to attend face-to-face meetings regularly. Webinars are also useful when you have much information to disseminate and discussions and collaborations can be kept to a minimum. As such, webinars are ideal especially for introductory undergraduate courses. Webinars are also useful when either the instructor or the students may not be in the same place all the time.

However, webinars may pose some difficulties especially when there is a need to zoom into some objects for closer study or when the instructor needs to show some live demonstrations. Although these can be done, nevertheless one has to have a skilled video technician to manipulate the video camera. In such cases, it is better to pre-capture all the different scenes or demonstrations before the actual webinar is conducted.
7. CONCLUSION

This paper presents a model for incorporating webinars into the normal teaching and learning activities for undergraduate courses. Our experiences using the webinars to teach Science and Technology courses show that there are many advantages and some difficulties in using webinars to teach Science and Technology courses. Although the instructional strategy is mostly didactic in pedagogy, the webinar nevertheless makes it convenient for both the instructor and the student. Even those students who were not able to attend the webinar can retrieve the recorded webinar and go through the lesson.

As for the future, the SST intends to expand the usage of webinars to activities other than teaching and learning. We intend to use webinars for meetings with our associate staff members, for our outreach activities and for technical talks to the public.

REFERENCES