Implementing Electronic Conferencing Within A Distance-Based University: University Of South Africa Case Study

E. Kritzinger, University of South Africa, South Africa
K. Padayachee, University of South Africa, South Africa
M. Tolmay, University of South Africa, South Africa

ABSTRACT

The outcome of this paper is primarily to survey and analyse student interactions with electronic conferencing systems and to reflect on the impact of such a system on the students' learning within an open distance learning context. This pilot study is articulated within action research methodology to generate critical reflection on collaborative, online environments such as electronic conferencing systems for teaching and learning. This study aims to assess the benefits and feasibility of integrating such a system within the University of South Africa's (UNISA) current organisational structure. These results are intended to generate debate and further research within the university into possible evolution in practice within the institution that would address contemporary learning needs of students. As this was a feasibility study, a comparative study of the current tools available for electronic conferencing was warranted. The findings of this study may be used as a basis for further investigation on the challenges that might face the university if online learning were to be implemented. The success of the online conference is nevertheless significant within the context of the University of South Africa. It provides the opportunity to re-examine the current print-based delivery system, and to devise strategies and solutions to significantly increase the quality of learning within the organisation.

Keywords: electronic learning, electronic conferencing, distance based education, university

INTRODUCTION

The pressures and challenges of integrating new technologies and methods of instruction into a South African university are outweighed by the growing competition from virtual and corporate universities. Virtual universities mimic the traditional university, while corporate universities provide just-in-time training to the staff of multinational corporations. These competitors have become global in the sense that a South African learner can now enrol in an online university based in a different country such as the United States of America (Heydenrych, 2003).

The University of South Africa (UNISA) is South Africa's largest distance-based university and it is currently faced with the challenge of evolving its culture to accommodate newly available products and services in order to compete with international distance-based universities. A higher education institute can transform itself into a competitive education business without having to make major modifications to its obsolete teaching practice, by making use of new communication technologies. Institutions cannot remain undisturbed by these pressures, and changes in practice could allow UNISA to gain a comfortable niche in the market. Universities and other organisations that choose to incorporate e-learning may influence the student's decision as to where to study. This may influence student enrolment numbers and attract students (Peterson, 2001).

UNISA has an established form of correspondence studies as a mode of education. This is a single-medium mode of print-based correspondence in which the learners have access to course material and online assignment

submission systems. Print-based systems are the foundation of distance education and the basis from which all other delivery systems have evolved. Within this form of delivery the print material is sent and returned to the students by mail, and print material remains a significant component of all distance education programmes. Print based delivery is an easy to use, cost-effective delivery system that does not require sophisticated presentation equipment.

This delivery method, however, precludes feedback and interaction and is dependent on the student's reading ability. Numerous studies have shown that a learner requires more motivation to complete print-based courses owing to their passive nature. It is therefore essential that a distance-based university such as UNISA incorporate a variety of media to enhance its learners' knowledge of the course material.

The outcome of this paper is to primarily survey and analyse student interactions with electronic conferencing systems and to reflect on such a system's influence on the students' learning within an open distance-learning context. We isolated one specific module within the School of Computing to perform this survey. Currently, the School of Computing at UNISA does not facilitate any form of multimedia communication to assist students' understanding of their course work. This is particularly a problem with practical courses such as that in programming languages like C++ , where the failure rate is particularly high. We considered integrating electronic learning to assist students in the understanding of their course work for a first year programming module as a means of improving the throughput of students who are enrolled for programming modules.

E-LEARNING AND E-CONFERENCING

E-learning incorporates any form of learning which is electronic in nature; this includes audio, video and resource sharing. According to Allen (2003), e-learning:

- allows a student to individualise the pace at which he/she covers the material
- allows active participation, because e-learners are continuously active, as opposed to working in a classroom where they may participate only on occasion
- is independent of time and location

According to McCrea et al. (2000), e-learning addresses specific needs found in industry as well as in academia. These needs include:

- The need for organisational competency, as it provides employees with competency roadmaps
- The need to distribute latent knowledge
- The need to align the business objectives and learning outcomes
- The need to provide on-demand resources and training services
- The need to access these resources and services globally

E-learning could be globally implemented owing to the increasing availability of the internet in most homes and businesses. Improvements in bandwidth and better e-learning platforms make it increasingly more attractive and feasible. A rapidly growing number of organisations worldwide are currently using the internet to train and educate their staff and students. According to Capper (2002), there are an estimated ten million online courses available from over 700 e-learning companies. The Massachusetts Institute of Technology (MIT) already makes its syllabi for all its courses available online for anyone enrolled in the course to use. The Virtual University in Monterey provides a year-long course for in-service teachers through the use of satellite television or the internet, and has been delivering online courses since 1989.

According to Leem & Lim (2007), 85% of Korean universities are already implementing forms of e-learning. Of the large national public schools, 95.2% are implementing e-learning, and 75% of these universities offer support for cyber classes, which allows students at a university level to attend lecturers online.

E-learning covers a wide range of concepts such as web-based learning, computer-based learning, virtual classrooms, digital collaboration and electronic conferencing (e-conferencing). This paper focuses on e-

conferencing. An e-conference is a structured discussion that takes place via a computer-mediated form of communication, usually over the internet. E-conferences are less expensive to organise and less expensive to attend than face-to-face conferencing. They bring together participants from all around the world to discuss present problems or situations (Johnson, 2003). People use e-conferencing through a variety of software applications, and for various reasons. E-conferencing utilises various e-conferencing tools and techniques that can be used along with the established principles of effective e-conferencing.

When using e-conferencing, the user needs to be able to access a full set of collaboration features while being able to talk and present to an online audience. Good (2007) outlines the general tool characteristics of web conferencing:

- Downloadable Software is where participants would have to download specific software to make use of the system's functionality.
- Text Chat is a real-time text-based chat facility allowing for synchronous communication among multiple users.
- Voice Over IP is a full-duplex system that allows for synchronous audio conversation via the internet.
- Screen Sharing is the ability for a participant to share the contents of his/her screen with other participants in real time.
- Co-Browsing allows multiple participants to collaboratively browse web pages.
- Presentation facility allows the delivery of PowerPoint slides to an online audience.
- Whiteboard is an empty canvas to display pictures, documents or diagrams and annotate over them in real time.
- Video is the ability to present multiple participants through the use of web cams in real time.
- Recording is the ability to record the proceedings of web conferencing in real time.

The primary focus of this research study is to investigate how effective e-conferencing could be if implemented within a distance educational environment.

THE RESEARCH STUDY

The population of this study consisted of students selected from the University of South Africa (UNISA) who were interested in exploring e-conferencing. Students were contacted via an e-mail which requested their participation; however, not all the students that responded were incorporated in the study because of equipment and skill requirements. The population of this study was made up of students across the country of South Africa, as well as a select few from Rwanda and Portugal who were currently studying a first-year Computer Science programming course in C++ at UNISA. The study was made available as an optional lecture for students who wanted to find out more about this form of e-learning. As the content of the study was a lecture on items currently being studied by the students, it allowed them to gain a better understanding of the course material. Fifteen participants were involved in this study, selected on the basis of having the required equipment for the study. As this was a pilot study, the selection had to be restricted to cater for possible unknown variables that might impact on the study.

The following were taken into consideration:

- Students might be novice computer users.
- The bandwidth capabilities might vary between students.
- There would be a variety of computer configurations.
- There might be a difference in software such as operating systems, internet browsers, etc.

This research study consisted of two parts. The first part incorporated a comparison between two e-conferencing applications, Convenos Meeting Center and Microsoft® Live Meeting. Each of these applications will be briefly investigated.

E-Conferencing Applications

The audio of the two systems mentioned above would be run through Skype 3.0 program. This is a simple Voice over IP program that allows for conference calls between multiple users. The students would have to install this application, which would allow them to be added into the conference call for the lecture.

Convenos Meeting Center

Convenos Meeting Center is an independent software application that allows a user to collaborate online with others in an easy and efficient way. This application provides the following services:

- Application sharing
- Collaborative document browsing
- Whiteboard functionality
- Collaborative web browsing
- Collaborative media sharing
- Public and private communications between attendees

Attendees are invited to a meeting via a website link which takes them into the Convenos Meeting Center, which first allows them to download and install the required software. A demo of this software can be found at: http://www.convenos.com/solutions_demo.html#.
Microsoft® Office Live Meeting

The second e-conferencing application used was Microsoft® Office Live Meeting, which is an innovative service-based web conferencing tool, provided by Microsoft®. Live Meeting is an integrated, interactive, and easy to use web conferencing tool with a similar look to the rest of the Microsoft suite. Live Meeting users can take advantage of existing Microsoft tools, such as Word, Excel, Access, etc, which gives the product great functionality. As well as allowing the user to integrate with existing Microsoft products, Live Meeting provides a range of interactive tools such as (Microsoft, 2007):

- The main window of the application allows for the choice of:
  - document viewer
  - PowerPoint viewer
  - collaborative web browsing
  - application and desktop sharing
  - whiteboard functionality

These are controlled using the resources toolbox, which allows the user to switch between the above functionalities.

- The participants can chat between one another using a chat function in the menu bar.
- The instructor can manage the attendees using the Attendees toolbox at the bottom left of the screen.
- The seating chart toolbox indicates the seating of the attendees.
- The Question and Answers toolbox at the bottom right of the screen allows the attendees to pose questions to the instructor.

Comparison

As pointed out above, the two software applications used for the presentation of the lecture were Microsoft® Live Meeting, and Convenos Meeting Center. Both of these applications incorporated similar functions such as PowerPoint slide viewing, collaborative web browsing, and media and application sharing. Once the applications were installed they both performed quite well, but it was the setup process that distinguished the two. With Microsoft®Live Meeting it was considerably easier to set up a meeting and invite attendees. With the

Convenos System, the participants were forced to download and install a large file to enable them to enter into the meeting. The Convenos System also took a much longer time to load than did the Microsoft version. The Convenos Meeting Center did not offer collaborative audio conferencing, while the Microsoft Online Meeting only allowed for audio conferencing through the use of land-based telephone lines in the United States. This necessitated the use of a third-party Voice-over-IP audio conferencing software known as Skype to enable all participants of the sessions to engage in conversation collaboratively.

After comparing the two applications, it was decided to use Microsoft® Live Meeting for the research project, with the following parameters. Each participant should have:

- an ADSL or dial-up internet connection
- a computer with a 2.8GHZ processor or larger
- a computer of 512Mb of RAM or more
- computer literacy

There was one lecture that was repeated five times at different dates and times. This was done because of time constraints of the instructor and students; it was impossible to find a time when all participants were available, owing to their other responsibilities. This research project used feedback and quality rate forms to obtain opinions from all the students who participated in the project.

RESEARCH RESULTS

The second part of this research project consisted of obtaining students' opinions regarding their participation in the e-conferencing. The collection of research findings was obtained through the use of both qualitative and quantitative collection methods which enabled a responsive and interesting analysis. These methods included:

- participant feedback forms that allowed the participants to articulate their opinions and concerns about specific parts of the study
- quality ratings, which allowed the participants to rate the overall performance, functionality, ease of use, and quality of the sessions

Feedback Form

The feedback forms consisted of five questions which addressed the involvement of each student within the e-conferencing environment. These five questions are depicted in Table 1.

Table 1: Feedback Form

Feedback Form	
Please answer the following questions as best you can:	
1	Have you ever taken a course using web conferencing before?
2	Did the technology help you to understand better?
3	Would you consider doing all your courses this way?
4	What would you say are the advantages of a course using video conferencing?
5	What would you say are the disadvantages of a course using video conferencing?

The results of each of these five questions will be briefly investigated to provide a better understanding of whether e-conferencing could be implemented within a distance educational environment.

The first question examined whether the students had ever participated in a course that was presented by means of e-conferencing. The result of this question is depicted in Figure 1.

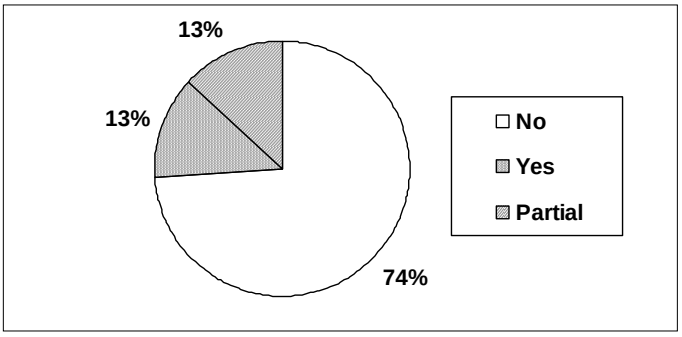

Figure 1: Have you ever taken a course using web conferencing before?

Only two of the students (13%) had ever undertaken a study of this nature, while a further two (13%) indicated a partial knowledge in the area of study. Eleven students (74%) had no prior experience with e-conferencing.

The second question investigated whether the e-conferencing helped them to understand the course work better. The result of this question is depicted in Figure 2.

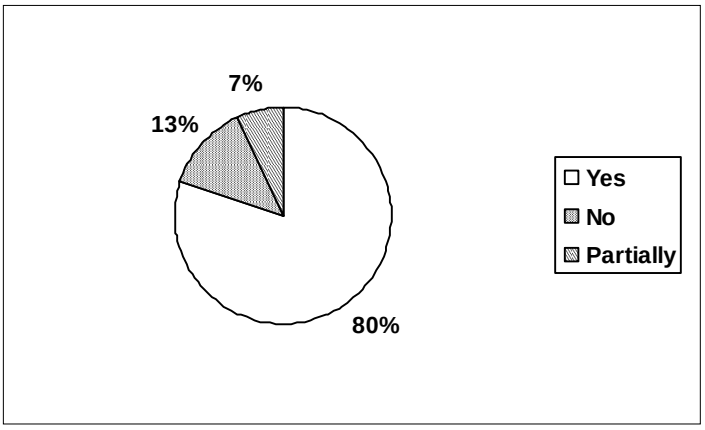

Figure 2: Did the e-conferencing help you understand the work better?

Twelve of the students (80%) responded that the e-conferencing had helped them to understand and comprehend the work better. Two students (13%) replied that it had not benefited them, while one student (7%) indicated a partial response.

The third question addressed the issue of whether the learners would consider using e-conferencing for all their enrolled subjects. The result of this question is depicted in Figure 3.

Twelve students (80%) agreed that they would use e-conferencing for all their enrolled subjects. Three students (20%) indicated that they would use e-conferencing partially for some of their subjects when they did not understand their work.

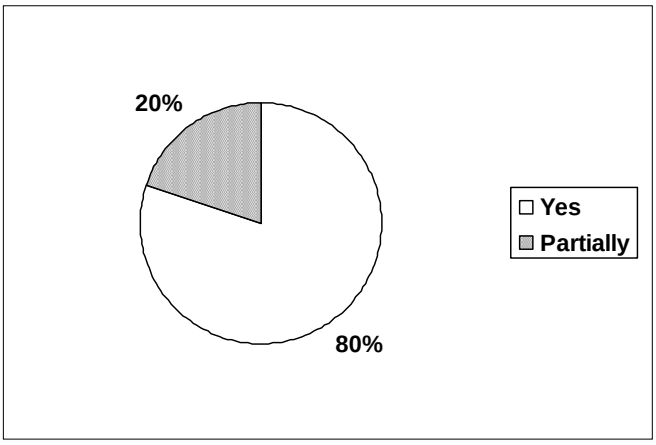

Figure 3: Would you consider using e-conferencing for all your enrolled subjects?

The fourth question investigated the advantages e-conferencing held for each student. The advantages identified by the students included:

- Accessibility of the resources aided in reducing transport time and costs.
- The use of a video feed would provide a human touch to the distance-learning environment.
- It would enable students to study at their own pace and in the convenience of their own home.
- Students were able to view examples as they were done.
- The opportunity for the students to ask questions would give them confidence when approaching the course material.
- Students have direct access to the instructor.
- Students have direct real-time interactivity with the instructor and other students.
- The method allows for selected activity; the students do not have to interact with others if it does not suit them.
- It was easy to keep track of the outcomes of the lecture.
- PowerPoint slides were easily readable.
- Some students, especially international students, feel isolated and found that this method helped them to feel included in the course.
- The discussions with the instructor and fellow students aided them in understanding the material.
- The ability to download the lecture slides helped the students if they needed further understanding.

It may seem at this stage that e-conferencing has been proved to be an effective teaching method, but we cannot ignore the fact that there are some disadvantages for the students. The participants were also asked to identify the disadvantages of video conferencing. The responses indicated the following disadvantages:

- If the quality of the video is low, students may struggle to see what is going on. But if the quality is high, many students may not have sufficient bandwidth or processing speeds to stream the video effectively.
- Bandwidth may cause another problem, as video can involve a very large data usage, and internet failures could disrupt the lectures. Students would need a considerable broadband connection in order to effectively use this technology.
- The larger the population of these online meetings, the more problems you would get, therefore a downloadable, pre-recorded lecture would be effective, or a smaller number of students at each lecture.
- Not all students have the required equipment for e-conferencing

E-Conferencing Quality Rating

In the e-conferencing quality rating section, students were able to rate six quality aspects of the applications used on a basis of 1-10, 10 being the highest rating. These included:

- Picture quality
- Audio quality
- Software: ease of use
- Software: functionality
- Classroom environment
- Overall performance

Participants rated the overall performance of the technology at 74.7%, which indicates an acceptable approach to a learning environment. The picture, ease of use, and functionality of the system each received an average rating of above 80%, which indicates a high acceptability to the participants in the usage of the system. The main problem arises with the ratings of the audio quality, which was awarded a rather low 46%. These results are depicted in Figure 4.

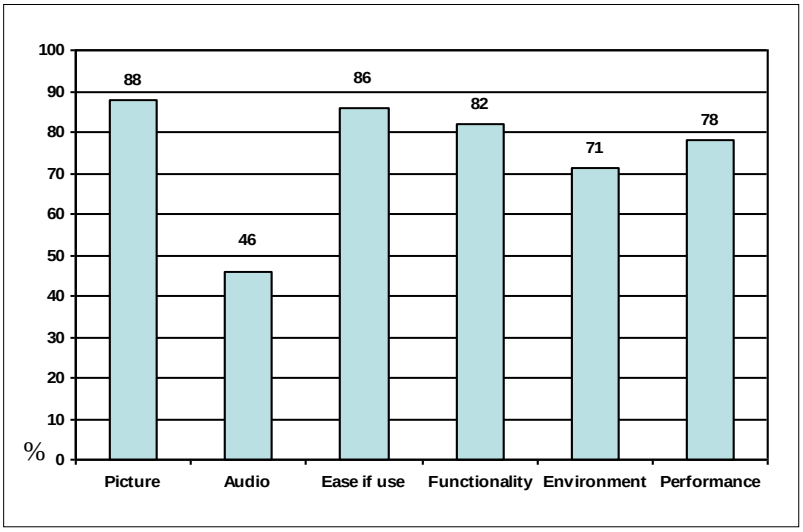

Figure 4: Graphic Depiction of Average E-conferencing Quality Ratings

The participants indicated a high response to the overall functionality of the e-conferencing technology as a good form of communication, and stated that it would be a suitable method of study if the student had access to the required equipment.

Generally the participants thought that installing and setting up the software was relatively easy, but there were a few students who struggled, and had to be individually coached through the process. These problems arose from the fact that some of the students were from distant countries, such as Portugal and Rwanda, and the downloading and installing of the software became a tedious task. Yet once the software was installed the students could enter and leave online meetings with relative ease. The participants also found the interfaces of the software applications relatively easy to understand, as well as the navigating of the functionality of the applications.

One of the major prior concerns about this research was that the method of communication would seem artificial, stifling or forced to the participants. However, they all disagreed with the statement that the technology made the class environment feel artificial, stifling or forced. These results were extremely satisfactory; however, these variables may come into play when a video feed in the lectures is incorporated, as opposed to the PowerPoint slides used in the study.

There were mixed responses to questions on how the performance of the software allowed for a responsive environment, given the bandwidth required. When a larger number of students attend a single e-lecture, this may hinder students with a slower computer or little bandwidth. This could form the basis of a future study on what capabilities would be needed by students if they were to adopt such a method of study.

During the observation of the sessions and the feedback from participants various aspects were raised that could be related to the poor audio quality rating. One of the reasons for poor audio quality may be the hardware and bandwidth of the participant's system. If the computer lacks the required processing speed to stream the audio, the participant may experience disruptions or gaps in the audio playback. These disruptions can also be caused by the lack of an adequate internet bandwidth, if a participant does not have sufficient bandwidth to buffer the audio stream received. A further hardware complication may be the quality of the microphone used by a participant; this could contribute to further disruption, or low quality of the audio. The exact requirements of the system and microphone would have to be researched further.

CONCLUSION

This paper investigated the use of e-conferencing within a distance-based university to determine whether e-learning could enhance the quality of learning. This research study identified and addressed the advantages and disadvantages of using e-conferencing. One of the advantages is to allow students to approach their work in a different way, and to gain a better understanding and knowledge of the material. Many of the disadvantages of this method were attributable to technological or functional difficulties. However, the main concept of using such a method as a teaching tool was clearly perceived as a resource that would, without doubt, enhance the learning experience of students at UNISA. These results generated within this research study could be used as a foundation for a debate within the School of Computing on possible changes in practice incorporating new technologies, such as e-conferencing tools.

This research study proved that a distance-based university could successfully implement an e-learning environment to assist learners if learners have access to the required equipment. However, further studies should be done to determine whether the majority of students enrolled at UNISA do have access to the required equipment. In fact, many students wanted to participate in the research project, but were excluded on the basis of not having access to the required equipment.

REFERENCES

1. Allen, WM 2003, *Michael Allen's Guide to E-Learning: Building Interactive, Fun, and Effective Learning Programs for Any Company*, John Wiley& Sons Inc, Hoboken, New Jersey.
2. Capper J, 2002. E-Learning: Current Status and international experience. World Bank Consultant.
3. Good R, 2007. Web conferencing Tools and Technology: A Mini-Guide. Kolabora database. Retrieved 27th June, 2007, from http://www.kolabora.com/news/2007/06/22/web_conferencing_tools_and_technology.
4. Heydenrych JF, 2003. Changing practices and systems: Implementing the online learning community at the University of South Africa. Doctor of Education. University of South Africa.
5. Johnson N, 2003. E-Conferencing. INCLEN Leadership & Management Program. Module 6. Version 1.
6. Leem J, & Lim B, 2007. The Current Status of e-Learning and Strategies to Enhance Educational Competitiveness in Korean Higher Education. *International Review of Research in Open and Distance Learning*. Vol. 8, No. 1.
7. McCrea, F, Gay, RK, Bacon, R 2000, Riding the big waves: A white paper on B2B e-learning industry, Thomas Weisel Partners LLC, San Francisco.
8. Microsoft, 2007. Microsoft Office Live Meeting. Retrieved July 02, from http://office.microsoft.com/en-gb/livemeeting/FX101729061033.aspx.
9. Peterson C, 2001. The impacts of technology on Interactivity in a Distance learning Course. Department of Technology education. West Virginia University.

NOTES