Evaluating staff development and training models to support the implementation of videoconferencing technology for teaching and learning in a distributed University

John T Burns
De Montfort University UK

Key words: *Videoconferencing, staff development, teaching and learning, virtual learning environments*

Abstract:

Within education, videoconference systems appear to provide a number of benefits. Researchers however have identified that there are a number of issues that need to be addressed if videoconferencing is to be used effectively. One of the most important factors identified by researchers is the need for staff training.

Whilst there have been a number of national & international initiatives to develop a range of staff development materials for the effective use of videoconferencing, there is little evidence of any attempt being made to evaluate the form of training which is the most appropriate and effective.

The objective of this paper is to present the findings of a research project, which attempted to evaluate the effectiveness of different approaches to staff development.

1.0 Background

De Montfort University is a large distributed organisation offering programmes of study to students at three centres in the UK. In addition, the University has entered into partnership with an education institute in the Far East to provide undergraduate and postgraduate courses. Against this background, senior management saw the potential to make use of videoconferencing to support the management and delivery of these particular courses. The adoption of videoconferencing into the programmes meant that the institution needed to develop new flexible models in course management and teaching and learning.

Videoconferencing is not a new concept, within the commercial context, manufacturers of videoconferencing systems highlight their potential to increase collaboration and reduce travel. Within the field of education, whilst videoconference systems appear to also provide the potential to, reach a wider student audience, offer greater flexibility, make use of scarce expertise and enhance communication channels between remote groups of learners and their tutors, its use within an educational context is still not well understood.

Researchers have identified that, whilst there is considerable potential there are a number of issues that need to be addressed if videoconferencing is to be used effectively. One of the most important critical success factors identified by researchers is the need for staff training and awareness. (Burns J T et al 2000, Higginson 1998, McKillop & Lee 1998.). , Wagner (1993) reports that tutors need improved presentation skills and Riebold (1995) states that teaching styles need to be adapted to videoconferencing.

In response to this published research, there have been a number of national & international initiatives to promote awareness of the technology and develop a range of staff development materials for the effective use of videoconferencing in teaching and learning. These include guidelines (Burns J T et al 1999, Coventry, L 1995), videotapes (UKERNA 1999) and a combination of study manuals and videotapes. (SAVIE - Fraeters H et al 1997).

However, in spite of the range of support materials available, there is little evidence of any attempt being made to evaluate the form of training most appropriate for staff . In an earlier study Bennett et al identified that a range of training strategies were available to tutors. Two types of training that tutors considered would be the most useful were a guidelines booklet on using the technology and a training course on using the technology. (Bennett Burns et al 1997)

A key objective of the project was to evaluate two particular training strategies. The first training strategy required the tutors to use published training materials. Based on our previous experience the project also introduced a new approach that we have provisionally labelled the 'consultative' approach. The value of the project lies in its potential to ascertain whether the different types of training materials already in existence can be used to enhance the effectiveness of learning via videoconferencing.

Analysis of the results reveals a relationship between the students' perception of the success of the videoconference sessions and the level and types of training that the tutors had received. The study also demonstrates that the provision of training, of any form, cannot always compensate for deficiencies in the

technical capabilities and characteristics of the technology and the environment in which it is being used.

2.0 Research Methodology

For the purpose of the study two groups of students who were to have part of their degree programme supported by videoconferencing were identified. The first group consisted of 52 Malaysian students studying for a BSc Computer Science Degree and the second group were 40 Singaporean students studying for a Masters degree in Computing.

The model for delivery on each of these programmes is similar. Typically this consisted of students having two initial 2 hour sessions via videoconferencing followed by 18 hours of direct face to face lectures and finally two x 2-hour sessions when the lecturer is back in the UK. Between the start of the programme in September and the end of the programme in June, a sample of students was asked to complete a questionnaire. The questionnaire was to be completed at the end of one of the initial videoconference sessions and also for one of the final videoconference sessions. This was to be done for each of the modules that were delivered by the tutors who were involved in the project and who had received some form of training.

The questionnaire was designed to capture the student's views on the educational aspects of the session, including characteristics of the teaching and their overall impression about the effectiveness of the session. The questionnaire included a mix of open-ended questions and rating scales in order to gather as much information as possible.

As stated above two training strategies for the tutors were adopted.

2.1 Training strategy 1

Some time before their initial videoconference sessions, a total of 5 tutors were provided with a set of guidelines. Two of the tutors were also provided with the UKERNA video and another two were given the SAVIE video and study material. They were asked to use these to help them prepare for their videoconference sessions. A particular attraction of this strategy was that it uses training material readily available and it is in a format which is readily accessible to the tutors, thus providing greater flexibility regarding how and when the material can be studied.

2.2 Training strategy 2

Prior to each tutors final videoconference sessions two of the tutors received further training. This was in the form of individual support and guidance on how to plan and adapt their lectures and teaching style for delivery via videoconferencing. For each of the two-hour lectures they were given one hour of support by an experienced tutor who had specialist knowledge in the effective use of videoconferencing for teaching and learning.

The final part of the methodology involved a structured interview with the tutors after they had completed their module. This approach was taken as it would enable information that the tutors considered to be highly relevant to be documented. It would also enable the researcher to explore particular issues that might arise in further depth.

The interview was designed to focus on issues such as the teaching style adopted, the level of interaction they obtained and their overall satisfaction with the level obtained. They were also asked to comment on the mode of training they had received and how appropriate or useful they considered it to be. Questions were also asked about aspects of the technology that they found useful or difficult to use in a teaching and learning environment. They were also asked to indicate whether they made use of other forms of information and communication technologies and, if so, how and to what extent they relied on these. Finally they were asked to comment on what they considered the main benefits and disadvantages of having to delivery their module in this way and whether they considered that the students had been disadvantaged in any way.

3.0 The Technical environment

Although the study is largely concerned with evaluating staff development and training models, previous studies have shown that the technology and the environment in which it is used can present barriers to the effective use of videoconferencing for teaching and learning. (Burns J T & Lander R 2000). For this reason the technical environment of the centres in Malaysia and Singapore are described below. This will enable the discussion on the results of the study and the effectiveness of the chosen training strategies to be considered from both a technical, pedagogical and environmental perspective.

Each of the three sites was equipped with Picturetel compatible equipment. Picturetel equipment had been selected for use at De Montfort, to deliver modules between its sites in UK. At the time of its implementation for this purpose, an evaluation of the equipment indicated that it offered the best quality at the lowest bandwidth and could provide high quality audio and video using up to 12 channels at standard transmission speeds of 64kb/s over Integrated Services Digital Network. (ISDN). In practice 6 channels

were used. At this level, high quality audio and video can be obtained.

Due to the relatively high costs of transmitting over ISDN, and the higher cost of transmitting to the Far East, most of the international conferences are conducted using only 2 x 64Kbps (128Kbps) channels. An initial evaluation of the equipment had indicated that operating at this level could provide satisfactory sound and picture quality.

Systems compatible with the equipment installed at De Montfort were purchased and installed in Malaysia and Singapore. Details of the equipment used at each of the overseas sites and the design characteristics of the room and the environment are described below.

3.1 The Videoconference room and facilities at Singapore

Teaching in Singapore took place in a normal classroom containing long tables and chairs, divided into 3 sections with 5 rows each. Each table seats a maximum of 4 students. No specific modifications were made to the layout of the room and the tables and chairs were typical of those found in this type of environment thus, there was no tiered seating for the participants.

The room is air-conditioned and the walls are painted white. No curtains are installed. Standard diffused fluorescent lights, recessed into the ceiling, were used.

The incoming image is displayed by a projector onto one large projector screen at the front in the centre of the room.

There are a total of 4 microphones. Three are handheld, cordless, and one is for 360 degree

use, with limited range of voice pick up.

The videoconference equipment used is a Codec RSI video flyer that can support a maximum of 3 channels at 64Kb/s.

There is no additional equipment in the room though a video-pc interface facility is available but not used.

3.2 The Videoconference room and facilities at Malaysia

The teaching room in Malaysia was also a normal classroom. A particular feature of this room was that it was long and thin. Once again there was no tiered seating, the tables and chairs were typical of those found in a normal classroom.

The room was air conditioned and there was a sliding curtain along one wall which could be drawn to block the light coming in through the windows. Standard diffused fluorescent lights, recessed into the ceiling, were used.

The incoming image is displayed by a projector onto one large projector screen (8 feet x 8 feet) at the front in the centre of the room.

There are a total of 3 microphones. One unit is a handheld cordless microphone, the other two are table top microphones with a limited range of voice pick up.

The videoconference equipment used is a Codec RSI video flyer which can support 3 channels at 64Kb/s.

Additional equipment in the room includes a computer, a videotape player and a fax machine.

4.0 Data Analysis

In all 10 sessions were selected for evaluation. Each of the 5 tutors presented two videoconference sessions. The tutors who received the additional individual training had their 2nd session evaluated after they had received their training. The students completed the questionnaire after each of the sessions. The table below provides details of the training that each of the five tutors who delivered the sessions had received. The figures in brackets indicate the number of student responses obtained for each of the sessions.

Table 1

Sessions/ (sample size)/Site	Tutor	Training Received
1 (10), 2 (10) Malaysia	A	G, U, I
3 (9), 4 (9) Singapore	B	G, S,
5 (9), 6 (9) Singapore	C	G, U, I

| 7 (9) 8 (9) Singapore | D | G, S, |
| 9 (15) 10 (13) Malaysia | E | G,W |

Key to Training Received

G = Guidelines

U = Ukerna Video

S = SAVIE Video & Manuals

I = Individual Training

W = Workshop

4.1 Student and Staff Responses

Analysis of the data reveals interesting results. Responses to one section of the questionnaire which asked students to rate, the extent to which they agreed or disagreed with a number of statements about the lecturers teaching style, their attempt to get interaction and the appropriateness of the teaching materials that they used shows that the average score that each lecturer obtained was always 3 or higher for each of the questions. (A six point rating scale, where a 6 corresponds to - I strongly agree and a 1 corresponds to – I strongly disagree with the statement was used).

Although there are variations between the tutors and between the sessions, this would seem to suggest that whichever training they had received it had helped them to be successful overall in these particular aspects.

Analysis of the data also points to significant variations in the overall perception of the success or otherwise of the different sessions. Analysis reveals that often the variations between the different tutors and between the different sessions presented by the same tutor where due to a mix of training, pedagogical, technical and environmental factors.

An analysis of each of the tutors' sessions is provided below together with some discussion of the factors that contributed to the overall success or failure of each particular session. An attempt is also made to ascertain reasons for any variances in the ratings that were obtained, though the small data sample does limit the extent to which strongly significant and valid interpretations can be made. For this reason, whenever possible, an attempt has been made to support the analysis of the quantitative data with the qualitative data that was also obtained.

4.1.1 Tutor A

In the first session conducted by Tutor A, 9/10 students stated that the overall level of interaction was unsatisfactory or very unsatisfactory. During this particular session there was a very poor connection that made it difficult for the students to hear the tutor. This severely limited the ability of the tutor to get interaction. Some of the comments that were made included the following:-

"Appreciated that the tutor tried to get interaction, but poor sound and noise inhibited this and also perhaps the tutors attempt to get interaction"

"The worst videoconference session ever"

Students overall views on being able to follow the session and whether the session had contributed to their understanding of the lecture topic were all negative.

In the second session conducted after the tutor had received individual training there was a marked improvement.

In this session 10/10 students stated that the overall level of interaction was satisfactory or very satisfactory.

However, this may not have been entirely due to the additional training that the tutor had received, as the sound and other technical problems that had been a factor in the previous session were not such a factor on this occasion, though the sound quality was still not entirely satisfactory.

Some of the comments that were made on this session included the following:-

"Much improved – much better also less technical problems"

"The tutor split us into groups and this lead to greater interaction"

"Forming groups was a good idea but still can't always hear"

" Much better but need to improve the sound"

In this particular session, the students' overall views on the tutor's attempt to get interaction, being able to follow the session and whether the session had contributed to their understanding of the lecture topic were all positive and an improvement on the first session ratings.

Table 2 below shows the average ratings the tutor received for these particular aspects for both the first and second sessions.

Table 2

Tutor A	1st Session	2nd Session
Tried to get interaction	2.8	4.5
Could follow session	2.3	3.5
Contributed to understanding of topic	2.3	3.2

Much of the above analysis is supported by the tutor's perception of the sessions and the way in which he prepared for them.

Following the first session the tutor said that

"I wished that I had knew more about teaching via videoconferencing before I started."

"Everything takes longer – its hard to stop them getting bored".

He also found that there were significant problems with the technology. During the first session there was only one microphone for 40 students and he felt that it was difficult to get interaction even though he did make some attempt.

For the second session, after he had received additional training in the form of a consultative session with an expert on teaching via videoconferencing, Tutor A stated that he did adapt his style and tried to make it as interactive as possible.

He felt that this session had been more successful. The tutor felt that the training had been very useful and had helped to make the session more successful but the audio quality was also much better during this session and contributed to the success.

Tutor A felt that the overall success was still limited by several key factors. First, the lack of control over being able to 'zoom in' on students, secondly the poor audio quality and finally the need for students to be prepared and to have done their work so that they can answer questions.

Asked whether he considered that the students were disadvantaged in any way through having part of the module delivered by videoconferencing, Tutor A considered that whilst there was a lack of physical presence, the students gained extra opportunities for 'face – face' contact which otherwise would not have been available to them.

From this it can be seen that the additional training and the adoption of the suggested techniques did lead to an improvement but that the lack of technical problems also helped considerably. It also points to the need for students to be prepared to enable them to participate.

4.1.2 Tutor B

Tutor B had received the guidelines and the SAVIE video and training materials.

Analysis of the sessions shows no significant variations in the students' ratings to the various statements. Students rated his teaching style, teaching materials and attempt to get interaction highly. Table 3 below shows the average ratings that the tutor received for these particular aspects for both sessions.

Table 3

Tutor B	1st Session	2nd Session
Teaching Style	4.3	4.5
Tried to get interaction	4.5	4.7

Teaching Materials	4.2	4.0

However, some students did still comment on the difficulty in trying to interact with a large group and too few microphones. Comments were also made about the inhibitions that some students feel about trying to interact with the tutor through the technology. Some students also commented negatively on not being able to see the material that was presented but this was again due to the characteristics of the technology and the environment in which the session was conducted

Some typical comments were:-

"The Tutor tried to get interaction but students are not used to talking to the camera and using a microphone"

" Having to pass microphones and waiting for the microphone limits interaction"

"Having only 3 or 4 microphones for around 50 + students is not enough"

"Class size can limit interaction"

" The videoconference screen is too small – cannot always see or read the material"

"The room layout is poor. Students behind can't see the screen . The seats are not tiered.

The overall positive response from the students suggests that this particular form of training provision did provide the tutor with sufficient knowledge and skills to deliver effective videoconference sessions. However, once again, the analysis suggests that the technology and the environment are important contributory factors in attempting to deliver an effective interactive videoconference session.

This analysis was supported by comments made by Tutor B. In the interview, he stated that he was satisfied with the overall level of interaction. and that the training he had received had given him some ideas about how to try and structure and plan his session to try and get interaction. However, he still felt that generally there was no real provision for training and support. This meant that he did not have enough time to look at the SAVIE video material, though he did look through the manual. The tutor also stated that he had experienced problems with the sound and the lack of microphones made interaction difficult. The poor quality of the picture was another issue as this made it difficult to identify students and develop any real sense of presence. The tutor also considered that the group size also made it difficult to make the session interactive. Overall though, he did not consider that the students had been disadvantaged and he felt that there were some benefits through them being able to have additional contact with him when he was back in the UK and that the videoconference sessions were useful for introducing the module and doing revision sessions.

4.1.3 Tutor C

This tutor had received the guidelines book, the UKERNA video and individual training.

Analysis of the sessions reveals that, taking a rating of 3 to be satisfactory on a scale of 1 – 6, the overall rating is only just satisfactory. There was a slight improvement in the ratings following the individual training session that the tutor received but in their comments, students gave a mixed reaction to whether they felt that the teaching style was appropriate and to whether delivery of this module by videoconference was appropriate.

Table 4 below shows the ratings obtained for questions on, teaching style, level of interaction and appropriateness of the teaching materials, for the two sessions.

Table 4

Tutor C	1st Session	2nd Session
Teaching Style	3.0	3.0
Level of interaction	3.0	3.2
Teaching Materials	4.5	4.7

It was noted that this was a very technical and practical module. This resulted in the tutor presenting the material in a very standard non-interactive lecture style. Students commented upon the fact that although the material was very technical, it had been adapted for presentation via the videoconference system and was well prepared.

Some typical comments included the following:-

"This module is not suitable for videoconferencing. It may be ok for the introduction stage"

"Trying to teach programming via videoconferencing is very difficult. It is very difficult to follow if a student does not have programming skills"

"For this module you need to have face to face contact with the tutor"

"Notes are well prepared and 'VC – friendly' ie can be followed easily throughout the session"

The analysis of the student data suggests that there may be an issue regarding the appropriateness of trying to deliver technical and practical modules via videoconferencing. It also suggests that whilst training has helped the improvement has not been very significant.

Analysis of the information provided in the interview with Tutor C provides some further insights and explanations for the apparent failure to achieve any significant improvement in the quality of the videoconference session and the overall level of interaction.

In response to whether he had adapted his teaching style for the session, the tutor stated that he had not 'taken on board' any of the advice that had been given, and therefore had not adapted his style but had stayed with a formal lecture style format. This he stated was for a variety of reasons, including his believe that the very practical and theoretical nature of his module was unsuitable for videoconferencing. There does appear to be some concurrence here between the tutor's and the students' views on the appropriateness of delivering this module by videoconferencing.

The tutor also stated that he did not actively try to get interaction as the time delay and difficulties with the quality of the sound made interaction very difficult. This was reflected in the difficulties that both he and the students had in understanding and hearing what was being said. As English was not the students' first language, he found that this, together with the sometimes high levels of sound 'distortion', made it difficult and sometimes embarrassing for him and the students as he frequently had to ask them to repeat what they had said. To avoid this the tutor stated that he tried to 'limit' interaction and did not actively try to encourage interaction until the end of the session. Tutor C also felt that the students needed to be prepared for videoconferencing so that they understood its limitations.

Overall Tutor C felt that he needed to be convinced that videoconferencing could work. He also stated that, to persuade him to adopt some of the teaching techniques that had been suggested, he would like, as part of the training, to be able to observe someone teaching successfully by videoconferencing.

4.1.4 Tutor D

Tutor D had received the guidelines book and the SAVIE video and training manuals.

Analysis of the sessions reveals students were generally satisfied with the tutor's teaching style, the quality of the teaching materials and the level of interaction. There was no significant variation between the two sessions.

Table 5 below shows the average ratings that Tutor D obtained.

Table 5

Tutor D	1st Session	2nd Session
Teaching Style	3.7	4.0
Level of interaction	4.3	4.3
Teaching Materials	3.3	4.0

The lack of variation between the sessions may, in part, be explained by the fact that the tutor stated during the interview that he had followed the guidelines in the booklet and had used these to plan his sessions. He had not, however, had time to look at the SAVIE material and therefore did not learn anything new or try to do anything different. Reading the guidelines booklet had encouraged him to adopt a 'participative' approach and to encourage interaction. However, the tutor did find trying to adopt this approach difficult for two reasons. First, students did not always do the required preparatory work prior to the session. This meant that they could not participate and engage in the planned discussion as they had little to contribute. Secondly, the technology was very limiting. Tutor D highlighted problems with the sound and a lack of visibility of the students participating in the session. This made it difficult to get effective interaction. The lack of tiered seating made it difficult for him to see students beyond the front row, though, with the assistance of the local tutor he had tried to make use of the camera preset facility to overcome this problem. The tutor also felt that the students experience of videoconferencing and the size of the group affected how much interaction could be achieved.

Tutor D stated that, as the equipment and the technology was letting him down, he planned to make more use of e-mail and the web to support his teaching and to use videoconferencing:-

'for consulting not teaching'.

Tutor D did not consider that the students were disadvantaged in any way and that there were benefits. A particular benefit was that videoconferencing did give them more 'face to face' contact once the tutor was back in the UK.

Regarding the training, Tutor D felt that he would have liked to have more training, particularly so that he was more comfortable with the technology and could use it independent of any technical support. As previously stated, he did not have the time to look at the SAVIE material. He also felt that you needed to make an extra effort to view the video and study the material in your own time.

4.1.5 Tutor E

Tutor E had received the guidelines booklet and had attended a workshop on teaching by videoconferencing.

Analysis of the two sessions from which the data was collected shows some interesting variations. Table 6 below shows the responses obtained to the questions relating to teaching style, level of interaction and suitability of the materials used.

Table 6

Tutor E	1st Session	2nd Session
Teaching Style	4.5	3.6
Level of interaction	5.6	5.3
Teaching Materials	4.8	3.6

In all cases the ratings are lower for the second session compared to the first. Lower scores were also obtained for questions relating to how easy it was for the students to follow the session and how it had helped them to understand the topic.

Analysis of the students' comments and the information obtained from the interview with the tutor quickly reveals the key factors for this reversal.

During the second session there had been a major problem with the sound.

Some of the comments that were made included the following:-

"The tutor tried to get interaction but the very poor sound makes interaction difficult"

" There was a very bad time delay during this session – the time delay causes less interaction"

"The poor sound makes trying to understand the topic and follow the lecture difficult"

The tutor's effort for trying to adopt an interactive style is still acknowledged as the rating and the comments above demonstrate. However, it would appear that this, in itself, is insufficient to compensate for problems with the technology.

The low rating given to the tutors style for the second session may suggest that trying to adopt an interactive style when there are technical problems may be inappropriate.

The tutor also made some pertinent observations that might support this view.

On asked whether he had adapted his style, Tutor E stated that he had made an effort to make it interactive using a question and answer technique but due to sound and equipment problems, having on one occasion only 2 microphones working, the session was very stilted and developed into a one way delivery.

The tutor also commented that, even when the technology is working, getting interaction, still relies to a certain extent on the students being prepared and doing the necessary work prior to the session.

Asked what lessons he had learned about delivering his module to overseas students using videoconferencing, the tutor stated that tutors should not rely on videoconferencing to deliver any significant aspect of the module. He also felt that the current technology as provided in the overseas centres is :-

"Too limited and does not have enough interactive capabilities. The lack of camera control in a room not designed for videoconferencing cannot be regarded as satisfactory"

Regarding the training that he had received, the tutor felt that, whilst it had given him enough guidance on how to plan and structure a videoconference teaching session, he would also like to have training on how to use more advanced features of the technology and to understand more about its capabilities.

5.0 Summary of Results

The primary purpose of this research project was to attempt to evaluate the effectiveness of different approaches to training staff to support the delivery of their module by videoconferencing. Analysis of the data suggests that the characteristics of the technology and its limitations may have contributed far more greatly to the perceived effectiveness of the sessions than the amount and type of training that the tutor had received.

5.1 The Technology and Environment

The analysis of the data shows that there is a strong consensus of agreement between the staff and the students that the technology currently provided at both the overseas centres is inadequate. The analysis reveals that there are serious technical and environmental issues that need to be overcome if the full potential of this medium is to be realised. The major technical and environmental factors that have been identified are:

- The very poor quality of the sound
- The insufficient number and inappropriate type of microphones that are used
- Only having one screen
- The lack of tiered seating

Students and staff all agreed that the lack of microphones and poor audio quality made interaction very difficult and at times impossible even when the lecturer had attempted to adopt a more interactive style. The failure to provide tiered seating also made it difficult for staff and students alike. The tutors commented that often they could not see the students and this, coupled with the poor visual image, made it more difficult for them to gauge student reactions or see who was talking to them. Students commented that often their view of the tutor or the lecture material was blocked. Students also commented that there was a need for two viewing screens in the room. With only one screen they could only see the notes or the tutor, they stated that this was very unsatisfactory. As most of the time the tutor is presenting material, they only hear the tutor but do not see him. A key purpose of videoconferencing is to enhance the sense of presence, the provision of only one screen clearly limits this as, for the most part, the tutor is not there!

As well as impacting on the overall levels of interaction the above factors clearly impacted on the type of lecture that the tutors were willing to deliver when using this technology. Whilst all the lecturers stated that they did not consider that having part of the module taught by videoconferencing had disadvantaged students, none of the lecturers used the sessions to teach or deliver important module content. In all cases they used the sessions as an introduction to the module or to re-enforce material that had been delivered during face-to-face contact. All the tutors also stated that they made use of e-mail and the web. These particular forms of Information and Communication Technologies (ICT) were used to answer queries and provide supplementary information and materials and to clarify points that may have been missed during the videoconference session.

This may have been a prudent strategy, as the students made frequent reference to how difficult it was to follow and understand the lecture topic. Unsatisfactory ratings were obtained in every session to the questions that asked the students to rate the extent to which they felt that they had been able to follow the topic and had understood the session and the main teaching points.

In spite of these technical limitations students and recognised that there were benefits. The most frequently stated benefit was that the videoconference sessions provided an extra opportunity for face-to-face contact between the tutor and the students which otherwise would not have been possible.

5.2 The training

An evaluation of the effectiveness of the training strategies adopted is difficult due to the factors outlined above. Analysis of the data indicates that the different strategies had some effect on both the style of delivery adopted by the tutor and the overall perception about the success of the sessions.

With the exception of one tutor, all the other tutors had attempted to adapt their teaching style to a format that would encourage interaction. Students also commented positively on the tutors' attempts to get interaction. Typical strategies included devising question and answer sessions and putting the class into groups. However, tutors commented that this did not always work as the students had not done the required preparatory work and were reluctant to engage in meaningful dialogue, as they did not have the answers. Another factor that appeared to limit interaction identified by the tutors and the students was the size class. Many considered that having a large group made it very difficult to get interaction even when the tutor had tried to adopt an appropriate strategy.

Of the different types of training provided, all the tutors considered that the guidelines booklet had been useful and they had all read and made use of it to structure and plan their sessions. Disappointingly the two tutors who were given the SAVIE video stated that they had not looked at it, as they did not have the time. One of the tutors had looked at the accompanying material but did not consider that it told him much more than what he had found out from the guidelines booklet.

The two tutors who had been given the UKERNA video considered that it had given them some useful information about the technology but did not give them any useful information about teaching via videoconferencing.

The two tutors who had received the 'consultative' training had different perceptions about the usefulness and effectiveness of this approach.

Tutor A considered that this approach was extremely useful and adapted his teaching style accordingly. Whilst the analysis reveals that other factors may have contributed to the overall success of this session, students still recognised that the tutor had adapted his teaching style and were appreciative of this. In contrast Tutor B rejected the advice and chose to stay with his chosen format as he considered that this particular module was inappropriate for teaching via videoconferencing.

Tutor B considered that he needed to be persuaded that videoconferencing did work, particularly for very technical and practical subjects. The tutor stated that, as part of the training, he would like to see someone successfully teach via videoconferencing.

Tutor B's desire for some kind of additional and different training is a common comment from all the tutors who participated.

Three of the tutors stated that they would like to have more training in the use and capabilities of the technology. Two of the tutors also stated that the training was not adequate as there was no time allowance built into the present model to enable them to have adequate and appropriate training. Two of the tutors also stated that being able to observe other tutors using the medium would have been useful.

All the tutors also considered that students needed to be prepared for having the module delivered in this way and that student training was needed to make the sessions more effective.

6.0 Conclusion

This project revealed some interesting results.

It is apparent that the characteristics of the technology have a significant influence on the overall effectiveness of this medium when using it in a teaching and learning environment.

The poor quality of the audio and visual channels clearly limits the extent to which the tutor can effectively interact and communicate with the students. The analysis suggests that, when confronted with such limiting technology, tutors should abandon best practice guidelines re trying to get interaction, as this becomes an almost impossible goal.

This research also suggests that if the quality of the audio and visual channels deteriorates to such an extent that the students cannot follow the session, the tutor may prefer to abandon the session and use other forms of ICT including e-mail and the www. The use of these technologies, within this particular context, provided additional opportunities to give support and guidance to the students.

The current room environment is also a significant contributory factor. The research suggests that tiered seating needs to be provided and that an additional monitor is required to facilitate interaction and provide a much greater sense of presence. Problems with the sound may, in part, be due to the acoustics of the room and this should be investigated.

There is also some evidence that class size may limit the tutors' ability to use this medium effectively.

The research also suggests that, whilst there are deficiencies in the technology and the environment neither the tutors nor the students feel that they are being disadvantaged. This may, in part, be due to the strategies that the tutors have adopted. The research shows that none of the tutors had sufficient confidence in the technology and the tutors were reluctant to use the sessions to teach 'essential module material'. They were only happy to use videoconferencing to introduce their topic and for revision sessions.

Students also stated that they valued the extra opportunities that this technology provides for further face-face contact when the tutor is back in the UK.

The project suggests that, regardless of the type of training provided, inadequacies in the technology and the videoconference environment will largely negate any investment made in attempting to provide adequate and appropriate training.

However the project clearly identifies training and support as a critical factor. The training did help the tutors to be effective overall. There is a need to develop an appropriate staff development model that will meet the different training needs of individual tutors. The project reveals that none of the adopted training strategies fully met the needs of the tutors. Whilst different tutors identified different needs, a key element that undermined much of the training provision was lack of time. This suggests that the delivery model must include provision for staff development and that a fundamental element of the model must be that it will provide tutors with the time and space to enable them to take advantage of the training opportunities provided.

The project also indicates that some form of student preparation and training may be necessary if the technology is to be used successfully.

Finally, the use of videoconferencing to support the overseas programmes provides some benefits to the students, but its overall effectiveness in supporting the overseas programmes is not being realised. Until such time as the issues identified above are addressed it is extremely likely that staff will become increasingly disillusioned with the technology and its full potential will not be realised.

References:

Abbott, L et al. 1994 The application of Videoconferencing to the Advancement of Independent Group Learning for Professional Development" Educational & Training Technology International Vol.31 No.2 p85 – 92.

Bennett, S. Burns J T et al 1996. Issues in the use of Videoconferencing in a Higher Education Institute for the delivery & management of courses. In proceedings from Online Educa Conference Berlin 1996

Bennett, S. Burns J T, Lander R and Wragg R 1997. Videoconferencing in Higher Education- Staff attitudes and Training Needs. In proceedings from Online Educa Conference Berlin 1996

Burns, J T 2000 Towards an Effective Virtual Learning Environment. Quarterly Review of Distance Education. New York June 2000

Burns J T, Lander R, Ryan S and Wragg R. 1999 Practical Guidelines for Teaching with Videoconferencing. JTAP Report No 37 at http://ww.jtap.ac.uk

Burns, J T, Lander,R and Spence, M (2000) " De Montfort University Case Studies in the use and evaluation of Videoconferencing in Teaching and Learning." JTAP report at http://www.jtap.ac.uk

Carter C & Clarke A 1996 Evaluation of the Suitability of Distributed Interactive Videoconferencing for use in Higher Education. SIMA Report Series No 30.

Coventry L 1995 Videoconferencing and Learning in Higher Education. SIMA Report Series No 8

Dallat, J et al 1993 Videoconferencing and the Adult Learner. University of Ulster

Fraeters, H., Vanbuel, M. & Reynolds, S. (1997) "The SAVIE Manual - Learning About Videoconferencing" Leuven University Press and at http://www.avd.kuleuven.ac.be/savie/saviemanual.htm

Higgison, C. (1998) "Training Issues and Promotion of Videoconferencing" in Proceedings of Implementation and Management of Videoconferencing, UKERNA/JTAP Nottingham 6-7 May 1998.

Malloy, W et al 1991 A Navy Video Teletraining Project. Lessons Learned. The American Journal of Distance Education

McKillop, S. and Lee, M. (1998) "Using Videoconferencing to support Distance Learning. A Staff Development Course" Report for The Advisory Group on Computer Graphics at http://www.agocg.ac.uk /reports/mmedia/casestdy/qub/qub.htm

UKERNA 1999 The Essential Guide to Videoconferencing. Video available from JANET Customer Services, UKERNA

Watson, B., 1997 Increasing Awareness on Using Multimedia in Education. AGOG Technical Report Series No. 32

Wagner, E. D., 1993 Variables Affecting Distance Educational program Success. Educational Technology, April 1993, p28 - 32

Riebold, P 1995 The Do's and Don't's of Videoconferencing- Experience from LIVE-NET. SIMA Report Series No 7

Robinson, B 1995 The Professional Development of Distance Educators: The work of the International Extension College, Cambridge in Morgan W. J. (ed.) Distance Education: Some International Examples.

Treagust, D F et al. 1993 Effectiveness of ISDN Videoconferencing. A case study of two campuses and two different courses. Distance Education, Vol 14, No 2 p 6 – 27

Glossary of Terms Used

UKERNA United Kingdom Education and Research Networking Association

SAVIE Support Activities for Teaching In Virtual Environments

Author(s):

John Thomas, Burns, Mr

De Montfort University, Department of Information Systems

James Went Building, The Gateway Leicester England UK

e-mail jtb@dmu.ac.uk