Paper 1:

The Tutorial: Combining Asynchronous and Synchronous Learning

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Abstract

- In order to achieve effective delivery and receipt of key course components, it was decided to embrace the use of support information and communication technologies for the delivery and receipt of tutorials. The drive for the development arose from a need to embrace student centred learning at a distance, whether that distance was 3 feet or 3,000 miles. The solution was tested on different study groups within the profession of nursing.

  Description of the teacher and student preparation is given. Outlines of the four individual elements of the technology employed, these being video conferencing (not PC to PC), electronic mail, on-line discussion forum and file store.

  The significance of using a combination of the media will be highlighted. The methodology employed for teachers to assist in preparing content materials for use during the tutorial and the competencies required for managing the on-line discussion and video conference elements. In each area the option for synchronous as against asynchronous learning will be explored.

The implementation of the tutorial will be described, showing how this methodology differs from traditional tutorials. Consideration will be given to the teacher and student input over the one week duration of the tutorial.

Student responses will be given and issues arising from their comments will be highlighted. Comments from teachers having been involved in the giving of tutorials by this method will also be given along with considerations for changes to teacher preparation required as a result of the paradigm shift towards embracing information and communication technologies in teaching and learning.

In conclusion, the author will consider the potential for this method for lifelong learning and the possible implications that it will have upon traditional summative assessment and approaches to student environments.

Introduction

- Education is about communication, the ability to share knowledge between student and teacher is based upon the ability to communicate[1]. It is said that as human beings, we carry out 75% of our communication through non-verbal actions[2], and yet we manage to use the voice telephone quite effectively. Even with 75% non-verbal actions, many seem to communicate effectively using electronic mail and on-line discussion groups. There are those who believe that modern technology is reducing the effectiveness of communication, indeed one would have to agree if taking a unilateral approach, that is one method of communications technology at a time. It appears as though we have embraced the various technologies, such as the telephone and electronic mail, but we view them almost independently of each other and the more traditional face to face methods of communication.

  In Higher Education it has long been considered a good use of teacher time to work in small group tutorial settings, where the students will have developed some knowledge on a subject prior to meeting with the teacher[3]. The purpose of the tutorial is to advance understanding through discussion and expert input from the teacher. Recent studies through the Higher Education Quality Council[4] have indicated that although the tutorial is the desired method for effective education, it is not being practised.

  There would appear to be communications and information technology opportunities to reassert the tutorial as an effective means of teaching and learning.

Early Developments

Within nursing and midwifery education, studies and projects have explored the use of communications technologies starting in 1988[5]. Through the Acorn BBC Master 128K computer and the Dialcom network (The Times Network System later to become Campus 2000) at 1200 baud rate, electronic mail, on-line conferencing, resource material and assignments were used across England to advance knowledge amongst nurse and midwife teachers in the uses of technology as support to education. This early development was stimulated through a belief of the potential informatics would play in the shaping of the future[6].

In 1994, a study was undertaken to ascertain the effectiveness of video communications technology for education within nursing and midwifery[7].

Both of these projects laid much of the ground work for the development of the current study. The combination of methodologies was now possible as the advances in support technology offered considerably more user-friendly interfaces and the cost had dropped to reasonable levels.

Synchronous and Asynchronous tools used

To enable the current study to take place, three asynchronous tools were employed:

- **Internet** - Email
- **World Wide Web** including Discussion Group
- **File Storage** through ftp

In addition, two synchronous tools were used:

- **ISDN**-based video conferencing (not PC to PC)
- **Telephone.**

The asynchronous tools have been employed in many circumstances for learning, Tait (1998[8]) describes the use of Internet based learning and concludes that it,

> "...facilitates the presentation of Internet information in a constructive way, and gives students the confidence to engage in active exploratory learning."[9]

Electronic mail was employed as the major communication tool outside of the tutorial itself. All participants were given each other's email address. The Web was used for introduction and student direction to the discussion forum (Web Board), Web site resources previously identified by the teacher and to the ftp site for file download.

From the earlier work undertaken with video conferencing, three significant outcomes were mentioned,

> "need to identify environmental and ergonomic factors which influence conducive educational interactions; need to include training for students as well as lecturers in preparation for the activity involved during a live transmission; and, need to develop skills in the management required to advance the use of video communications technology."[10]

Video conferencing was used to introduce the tutorial and to make face to face contact. After the initial contact, it was again used for the first plenary session. The telephone was used primarily for set-up purposes, in the study it was not used by teachers or students active within the tutorial.

Preparation

- For the study, the format of the main teacher and distant co-ordinator was used. The latter assisted the students where necessary and acted as a conduit for management links between institutions.

The preparation required in this instance is both content and delivery vehicles. In the study, it was found that the first rule is to check compatibility of equipment, especially the video communications link. The study found that the use of ISDN2 (Integrated Services Digital Network) does not ensure that the codecs inside the video unit will connect. The accepted current standard for connection is H.320 and most stand alone video units meet this standard. Having got the standard and ISDN2 the same still may not complete the connection as some countries require two zeros at the start of the number and some require three; some ISDN2 lines require single number entry, some require the number to be entered twice.

Once the video link has been established, it is reasonably safe to assume that the protocols used can be replicated, which indeed proved to be the case.

The Web page, discussion group and the uploading of files to an ftp site then took place. Preparing the Web page is ultimately dependant upon the method of connection the student will be using, in the study it proved best to be as simple as possible with limited use of graphics and Java script as both may detract from the education opportunity of using the medium, within the study the standard of Netscape™ version 2.02 was used. The Web page directed the student to materials used for the tutorial, such as supportive papers - copyright allowing - the teacher's presentation, for example scanned overhead acetates/PowerPoint, and the direct link to the discussion area. Given the dynamic nature of communications and information technologies, the use of a Web environment such as TopClass or WebCT should be used offering the student a common platform within which is stored the session, additional notes and any assignments. However, these were not used during the study as it was considered important to use commonly available tools such as HTML and file storage rather than expecting the use of pre-set environments or client requirements.

If the teacher can be assured that the student can receive particular file extensions, such as .doc, .ppt etc then the basic uploading onto an ftp site is appropriate, if however, such assurance is not possible, then the wordprocessed documents should be uploaded in text only format with any diagrams in .bmp or .gif format separately. If possible, where English is not the first language of the student, attempts should be made to hold documents in the student's own language to ease understanding.

For the discussion group there are a number of options. For this description, Web Board has been used. Most discussion groups require the individual to register in order to enter the discussion as an active participant. The study found that it is most efficient if the teacher is able to pre-register the students to the discussion.

The distant co-ordinator for the tutorial should be informed of the Web address and instructed to pass this information on to the students prior to the video link. The distant co-ordinator should also download the presentation slides and have available a computer beside the video unit to show the slides during the introductory talk by the teacher.

The Tutorial

- Three tutorials were conducted as part of the study. The main teacher was the same person, with another teacher in attendance as part of the learning cycle. The distant students were in Powys, North Wales (6 persons), Dublin, Eire (8 persons) and Borås, Sweden (12 persons). One tutorial was held for Powys, three for Dublin and two for Borås. Each time the subject matter was that of informatics and telematics in health care.

  The events of the tutorial were under the control of the teacher with the distant co-ordinator available for assistance should it be required, such as moving the camera to focus in on a particular student and/or cope with any technical events not planned.

  Using a low transmission rate, as with ISDN2, it proved important that the teacher moved as little as possible, this is a skill that takes some development. In the study, the most effective method for delivery seems to be to deliver a short (10 to 15 minutes) pre-prepared talk with presentation slides (shown at the distant end through a PC), where exchange with the students took place about every 4 minutes.

  After the introductory talk, the teacher invited the students to use the materials on the ftp site for a local discussion and disconnected the video link to return after 20 minutes. Upon return, a discussion was held to identify the key issues, at this point the teacher noted about 4 key issues ready for inclusion in the on-line discussion. This second connection generally took 20 minutes in the study.

  At the end of the video link, the students are instructed in the use of the discussion forum and the teacher enters the key issues as discussion topics. It is common for the discussion to take one week following the tutorial allowing time for reflection and different points of view, this was found to be the optimum length to allow for reflection without boredom. After the week, the teacher makes a summary of the discussion and returns that to the students through electronic mail. The option of having the discussion forum open for a week was welcomed by the students and staff alike.

  The teacher retains links with the students through the on-line discussion, electronic mail and more traditional media as required. We found that it is vital that the teacher accesses the on-line discussion group at least twice a day and plays an active part in the discussion if only to encourage students to add in their comments. Where appropriate, others may join in the discussion, this can be helpful to get further expert help for the students to answer a particular query.

  The Web site is retained for the period of the discussion and additional material may be uploaded to the ftp site as required.

  At the conclusion of the on-line discussion, the teacher can prepare a summary and forward this to the students through electronic mail, this sort of record was welcomed by the students as additions to their portfolios. It is likely that there will be an on-going link between the teacher and the students in an expert mentoring role, this can be accepted or rejected by the teacher at his or her discretion.

Changes in Teaching and Learning

- In this description it is clear that the teacher plays both a facilitative role and a content expert role. It is acknowledged that in many situations, the teacher may have assistance to set up the Web and ftp site, the discussion group and make the video link, but these 'luxuries' may be short lived and the teacher may have to have a working knowledge of the support communication technologies in order to be in control of the session.

In the study the key issue for the teacher was the transition from being the centre-point of the session, to that of being an expert resource to the students amongst other resources which may or may not have been produced by the teacher. This can be a difficult transition and one which clearly requires time and support.

Comments from the teachers involved, either as the main teacher or the attending teacher include:

> "I was afraid of computers and technology, now I see these as tools for the handling of information, and helping me with my teaching, whilst at the same time, giving me more time for the other areas of my work."

> "...there was a vacuum in my understanding of technology, now I can see lots of different ways to use the tools in a combination with my distance students."

> "It is over five years since I did my teachers' course, I remember the hours of preparation. With this combination method, it requires a lot of effort from the teacher, which is probably right, at least I know the students found it helpful."

> "The image of the students using video conferencing was very jerky and it was difficult to pick up on nuances amongst the group."

> "Although this was not easy, I can see no other cost effective way of meeting with students in other countries and exchanging views about informatics and telematics."

Teachers it would appear from the study are interested in developing this method of learning, but equally see it as an evolutionary skill which will progress along with the rate of progress of the technology.

The key issue for the institution is to accept that a student receiving a course from the institution may never set foot in the corridors or classrooms of the institution building, but they may enter the virtual corridors and classrooms of the on-line mixed media delivery of the course. There does appear to be some difficulty amongst some institutions with regard to accredited assessment. It is time such difficulties were overcome and dispensed with following the implementation of on-line assessment with as vigorous as possible security. For the study however, the sessions formed part of a course, with the remainder being taught in the more traditional face to face manner.

Of the 26 students who took part in the tutorials there was a mixed reaction. This was the first experience with multiple technologies for all of them and indeed, the first experience with any technology supported distance learning for some. All the students said that they would have preferred to have the teacher with them rather than on a screen, and all of them appreciated the use of the week long discussion on-line as it gave them "...the opportunity to see how a discussion thread built up and allowed for reflection before adding to the discussion."

In 67% of instances the students typed in their responses to the on-line discussion in real time, only 23% of them pre-prepared their response in word processing before uploading this to the discussion. 80% of the students liked the use of the Web as the direction agent for the materials and appreciated the teacher preparation of key Web site links to support the topic being studied. 62% of the students liked the information being available

from a central source, as one commented, "...at least if you loose the paper you can always get another copy!"

The students felt that they had control of their learning to a greater degree than when receiving a lecture. The summary document, prepared by the teacher, was considered helpful by 52% of the students, the remainder felt too much had happened for an effective summary to be produced.

Of those students where more than one tutorial took place, there was a greater acceptance of the media and a relaxation in mind and body during the synchronous video connections. It was difficult to measure the learning that had taken place, for although all the students involved were undertaking degree level education they were already practising nurses and had requested to undertake the course. With the students from Dublin, an assignment was set in the form of a written essay discussing issues associated with informatics and telematics in health care; all were powerful essays and all received high level pass marks. Interestingly the students included many Web and Email references in their bibliographies.

Conclusion

- In these days of increasing need for teaching academics to undertake research, the opportunities offered through the mixed media tutorial are potentially great, especially with regard to time saving on travelling. It is acknowledged that initial setting up may take time, this is reduced the more such tutorials are undertaken and a fuller knowledge of the process is developed.

  These are pioneering days in the uses of synchronous and asynchronous learning, the concept of combining different elements of technology in order to produce something permitting vision, thought, demonstration of ideas, discussion and an output for professional profile maintenance as evidence of life long learning must be a way forward, but equally one that requires more testing.

Certainly as the technology develops, with better vision and greater competence in identifying useful resources on the Web, there will be a place for the mixed media on-line tutorial.

The skills required to use the elements of a mixed media on-line tutorial should be included in the preparation of all teaching academics. It is only through such a development that the students will obtain a flexibility to their learning whether on campus or at a distance, for the principles of the tutorial will be the same. The teacher will gain time to undertake research and/or other dimensions to their position. If such becomes commonplace, then the apparent difficulties with changing approaches to teaching and learning amongst teaching staff will be minimised to the advantage of the students and the institution.

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