All the people, all of the time?

Experiences in using a large scale video capturing and serving infrastructure in an educational environment.

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Abstract

The School of Nursing, Dublin City University moved to a new, purpose built building in January 2004. As part of the design of the building the Nursing Skills Centre, an area that contains a simulated ward area, a community flat and several communication therapy rooms, includes a web based video recording and content management system. This system allows users (students and staff) to record video and audio from the teaching areas to a video server. The video server can also be used as a multimedia archiving and web distribution system.

The video server is a LDAP controlled, dual output system (MPEG 4 for instant on-line access, MPEG 2 for high quality download). Content can be recorded to the server from any one of 53 capture stations located throughout the centre. Most of these cameras are directed at the beds on the ward and these are used primarily for skills teaching. They also have other uses such as being used to aid large scale simulation projects and educational content creation. The cameras in the other areas are used for quite different teaching purposes, usually for communications analysis.

The paper will cover:

- A system overview, what it is and what it can do
- The usage of the system including a breakdown into use of pre-prepared video resources and use of live recording
- The teaching and learning outcomes, focusing on the pedagogic outcomes of using the technology; what types of teaching were enabled and flourished, what areas were slower to take off than expected
- Evaluation, reporting on the evaluation of individual projects using the technology as well as some overall points
- The evolution of the technology

Biography

On completing a BA in Communications in 1995 **Gerald Cannon** worked for 3 years as a camera operator/video editor before studying for a MSc in Multimedia.

Thereafter he established a multimedia production company producing CD-Roms, videos, websites and installations before travelling to Australia and working for a year at the JMC Academy in Sydney as a lecturer/trainer in video/multimedia production.

Returning in 2004 he took up his current post as Senior Technical Officer for AV & Communications at the School of Nursing, DCU.

Full Paper

Introduction

The use of AV is becoming more prevalent in all types of education. It holds particular interest for areas that involve manual dexterity skills training and situation based decision making. Nursing is an area where both of these types of learning are highly prevalent. With that in mind, and following analysis of other university installations such as those at Glasgow Caledonian and Queen's University Belfast, the School of Nursing in Dublin City University, when building a new facility, decided to incorporate an overall AV infrastructure.

A large area of the new building was given over to the Nursing Skills Centre (see diagram in Appendix 1). This area includes a four room ward area, eight communications suites and a community flat. The audio visual system installed includes 53 cameras and microphones. These cameras and microphones record video and audio back onto an access controlled video web server. Users, students and staff, can then look at the recordings instantly on-line or download a high quality version for playing as required. The server can also be used as an archiving and web distribution system for video resources.

This paper will give a brief overview of the actual system and discuss the use of the system within the school so far under the broad headings of usage, outcomes, evaluation and evolution.

System Description

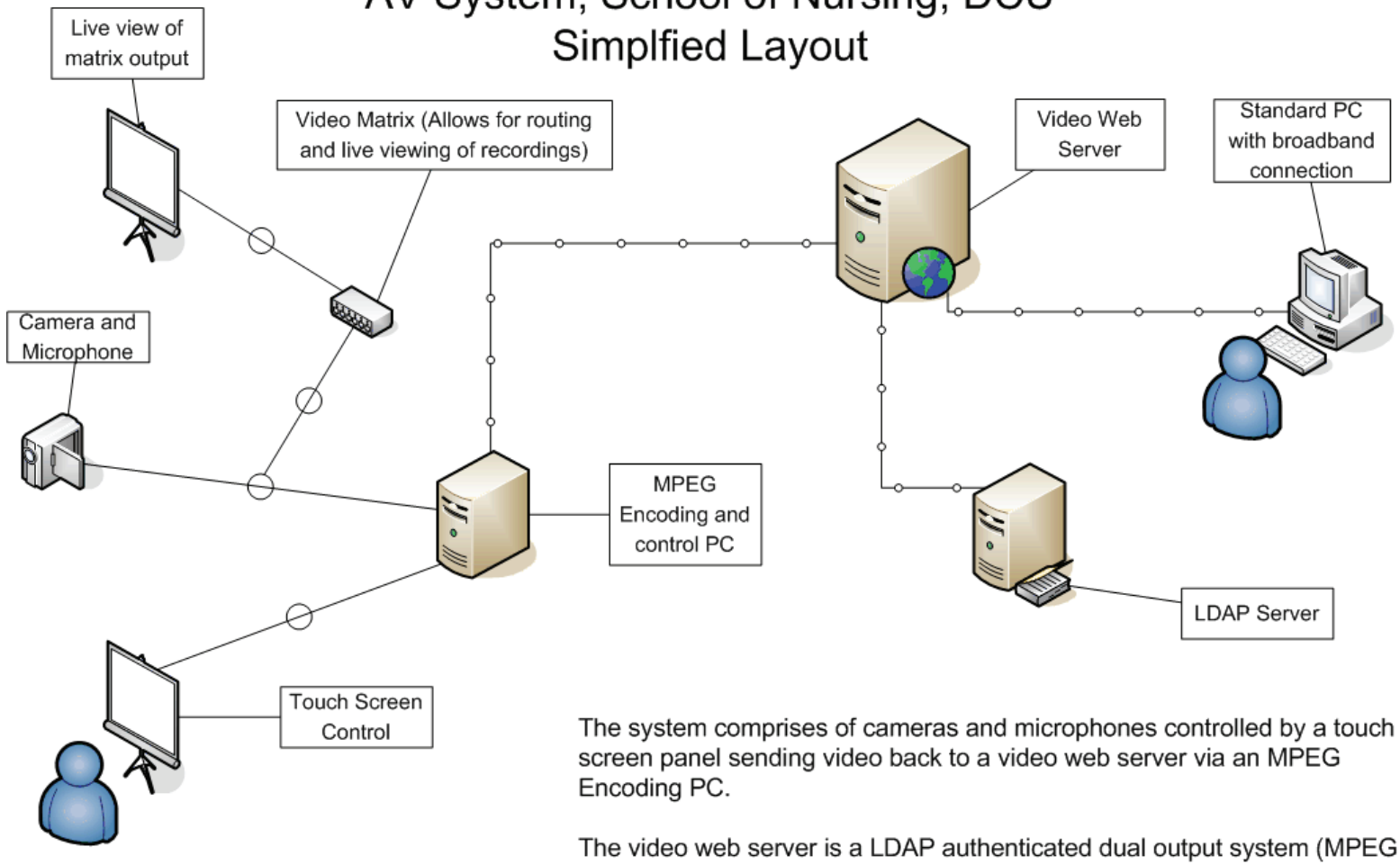
The reasons we choose this type of system included:

- The student (not technician) was central to the process via touch screen control and has on-demand access to his/her own footage
- Video is on a web server so no need for re-production and distribution. It is technically always available (broadband access being the obvious qualification here)

Other practical considerations included:

- The system works using both MPEG 2 and MPEG 4 files. The MPEG 4 files can be viewed instantly on line at even modest broadband speeds while the MPEG 2 files could be downloaded as desired for high quality viewing (this includes basic cutting of long takes if only a section of the video was desired for download)
- Access protection. Communicating with the university LDAP server the system can authenticate who should have access (in this case nursing staff and students). Also every user has his/her folder. Only the user has access to this private folder. This ensures confidentiality which is important in general for students confidence but particularly relevant in areas such as counselling training
- The web server administrator can create folders that have specific access rights so that for instance only mental health postgraduates can see a certain folder. This is very useful for pedagogic, copyright and intellectual property reasons.

AV System, School of Nursing, DCU
Simplfied Layout



The system comprises of cameras and microphones controlled by a touch screen panel sending video back to a video web server via an MPEG Encoding PC.

The video web server is a LDAP authenticated dual output system (MPEG 4 for instant on-line access, MPEG 2 for high quality download

Usage

Usage of the system can be broken into 2 categories

1. Using the system for live recording directly to the server for later playback
2. Using it as a repository for pre-prepared material

Live recording has been used in a variety of different ways including:

- Recording of skills demonstration and practise
- Role play scenarios and demonstration of situations
- Interviews, counselling sessions, presentations, meetings and lectures

Some of the applications have taken us by surprise while some other seemingly more obvious uses have still not been widely adopted. I will discuss examples of these later in the presentation.

Pre-prepared material can include:

- Purchased teaching videos (after copyright approval for digital conversion and use)
- Skills videos produced in-house
- Lecturer-driven pieces involving the creation of a case scenario

The main benefit in placing pre-prepared material on the server is that it allows students as much access as they want, when they want. For example if a training video (or live demonstration) was used in standard teaching to illustrate a specific nursing skill the student would only get one chance to view this video in a classroom situation. Using the video server the student can now view it as often as they need to understand and follow the procedure. This is a great aid for revision and for allowing students the chance to break complex procedures down into smaller more easily grasped parts in the student's own time.

Outcomes

Going into the project we had a range of expected usages and outcomes for the technology. These included:

- Formative analysis by students of their own work by recording and looking back
- Peer to peer analysis by students as a way of creating a level of intensity in training practise
- Making skills and demonstration videos available all the time to students
- Providing assignment/exam material

We quickly found that as people began using the system they started taking it in directions we had not previously expected. For example a large scale, ward simulation exercise was held that was filmed by many cameras. The footage from this was used in a variety in of ways from displaying prioritisation techniques to simple skills techniques (both wrong and right) and providing discussion pieces. This showed both a limitations in our understanding of the potential uses of the system and also the need to familiarise users of the system with what is technically possible.

The whole idea of providing discussion pieces/case scenarios has taken off at a far greater rate than expected in all branches of nursing and is more of a push factor for engagement with the system than skills teaching and learning in many instances, despite the relative success of projects involving skills teaching and learning.

In general although we had quite fixed, structured ideas for the way the system would work users preferred a far more unstructured approach. From a creative point of view this was

fantastic news but it had to be tempered by providing users with a clear understanding of what was feasibly possible with the system (for example to follow the ward simulation project mentioned earlier completely would require viewing 27 hours of footage).

Video recording has also been used as a minute taker although this is only suitable for certain types of meetings as a skilled minute taker can lend meetings brevity which live recording cannot.

Evaluation

Several individual projects using the system are currently under evaluation. The first complete evaluation of use of the system was "The Value of Technology in the Acquisition of Clinical Nursing Skills" presented by Mary McGrath, the Nursing Skills Centre Manager at 1st International Clinical Skills Conference, Prato, Italy on 11/05/2005.

This particular evaluation focused on teaching a reasonably complex clinical skill, aseptic technique, via use of a video demonstration viewed by students on the server. The findings included:

- 86.4% stated it was a good way to learn a skill
- 92% agreed/strongly agreed it give adequate information (I feel the repeated viewing is a very important factor in the strong score here)
- 92.8% agreed/strongly agreed it was very useful for revision

General feedback/observations on the server so far:

Issues

- The user interface/experience of the capture stations and the video sever. Although they are reasonably straightforward they do need some smoothing of rough edges.
- Some other technical problems from time to time e.g. camera controls via touch screen displayed the possible dangers in the grey area between cutting edge and bleeding edge
- Making use of the video within other web based platforms such as the university VLE, Moodle, mean stepping out of that VLE (this is due to the database design) i.e. it is not possible to play a video on the server via a simple direct hyperlink from Moodle.
- It needs to be incorporated from the beginning of module development outwards rather than grafting it onto modules from the outside in.
- Need to encourage peer reviewing

Successes

- Many staff highly creative with the system in generating scenarios, training videos, discussion points etc
- Very useful in areas such as counselling and interview assessment
- Very successful as a digital repository, especially for clinical skills videos
- Students beginning to engage with the system for productions and presentations beyond original intentions

Evolution

Some areas of teaching are already hard to visualise without the use of the system. As far back as 1983 it was said:

"Video, among other new technologies, offers education a challenge to rethink much of its method and content, helping it tilt the balance away from teacher-centred instruction towards learner-centred study". (Video; The Educational Challenge, Robin Moss, 1983)

Video in education did not have such a profound effect on education as envisaged at the time. This was because the production costs of video were really quiet astronomical when contrasted with educational budgets, localisation/modification of content was impossible, while the main distribution methods for video were through highly congested TV network schedules or the quiet cumbersome, unreliable and expensive video.

Now, however, the technical cost of producing a quality video is within even a modest grasp. This allows educators to develop productions that suit their own specific needs and if they are produced in small discrete packages (Re-useable Learning Objects) it is relatively easy to update content as necessary. The problem of delivering the finished video on demand is almost solved also. Blanket broadband coverage and take up is not that far away and portable video players are commonplace (6 out of a class of 30 recently downloaded a skills video made available for use on iPods on the School of Nursing server without any notification i.e. the students just found it on the server and used it).

Life long learning is now an expectation, indeed a demand, not an achievement so learners have the right to demand flexibility back also. Video materials – both teacher and learner constructed - will play a large part in providing flexibility in time, locations and styles of learning.

The system currently in use in the School of Nursing, DCU is a huge step from where we were only a year or two ago but will, within a very few years, be seen as quite a quaint construct. We are entering into a mutually advantageous reciprocal arrangement, being able to learn almost as much from students using our teaching methodologies in the next few years as students will learn from them.

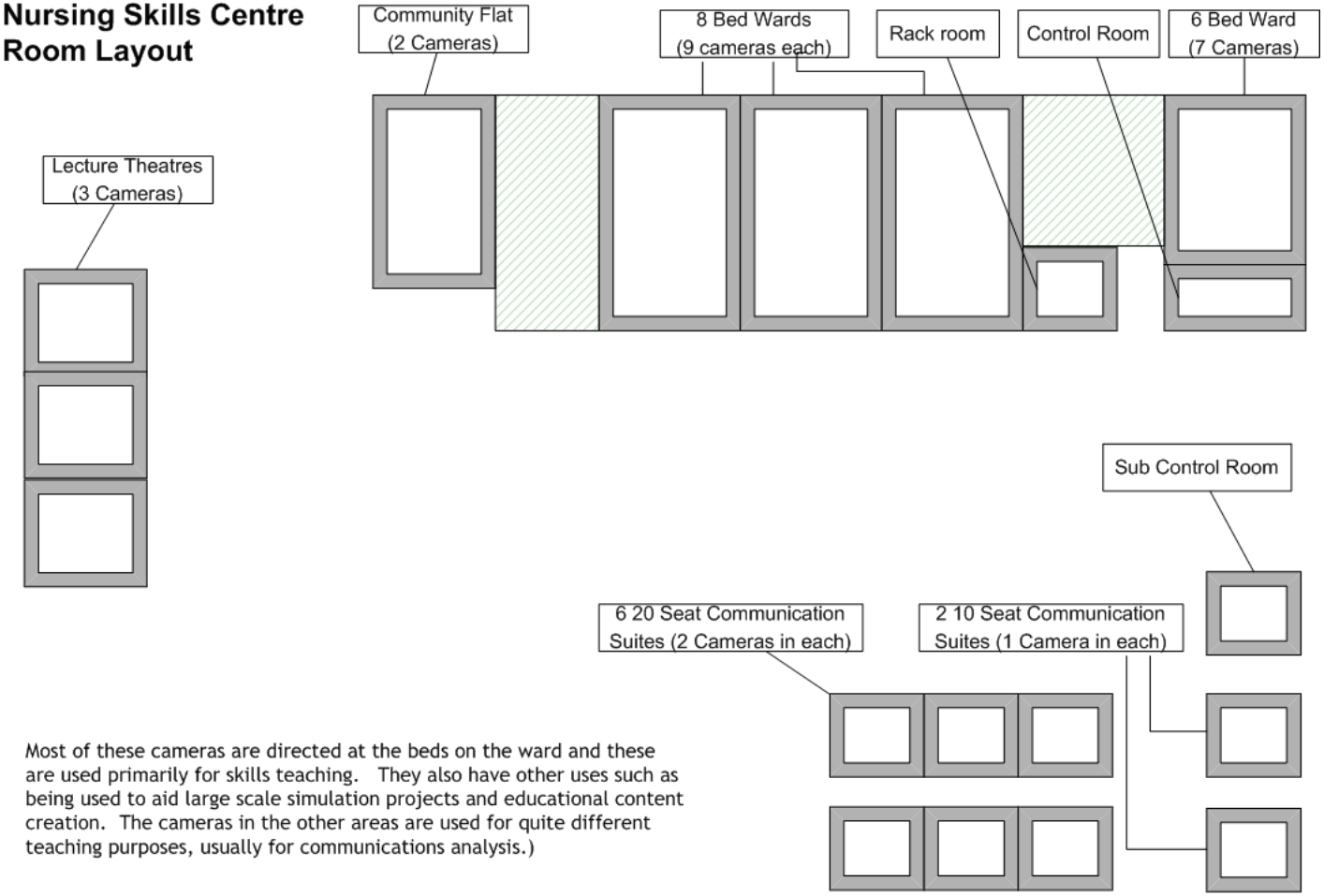
References

McGrath M., Moran A., Kelly M., Kingston R. and Henry, P., The Value of Technology in the Acquisition of Clinical Nursing Skills, *1st International Clinical Skills Conference, 09-MAY-2005 - 11-MAY-2005, Prato, Italy.*

Moss, R. Video – The Educational Challenge, Croom Helm Ltd (1983).

Appendix 1

Nursing Skills Centre
Room Layout



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