Videoconferencing for Teaching and Learning

Case Studies
Videoconferencing in Teaching and Learning

Case Studies

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Foreword

Using videoconferencing for teaching and learning demands an “imaginative leap” (suggested by Dearing) from practitioners in higher education. While many can see the benefits of videoconferencing for meetings and administration, its potential for direct support of student learning is not quite so obvious, and can raise some challenges to traditional ideas of teaching and learning. In particular, videoconferencing provides a facility for sharing teaching and learning, in a given discipline, amongst universities, which can increase the learning opportunities for students but challenges the natural possessiveness of academic staff with respect to the progress and development of their students.

As Director for Teaching and Learning at SHEFC I facilitated the introduction of high quality videoconferencing studios in nearly all Scottish HEIs, as an outstanding feature of the Scottish Metropolitan Area Networks. Projects funded by SHEFC under the Use of MANs Initiative and the TALiSMAN project explored and developed expertise in using videoconferencing effectively for teaching and learning. Recommendations from these projects resulted in SHEFC investing a further £300,000 to upgrade the videoconferencing studios to include data sharing and display facilities to support multimedia presentations, continuous presence of presenter and materials and reliable, problem-free data and applications sharing.

Some of this expertise, along with some UK examples, is captured in this set of case studies, which illustrate the variety of ways videoconferencing is used to support student learning. The case studies cover a range of teaching scenarios and methods and provide ideas that are applicable to other subjects and disciplines (just use your imagination).

I hope that these examples will provide inspiration and a starting point for other successful implementations.

Dr Paul Clark
Chief Executive Officer of the Institute for Learning and Teaching in Higher Education.
Former Director of Teaching and Learning for the Scottish Higher Education Funding Council.
Introduction

Who should use this book

- Teaching staff with little or no experience of using videoconferencing.

Why it will be useful

- The focus is on using videoconferencing for teaching and learning.
- It contains case studies from people who have used videoconferencing in real teaching situations.
- The planning suggestions here help make the technology "transparent" and help you to focus on pedagogic impact.

It is not a technical manual, nor is it about using videoconferencing for meetings.

What this book contains

- A series of case studies of videoconferencing use for teaching and learning.
- Key lessons for successful videoconferencing.
- A brief outline of videoconferencing terms and types.
- References to web sites and publications containing further information on all aspects of videoconferencing.
- Checklists for planning and setting up a videoconference.
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Videoconferencing in education

The growth of videoconferencing
- Videoconferencing technology has advanced rapidly in the last few years.
- Through SHEFC support, Scottish Higher Education institutions have access to the highest quality facilities for videoconferencing.
- You can now plan courses integrating videoconferencing with confidence in its reliability and quality.
- There is a wealth of experience of use in HEIs you can draw upon.

Why use videoconferencing?
- Videoconferencing is another tool which can assist you in delivering quality teaching and learning.
- It opens up possibilities for collaborative teaching and learning, to make best use of resources.
- It can provide “live” support for students at remote sites.
- It can give access to expertise not available within the institution.
- It can provide students from other institutions and in remote areas with access to specialist teaching and activities.
- It can provide students with opportunities to work with their peers from other institutions and countries. This supports groupwork, collaborative and international projects.

Planning for use
The case studies in this book illustrate the diversity of teaching situations and learning objectives where videoconferencing can be used.

To use videoconferencing effectively:
- You will need to take into account differences between videoconferencing and traditional face-to-face teaching.
- You will need to take into account the type of videoconferencing being used.
- You will need to take into account the number of students.
Diploma in German for secondary teachers by distance learning

Alison Borthwick

### Teaching context

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Language Learning (German Language and Cultural Study).</th>
</tr>
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<tbody>
<tr>
<td>Course level</td>
<td>1st year of 2-year part-time postgraduate diploma for teachers.</td>
</tr>
<tr>
<td>Participants</td>
<td>Staff 3. Each tutor individually taught several sessions. Students 9. 2-4 per site. Only 2 students knew each other before the course started. All participants met at a 1-day induction in Dundee just before the first videoconference.</td>
</tr>
<tr>
<td>Type of use</td>
<td>Interactive communicative language tutorials.</td>
</tr>
<tr>
<td>Teaching methods</td>
<td>Cross-site presentations, off-line task-based groupwork followed by guided inter-site discussion.</td>
</tr>
<tr>
<td>Support materials</td>
<td>Homework and preparation supported by CAL activities, WebCT email and discussion board.</td>
</tr>
<tr>
<td>Length of use</td>
<td>5 months. To date, 16 x 2-hour weekly sessions, organised in 4 blocks.</td>
</tr>
<tr>
<td>Project background</td>
<td>Course development, converting an equivalent in-house course to distance learning, received a SHEFC CPD Course Development Grant. The course is part of the regular provision offered by the Centre for Applied Language Studies, and is intended to be self-financing through fee income.</td>
</tr>
<tr>
<td>Sites</td>
<td>Dundee, Napier and Paisley Universities.</td>
</tr>
<tr>
<td>Prior experience</td>
<td>None, but tutors had training and a trial session, giving us confidence but no great technical competence.</td>
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</tbody>
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### Technical context

| Conference type | Multi-point: 3 sites. |
| Technology used | Studio based MAN conference. |
| Additional equipment | Visualiser, audio cassette player. |

### Contact

<table>
<thead>
<tr>
<th>Contact name</th>
<th>Dr Alison Borthwick</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

### Background

The aim of our course is to enable practising Secondary Modern Languages teachers, who are not qualified in German, to study during twilight hours for an Additional Teaching Qualification in that language. The conversion to distance learning was intended to widen the course’s accessibility and increase long-term viability, at the same time adding a technological dimension likely to enhance its educational value.

### Why videoconferencing was chosen

The high quality and reliability of MAN-based videoconferencing made it an attractive medium for interactive teaching and learning of practical communicative skills at a distance.

### The Execution

There was little flexibility in seating, with two of the suites having fixed rows. However, having a small number of participants meant that the row arrangement did not inhibit communication. The semi-circle formation at Dundee, with the tutor seated in the middle, was felt to be more inviting. It was helpful if tutors remembered to alternate the camera focus appropriately between themselves and local participants.

Careful planning in advance of the course and before each session was essential to promote successful interaction. In selecting sites, we tried to accommodate the preferences of the participants, but also to achieve an even distribution across locations. This facilitated communication and furthered learning. We ensured that no participant would be alone at any site. In some cases, this meant that people had to travel further, but, on balance, the educational benefits appear to have outweighed any inconvenience.

Each session was structured so that periods of whole-class interaction across the 3 sites were interspersed with short periods of group work at individual sites. In their groups the participants undertook a wide range of clearly defined contextualised tasks whose outcomes they subsequently communicated to the other sites. The relaxed atmosphere of small-group “off the air” communication allowed time for confidence building in preparation for whole-class “on the air” communication. Everyone took turns to act as group spokesperson. Usually, the tutor invited the contributions, varying the order in which the groups...
presented their material. Variety held the attention and gave everyone the opportunity to initiate. Instead of routinely asking each group to report back to the centre in Dundee, tutors also designed interview tasks to generate direct exchanges between the other sites. At appropriate moments more spontaneous interventions were also encouraged. In our experience, subtle control by the tutor helped to smooth the transition between speakers and to ensure equal participation by all class members. However, tutors had to be particularly conscious of the need to co-ordinate, rather than intrude, dominate or intimidate. A good sense of humour helped!

A further step taken to facilitate communication was the planning of a detailed homework programme. We used textbook exercises, graded Computer Assisted Language Learning activities, www-based information retrieval tasks, and the closed environment of WebCT with e-mail and bulletin board, in order to pave the way for effective videoconference interaction.

Overall, we were pleased with the lively and competent communication, mostly in German. The participants were mature and highly motivated. Remarkably quickly, they developed strategies to cope with the new teaching/learning environment. Due to its highly structured nature, the inter-site communication was more formal and intense than real face-to-face communication in a language classroom, but it was by no means strained. There was a stimulating pioneering spirit which possibly even inspired the participants to take more risks.

Regarding props, we used the visualiser at each site and an audio cassette player. Each group displayed written outcomes to set tasks, allowing other sites to comment. The visualiser was also useful for showing authentic teaching aids brought in by the participants. The visualiser at Dundee served as the tutor’s “blackboard”. As far as possible, we tried to anticipate “blackboard” data and to prepare large-font sheets in advance. Writing on a horizontal surface in the focus of a television camera is more disruptive to communication than writing on a vertical surface in a classroom.

What support was needed

Prior to the course, tutors attended several events on the use of videoconferencing in teaching and learning, offered through the SHEFC-funded TALiSMAN initiative. “Hands-on” activities developed familiarity with the medium and the presentations/discussions/documentation provided useful guidance. We found this initial training to be sufficient, though, as technology and teaching expertise continue to advance, further discussion would be welcome. We followed up the TALiSMAN training with an illuminating pilot videoconference session of our own, linking sites at two local universities and involving already established groups of our own students.

Technical support at our own site was excellent. This reassured tutors who were able to concentrate fully on adjusting to the new mode of course delivery. Technical staff at the other sites also co-operated in a helpful way, particularly during the early stages, putting students at ease. There have been few technical hitches to date, with many of the sessions problem-free.

Evaluation comments

We have held informal feedback sessions: individually by telephone; and with the whole group during a language immersion day in Dundee. A formal evaluation will be conducted at the end of the first year of the course.

The result of the informal feedback is positive, with both students and tutors apparently happy with their experience. MAN-based videoconferencing seems to be conducive to effective communicative language learning, as student performance compares well with that of previous groups on our corresponding in-house course.

The Barriers

The principal barrier was apprehension of the unknown. Tutors and students both worried about coping with the technology and initially felt self-conscious about performing communicatively over the air in front of their peers.

There is a constant worry that universities might at any time raise their fees for videoconference use to commercial rates, which we could not afford. We would argue that this would go against the principle of widening educational opportunity, according to which the MAN-based videoconference network was set up.

The Enablers

We were very appreciative of the technical and janitorial support which we received. The confidence of tutors was increased by training events, enlightened technical support, pilot sessions, and practice. Students were helped by personal contact at the induction and immersion days in Dundee. A practice run at the Dundee videoconference suite, followed by discussion with the Video Services Manager, was useful. Regular telephone calls or e-mail communication between tutors and participants also aired and alleviated concerns. It was important to create a sense of openness, solidarity and fun, stressing that together we were attempting to break new ground.
Advice for new users

Most of the advice for new users is contained above - suitable training, careful preparation, planning and timing; steady building of confidence, a spirit of collaboration and enterprise, and good relations with technical staff. It is important to ensure that the sessions involve structured interaction, a variety of activities allowing a change of pace. A practice session is helpful not only in showing up potential problems but in giving tutors confidence in using the technology.

Our course is to continue for another 18 months. In our view, videoconferencing has enormous potential which we are only beginning to explore. In future, we hope to use video clips, to link videoconferencing with the Internet, to video the performance of tutors and participants for feedback, to conduct videoed assessments, e.g. oral presentations, and to set up collaborative projects with teachers in Germany. This type of structured interaction, with a variety of activities and changes of pace, is well suited to videoconferencing.

A parallel Distance Diploma in Spanish, based more exclusively on computer technology, will soon be launched from Dundee. We intend to compare the effectiveness of the two approaches.
Discussing the Euro

Inés Carradice

**Background**

The TALiSMAN Roadshow, a demonstration of ATM technology, was held at St Andrews in March 1998. It was at this event that I encountered the videoconference medium for the first time. I was aware of the investment in networked communications by SHEFC and have a Postgraduate Certificate in Vocational IT obtained from St Andrews University in 1997. With many years experience as a language teacher I was thrilled with the potential offered by this medium to promote real communication activities between distant groups. Language activities mediated by technology can only be successful if the quality of the audio and/or video transmission is very high and the ATM set-up offered very high quality indeed.

**Why videoconferencing was chosen**

On April 20th 1998 I organised a videoconference session between students of Spanish of the Universities of St Andrews and Abertay Dundee. This was an interactive session looking at the Euro from the Spanish perspective. Designed as a language practice session, the aims were to explore the potential of the videoconference medium and observe students’ and tutors’ perceptions. The existing technology was not geared up to record both sites at the same time but we managed to get a video recording of the St Andrews transmission.

**The Execution**

There were 6 participants from Abertay Dundee and 5 from St Andrews. These were advanced students of Spanish in Year 1 of their university careers. Most were planning to study in Spain as part of their year abroad with the Erasmus programme in Year 3, i.e. 1999/2000. The facilitators were tutors from the Spanish Department in St Andrews and myself, tutor in the European Business Management course in Abertay Dundee.

My plan was based on the principle that variety breeds interest and enjoyment. I followed the organisation guidelines suggested in the TALiSMAN booklet “You and Your Videoconference”.

3.00 Overview of the Technology by the technical team. (In English)

3.10 Introductions (Only Spanish to be used from this point)

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1 An online report of this exercise, including video clips from the sessions, will be available from the WELL (Web Enhanced Language Learning) site at http://www.well.ac.uk/
3.15 The Euro - Presentations of about 2 minutes
   a) “Historical context” by St Andrews student
   b) “Legal requirements” by Abertay student
   c) “Countries involved” by St Andrews student
   d) “Problems for the Spanish public” by Abertay Dundee students. (Illustrated situation dialogues)

3.25 (off-line) In home groups decide whether the creation of the Euro is a positive or negative step for Spain and be ready to justify opinions on-line.

3.35 Opinions -2 minute slots each- and close.

3.40 Design the Euro currency:
   a) Show and describe examples of European currency as it is today.
   b) (off-line) In home groups design, draw and be prepared to describe your design. Can be coin or note, or one each.
   c) Each group will take turns at describing and the other group will try to draw following the description. Then both original and interpretation will be shown on screen and compared.

3.55 Close

At each venue all the participants sat facing the cameras, with the controls operated from the same table. I chaired the session with one of my students operating the console at the Abertay Dundee end, and one of the tutors doing it for St Andrews. Interaction was ensured by careful planning and role allocation. Two cameras were used at each site, one with the ability to pan, which was pre-set to focus on single speakers, and the other fixed on a wide-angle position. We made extensive use of the visualiser. Firstly, to show the illustrated cartoons of conversations which were read off camera to represent appropriate situations; secondly, to show real 3D objects (coins) and finally, for the most entertaining (and positively hilarious) of the sections, projecting the students’ drawings. One group described a prepared design (not shown) for the other group to draw and the visualisers were used simultaneously to compare accuracy, projecting both drawings at the same time.

What support was needed

There was a half-hour preparation videoconference meeting the week before between the tutors involved. The purpose of this was for the St Andrews tutors to experience the technology for the first time and discuss the activity itself in order to help the students prepare for it. We discussed issues such as “Should we correct their mistakes?” and “Should the tutors intervene if there are gaps?” We decided on “No” to the first and “Yes” to the second, amongst other things. The students were allocated topics to develop for the event, and some lessons were devoted to the preparation of the vocabulary area.

Evaluation comments

There was a follow-up exercise designed to elicit further language production and establish attitudes among the students. They were asked to write me a letter with comments on their experience, and to express both negative and positive impressions. All the letters received were overwhelmingly positive. They all expressed surprise at the quality of the transmission, “like being on television”, and delight at the ease with which they could communicate. Some were more enthusiastic than others about the planning, some would have preferred a more spontaneous approach throughout, but they all enjoyed the experience. Some finished their letters with suggestions on what to do “next time”. There were no adverse comments.

The Barriers

The major problem was finding a suitable date for all the participants. Timetabling across different institutions can pose major difficulties. We tried to recreate the experience in April this year. We managed to settle on a date on the last week of teaching, but when the time came there was construction work at St Andrews and we had to cancel the exercise.

The Enablers

The technical support was very good and the equipment worked flawlessly. The students were cautious at the beginning but positively enthusiastic as soon as they experienced the medium. The tutors, new to the technology, were surprised at the ease of use and high quality of the environment. It was a learning experience for them too.

Advice for new users

My advice to any newcomers to ATM videoconferencing in Scotland is: find someone who is familiar with the medium and allow yourself to be drawn in. Technical support will be close at hand in most institutions, but find an enthusiastic amateur to share the experience with. Students are more likely to gain confidence if led by an enthusiast. Planning and preparation help ensure an effective experience, as does a mix of activities.

I strongly believe in the multiple media approach to teaching and learning. There would be much more benefit in the occasional videoconference session which is the climax of a series of activities and is then followed up by others. To be more than an optional extra it would need to be built into assessment.
Background

Remote Sensing is a subject which is used in many different disciplines but in most universities the number of experts in remote sensing is very small, often only one. The National Learning Network for Remote Sensing uses videoconference lectures and seminars to allow students in many Scottish universities to hear experts from other universities. Seminars are usually only for interest but the videoconferenced lectures form an assessable part of some courses.

Before starting to give videoconferenced lectures I used to travel each year to deliver three lectures to students at Heriot-Watt University. The lecturer at Heriot-Watt reciprocated to give three lectures to our students. After using videoconferencing every week for research meetings with groups in other universities and gaining considerable confidence in the system, it seemed logical to use this mode of delivery rather than travel across Edinburgh to give the lectures. One advantage of using videoconferencing was the ability to deliver the same material to students in other universities (Dundee and Paisley) at the same time. The perceived disadvantage was that students might feel remote from the lecturer.

Since remote sensing involves mathematics and images, some form of visual aid is essential. The visualiser was considered unsuitable because the view is limited to video resolution - much poorer than the 800x600 resolution that is common on computer-based displays. We chose to use PCs connected on the Internet, running NetMeeting in its shared application mode, to allow high quality visual aids to be delivered while maintaining visual contact with the students.

A major concern at the outset was in making the lectures more interactive. It seemed essential that remote lectures should be more interactive than local lectures. A great deal of effort was also expended in improving the quality of the visual aids compared with those which had been used for several years. Animation is important but it proved to be difficult to rely on normal animation techniques when the shared application protocols appear to send only one frame in every five, or so. About 3 hours of work went into producing the visual aids for each one-hour lecture although all the diagrams already existed in OHP form.
When the lectures were delivered, about five minutes was used to introduce the system to the students who were virtually all using videoconferencing for the first time. Each remote site was involved in a multi-point discussion to ensure that they were aware of the capability of the system and they were invited to interrupt at any point. Being aware that science students rarely interrupt lectures to ask questions, I broke the lecture at several points to pose questions intended to stimulate discussion. Although the students responded they did so reluctantly. It seemed that I expected these lectures needed more dialogue than a conventional lecture, but the students did not.

In the second lecture I made less attempt to introduce this dialogue but in the last lecture, which concerned the interpretation of images, a dialogue developed more naturally. It appeared that the students were less concerned than I was about their remoteness and that they engaged in discussion when it was in context but not when it appeared artificial. After each lecture the students were asked to complete questionnaires and their responses suggested that they felt that videoconference lectures were neither better nor worse than conventional lectures. Of course I was not readily accessible for students to ask questions after the lectures. This applied when I gave the lectures in person at Heriot-Watt as well, but one student emailed me with a question directly without contacting her local tutor.

There was no significant difference between the experiences in the first academic year and those in the second.

Students at two of the remote sites were examined in the topic of the lectures as part of their final year degree assessments. One university set and marked its own questions while I set and marked those for the other university. In both cases there was no detectable difference between the students’ performance in the topic of the videoconference lectures and those of other traditional lectures. In one university, where students had a degree of choice in the questions they could answer, every student who attended the videoconference lectures chose to answer that question.

Our monthly seminar series has been running for one academic year and has proved popular, with about 3 or 4 sites involved each time. This will continue next year.

**Why videoconferencing was chosen**

Videoconferenced lectures met two objectives in this case. The first was to reduce time spent travelling to deliver lectures but the second, a by-product of the multi-point videoconference system, was that several universities could share the lectures. The sharing of lectures and seminars has started to build a greater “community” feeling among staff involved in teaching remote sensing throughout Scotland and sharing of other resources, such as group collaborative projects, is under discussion.

**The Execution**

The videoconference lectures were delivered by a lecturer who had no local students. The “host” studio was set up to focus entirely on the lecturer. Since the lecturer was using a computer to drive the visual displays at the remote sites he was seated and had a tendency to be looking at the computer screen which reduced eye contact. At the remote sites students sat facing three screens in most cases: their own outgoing signal, their incoming video signal showing whoever was currently speaking (usually the lecturer) and a screen showing the computer output. Seats were arranged either in rows or in a curve facing the monitors.

Interaction was promoted in several ways. Asking questions directed to specific sites was essential, otherwise students remained silent in the hope that another site would answer. Asking questions which required a simple factual answer also produced long pauses as most students were inhibited about answering (as they are in non-videoconference situations). Asking questions which required group discussion at each site and a response from a spokesperson was the most effective. However, the only time spontaneous questions arose was in discussion of images in which objects required expert interpretation.

During the lectures no props were used but during the seminars various speakers used props. Some, such as a glass tank of water placed on the visualiser to demonstrate waves, were very effective. Others, held by the speaker, had varying degrees of success. In general, small props held in the speaker’s hands were more effective than those which required a wider view.

**What support was needed**

No training or support was needed for the use of the videoconference equipment. Many research group meetings had already been used for familiarisation with the equipment. These research group meetings required no more than a cursory few minutes of training on how to use the camera and visualiser controls. Of course many mistakes were made, identified, and corrected during these meetings. The

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2 A detailed evaluation of the lectures and discussion of the necessary preparations has been published in ALT-J, January 1999. See http://www.warwick.ac.uk/alt-E/Publications/
main lessons learned concerned filling the camera view and ensuring the speaker was aware of the volume of speech required and the position of the microphones.

A much more serious issue for our lectures was the use of PCs running NetMeeting to allow us to share data and applications. This required several hours of rehearsal and identification of what was and was not possible in terms of animation. It also took some time to find the most robust and secure methods of setting up a meeting. These procedures are described in the ALT-J paper noted above, and from the project website. When PowerPoint was used we took the precaution of downloading the presentation to every remote site prior to the lectures. In all but one case this proved unnecessary but in the case where the link was lost it proved quite easy for someone at the remote site to synchronise their presentation with that of the speaker.

Evaluation comments

Formal evaluations were conducted and are reported in the ALT-J paper (Jan 1999). Virtually all students felt that there was little difference between videoconference lectures and traditional lectures and they would not mind having more videoconference lectures. The reservations expressed by some at their first videoconference lecture were almost totally absent by the third videoconference lecture. There was some reduction in the number of students attending the lectures from the first to the third. A similar drop-off has also been observed in traditional lectures where students are given the complete PowerPoint presentations as handouts.

From the lecturer’s viewpoint I have come to increasingly question the use of lectures as a means of delivering information as a result of these videoconference experiences. Our experience of television makes us reluctant to offer students a “talking head” yet there is often little difference between that and what is delivered in a lecture theatre.

The Barriers

The biggest single barrier to our lectures and seminars was the lack of computers and data projection facilities in the Scottish MAN videoconferencing studios. We not only had to carry a computer to the studio each time we used it and change its network settings because it had moved to a new subnet but every one of the remote sites had to do the same. This has now been remedied by SHEFC funding suitable equipment in every one of the Scottish MAN studios.

Once we had rehearsed how to set up NetMeeting and established guidelines that we used with all our remote sites, it became possible to set up all our equipment and make the necessary connections for a lecture in about 10-15 minutes. Now, with permanently installed equipment this set-up time should be reduced to no more than five minutes.

The biggest problem both for the seminars and for increasing the scope of shared lecture courses is that of fitting in with timetables in many different institutions.

The Enablers

Access to videoconferencing has been wonderfully easy. Checking if the studio is available and making a booking can be done on the Internet. We are fortunate to have a studio in our own building. Preparing to give a videoconference lecture is therefore no more difficult than a conventional lecture.

Advice for new users

Try it! Next time you plan to go to another university for a meeting, use a videoconference instead. Get some experience in this non-critical environment before using videoconference for teaching. Once you are ready to try sharing teaching, try to identify if there is duplication of effort in universities which would allow you to share teaching resources. This not only creates more free time but it also encourages more collaboration and sharing of teaching resources between institutions.
Delivery of research methods teaching

Alison Galloway

**Background**

We had already experimented with videoconferencing being delivered by staff at the Scottish College of Textiles (SCOT) to Consumer Studies students at Queen Margaret College (QM). All participants had found the experience interesting and we were keen to keep up the momentum gained in the initial stages. Having had expensive equipment installed in both institutions, it also seemed somewhat wasteful to let it fall into disuse. In addition we wished to further explore possibilities for improving module choice for students by being able to provide courses for relatively small numbers of students.

**Why videoconferencing was chosen**

We were conscious that there were students at both SCOT and QM who had a particular need for basic research methods teaching. At QM, direct entry students who move into the second or third level of our courses, after having undertaken, for example, an HNC in an FE college, generally feel disadvantaged when they arrive because their peers who took their first year at QM had already been given a fair bit of research methods teaching. Similarly, students at SCOT felt unprepared to undertake survey work which is generally required of them in their third or fourth years. This presented an ideal opportunity to extend our experiments with videoconferencing and to try out simultaneous teaching to two institutions. The small group size at each site, lending itself to effective videoconferencing, also meant that such a solution could be cost-effective in terms of institutions sharing teaching resources.

The project set a number of initial objectives:

- QM to deliver simultaneous video-linked classes for students at SCOT and QM;
- Develop interactive teaching material in research methods for use during videoconference classes with students at both sites;
- Train and develop students and staff in teaching and learning by this medium;
- Allow students to further explore issues covered in these research methods classes by placing support material on the World Wide Web;
- Evaluate the project and disseminate findings.

---

**Teaching context**

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Research methods.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course level</td>
<td>2nd – 3rd year undergraduates.</td>
</tr>
<tr>
<td>Participants</td>
<td>Staff 1 at site with students. Students approx. 12 at 2 sites.</td>
</tr>
<tr>
<td>Type of use</td>
<td>Lecture/tutorial.</td>
</tr>
<tr>
<td>Teaching methods</td>
<td>Flexible learning: presentations, Q&amp;A sessions, interactive workbooks.</td>
</tr>
<tr>
<td>Support materials</td>
<td>Placed on Web for independent study.</td>
</tr>
<tr>
<td>Length of use</td>
<td>Six 1-hour sessions.</td>
</tr>
<tr>
<td>Project background</td>
<td>Pilot project funded by SHEFC Regional Strategic Initiative 1995-1997.</td>
</tr>
<tr>
<td>Sites</td>
<td>Queen Margaret College, Edinburgh (now Queen Margaret University College) and Scottish College of Textiles, Galashiels (now Heriot-Watt University, Scottish Borders Campus).</td>
</tr>
<tr>
<td>Prior experience</td>
<td>Had used videoconferencing for lectures delivered by remote expert. Fairly confident about using technology.</td>
</tr>
</tbody>
</table>

**Technical context**

| Conference type       | Point to point. |
| Technology used       | Studio based ISDN 6. |
| Additional equipment  | Visualiser. |

**Contact**

Contact name: Alison Galloway

Department of Business and Consumer Studies, Queen Margaret University College, Clerwood Terrace, Edinburgh EH12 8TS.

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Email: a.galloway@mail.qmced.ac.uk
The Execution

Six one hour classes were held in total, but the first was an informal introductory session to brief participants and to “break the ice”. This included suggestions for students about how best to interact during the classes, as well as giving them the chance to chat to their colleagues in the remote location. I was situated at QM with the QM students, while the other students were located in Galashiels in the Borders region. The other five classes all involved the use of the interactive workbooks, which contained notes and questions for discussion. I would go over the main theoretical issues on the subjects of, for example, data measurement, questionnaire design and sampling, and would then present the students with some questions to consider. After a suitable pause for reflection, students in both locations were asked (alternately) to suggest possible responses.

The introductory session helped the students to be comfortable in each others’ presence and interact well. We even managed to get a fair bit of “banter” going at times. The small number of students in both locations meant that I didn’t have any real problems in eliciting responses from all participants, as they accepted extremely well that they would all have to contribute to make the experience a successful one. Moreover, while the subject matter being taught could by no stretch of the imagination be considered interesting, the students all perceived a very strong personal need to become competent in this subject area in order to succeed in the rest of their degree, so their motivation was high.

What support was needed

No formal training had been given, but we had the results of the earlier pilot project to draw on. I had the opportunity to watch these earlier videoconferenced classes, so I was conscious of a number of problems such as time delay with the equipment, use of the controls, trying to give equal attention to both groups of students, etc.

Evaluation comments

We did conduct a formal evaluation, using both questionnaires and focus groups, with an independent member of the teaching staff. The feedback was encouraging, and students seemed to enjoy the classes and (more importantly) felt that they had learned a lot.

I was aware of the need to divide attention equally between the two groups of students, and this could be a problem especially during the delivery of theoretical background. In practice students were giving most of their attention to the workbooks during this phase, and neither group felt neglected or cut off from the lecturer.

The Barriers

The problems caused by the time delay, for example between asking a question at my end and getting a reply at the other end, meant that I often thought that no answer was forthcoming. Similarly, I felt disconcerted when making a joke and seeing serious faces at the other end, only to find that the time delay was again the source of the problem. All participants commented on this issue and the difficulties involved. Interrupting was a particular problem, because students worried that if they started speaking at their end, the time delay could mean that they would be interrupting somebody at the other end. We tentatively approached solutions to this, using cards with symbols on them (similar to Internet “smileys”), but this didn’t really get beyond the piloting stage.

The seating arrangements were not ideal. A somewhat linear approach had been adopted at QM, while those at SCOT managed to arrange themselves in a horseshoe shape, which was more successful as it allowed students there to see each other as well as the QM site on the monitor.

The cost of the ISDN lines and difficulties of timetabling across two institutions meant that we had to cover a lot of material in a short space of time, and had no flexibility to allow classes to over-run.

Advice for new users

I have used videoconferencing (through the MAN) since that time, but we haven’t managed to fix any other classes up yet. I would certainly like another opportunity to use this medium.

It’s useful to have some prior experience, so if possible watch or take part in a videoconference before you conduct one of your own. Try to establish a rapport with the participants. Varying the types of activity helps to keep people involved and establishes this rapport. Activities can be varied between local (i.e. off-line) or across sites using the videoconference connection. Try to build enough flexibility into your programme to adapt later conferences in the light of earlier experiences.
## Guest seminars for Design History & Contemporary Studies

**Marlene Ivey**

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<tr>
<td><strong>Teaching methods</strong></td>
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<tr>
<td><strong>Length of use</strong></td>
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<tr>
<td><strong>Project background</strong></td>
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<tr>
<td><strong>Sites</strong></td>
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<td><strong>Prior experience</strong></td>
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<td><strong>Technology used</strong></td>
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<tr>
<td><strong>Additional equipment</strong></td>
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### Background

As part of the Design History & Contemporary Studies Visiting Lecturer programme, we invited Christine Atha, Head of Education at the Institute of Contemporary Arts (ICA), London, to come to Dundee in 1996 and 1997 for one-off lectures to our second and third year design students. I proposed we extend her teaching involvement to include a videoconferencing seminar series for the 1998 academic year.

### Why videoconferencing was chosen

We were interested to discover whether or not it might be possible to conduct Design History & Contemporary Studies seminars with a “visiting” lecturer, through videoconferencing. We also wished to observe how we (staff and students) responded to learning using this technology. Also, how did this technology influence the learning process?

Ten second year design students participated in this Design History & Contemporary Studies videoconferencing seminar with two members of staff involved. The University of Dundee site hosted the students and a university lecturer; fees were paid to a University College London site to host a “visiting” lecturer from the ICA.

### The Execution

Christine Atha and I emailed and spoke over the telephone to prepare for the videoconferencing sessions. I planned to stand aside from the seminar group to encourage direct interaction between Christine and the group. However, I found that I had to be more flexible and from time to time become more central to the group - moving in and moving out.

There were problems because the University suite was very tightly designed to simulate a meeting room and this seemed inappropriate to our purpose. We sought to change the room but the relationship between the technology and the table is fixed, the room was rather small for our group - there was not enough flexibility in seating arrangements.

The videoconferencing experience was hampered by the poor quality of image on the videoscreen. This related to the England/Scotland connection. This took some adjustment because we had expected a clean, clear image based on our previous experience of the MAN videoconferencing facilities.
Nevertheless, we progressed. Interaction was prompted through questions related to the subject matter. Students were given assignments and expected to return to the following seminar having developed their understanding of the subject independently. We have the impression that they became more confident as time went on. We videotaped the first and the last session and we are looking to this visual evidence to support that impression.

**What support was needed**

Staff at the videoconferencing suites gave both myself and Christine Atha brief introductory sessions on how the system worked. Looking back, I feel it would be worthwhile if the University were to offer staff development opportunities in this area. Experience helps the most. Consequently practical sessions should be part of this training. It should also enable staff to develop sessions which would prepare students for using the technology.

I think we had the technical support we needed - we were shown what was available and could call upon it as needed.

**Evaluation comments**

Christine Atha came to Dundee in the third term for a live lecture on the subject and we held an informal debriefing session with the seminar students. They reported that they found the experience very strange but enjoyable. Students were asked to produce a paper on the seminar topic. We are awaiting return of these papers. Also, we have yet to examine/discuss the videotapes of the first and last seminars.

**The Barriers**

A few minor problems had to be solved before we could proceed. The ICA did not have a videoconferencing facility which meant we had to book a suite with a London college campus in close proximity to the ICA. Free access to the videoconferencing network was not available in England - a small budget had to be sourced.

As time progressed, it became clear that videoconference teaching required some academic facilitation at the student site. The remote lecturer could not completely replace the on-site lecturer. It also became clear that the design of the videoconference suite was not appropriate for this group and type of teaching.

**The Enablers**

Just about everyone we contacted at the Universities and along the videoconferencing network were very willing to help us to make this work. Christine Atha’s enthusiasm, interest and involvement was a great enabler.

**Advice for new users**

We are planning to assess the impact of this experience on the students across the coming year. Will they select essay or dissertation topics in the subject area of the seminar? In the area of communication technology? Can these dissertations be electronically supervised?

There appears to be an immediate impact on the lecturers. Having had this experience, I am directing dissertation students in this academic year to look at design and technology, the design of videoconferencing suites, etc.

We are also expecting to have a videoconferencing lecture theatre at Duncan of Jordanstone campus, hopefully for the next academic year. This will extend the scope for our use of this technology from 10 students to hundreds.

Because of the differences in quality between ISDN and the ATM conferencing available on the Scottish MANs, it is important to try things out at the quality (e.g. ISDN 2, 6, or ATM) which you will be using in the teaching context. This is especially important if detailed visual images are to be used.
Sharing lectures for teaching undergraduate surgery

Gordon Jameson

<table>
<thead>
<tr>
<th>Teaching context</th>
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<tbody>
<tr>
<td>Subject area</td>
<td>Medicine (Surgery).</td>
</tr>
<tr>
<td>Course level</td>
<td>Undergraduate.</td>
</tr>
<tr>
<td>Participants</td>
<td>Staff 6, one from each site.</td>
</tr>
<tr>
<td>Type of use</td>
<td>Lecture series.</td>
</tr>
<tr>
<td>Teaching methods</td>
<td>Traditional lecture, clinical case studies, online Q&amp;A sessions.</td>
</tr>
<tr>
<td>Length of use</td>
<td>An 18 lecture course delivered 6 times over two years.</td>
</tr>
<tr>
<td>Project background</td>
<td>Teaching and Learning Technology Programme (TLTP) Phase 2 Project, INSURRECT (INteractive SURgical Teaching at REmote CenTres).</td>
</tr>
<tr>
<td>Sites</td>
<td>Medical Schools at University College London (project leader), Cambridge University, Newcastle University, Edinburgh University, Manchester University, and Bristol University.</td>
</tr>
<tr>
<td>Prior experience</td>
<td>Most staff involved had none.</td>
</tr>
</tbody>
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<tr>
<th>Technical context</th>
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</thead>
<tbody>
<tr>
<td>Conference type</td>
<td>Multi-point 6 sites.</td>
</tr>
<tr>
<td>Technology used</td>
<td>SuperJANET ATM (Equivalent to ISDN 20).</td>
</tr>
<tr>
<td>Additional equipment</td>
<td>At each site: Two fixed cameras, OHP and slide projectors, VHS Video projectors.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Contact</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact name</td>
<td>Dr D G Jameson</td>
</tr>
<tr>
<td>Contact details</td>
<td>Director, Multimedia Support and Communications Centre, University College London, Wind eyre Building, Cleveland Street, London W1P 6DB. Tel: 0171 504 9320 Email: <a href="mailto:g.jameson@ucl.ac.uk">g.jameson@ucl.ac.uk</a></td>
</tr>
</tbody>
</table>

Background
The project linked the departments of surgery in six major UK Medical Schools. It ran for 3 years from 1992 to 1995. The first year was concerned with establishing the connectivity between individual partner sites and equipping the lecture theatres or teaching area with the necessary technology. The second and third years were spent delivering lectures and using the feedback from this experience to modify delivery.

Why videoconferencing was chosen
The project aimed to use collaborative teaching courses to teach undergraduates surgery. This allowed sharing of scarce teaching resources, particularly clinical case studies. By using video technology and projecting the images on a large screen the students were given a better view of the patient than they would achieve around the bedside. The collaboration of the teachers resulted in students being taught by experts in each topic, where this expertise would not necessarily have been available at their own centre.

The Execution
First Year - Technology Set-up
The first year was concerned with setting up the network and equipping the teaching space. The SuperJANET network connected five centres. Bristol University was not connected to SuperJANET, so special considerations were given to connecting that centre; (SMDS technology was used). Further work had to be carried out to connect the teaching space to the SuperJANET network.

The SuperJANET project did not have special Audio-Visual expertise, and there were a number of problems associated with the AV requirements. Audio in particular presented problems and work had to be done to incorporate echo cancellation facilities. These facilities are now incorporated in most videoconferencing systems. It was vital that the technical capability of each site was the same, so that a lecture could be transmitted from any of them.

Further information about the Insurrect project (INteractive SURgical Teaching at REmote CenTres) can be found at http://www.mmscc.ucl.ac.uk/insurrect/index.html
Second Year - Traditional lecture delivery

As the lecturers had virtually no experience of network teaching and it was difficult to explain this to them, it was decided to permit the teachers to give their lectures in the same manner as face-to-face teaching. This experience was a shock as they were forced to realise that many of the methods of feedback from their audience did not work over networks and the students found asking questions difficult in these circumstances.

The lecturers had a second chance to deliver their lectures but this situation did not improve the second time round, and so the project decided to have a special meeting to discuss the problems associated with network teaching. We had collected feedback from students and this was also discussed.

It was evident that the prime requirements were that the sessions should be interactive and that multimedia material should be used more in the lectures. In the medical context this meant that we should try to bring real patients into the lectures as part of the presentation of case studies of the clinical conditions.

Third Year - Modified lecture delivery and Conclusions

Changes were instituted and these improved the quality of lectures, which was measured by the proportion of students who continued to attend lectures throughout the course. Where possible clinical material was used in the lectures and this was appreciated by students.

Evaluation comments

The project had highlighted that the use of ISDN videoconferencing techniques for teaching was very different to the experience of videoconferencing meetings. Application was made for another TLTP project award for further work in this field but this was not supported. The cost of ISDN calls between the 6 sites was too high to maintain from departmental resources and consequently this teaching activity stopped.

The Enablers

If the teaching session was structured for interaction to take place at specified stages, i.e. after the initial presentation of the clinical condition of the patient, but before a discussion of how to treat that condition, then interaction was successful. This did not stop spontaneous questions and as the students became more accustomed to the network environment the interaction improved.

European Collaboration

A project has been recently completed linking Copenhagen (Denmark), Turku (Finland) and UCL London, which was funded through the EU SOCRATES Programme. This collaboration has presented clinical case studies, given by students under the supervision of a clinical teacher. This collaboration is continuing between London and Copenhagen although the funding has finished. The students have the opportunity to compare clinical practice in different countries.

Desktop Videoconferencing

Another project is being carried out within the UK between London, Manchester and Edinburgh using the IP (Internet Protocol) videoconferencing technique (i.e. desktop conferencing), where packet-switching technology is used. The user interface is very different to that used in the ISDN environment and this will have an important impact on the teachers and students which needs to be examined. The problems of taking the network to the teaching space have occurred again and also there are problems handling the audio for small groups. These audio problems can be avoided if the PC workstation is used by a single person who is wearing headphones.

At this stage there is much work to be done to establish a stable network. The AV quality is limited over the network, but if enabling packages such as NetMeeting are used then high-resolution images can be presented. Currently there are severe limitations on playing out video in this environment. If the multicast environment can be made to work suitably then a low cost method of network teaching is possible over a pervasive network.

Advice for new users

Experience of teaching in this way led us to the conclusion that this type of network teaching was more suited to delivery in small rooms to groups of between 12 and 20 students because the size of the group was not too large for interaction. Sessions have to be more interactive than traditional lectures, and should make more use of multi-media materials.
# Using videoconferencing for research seminar presentations

Dawn Lamond

## Teaching context

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Health care.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course level</td>
<td>Mixed (see below).</td>
</tr>
<tr>
<td>Participants</td>
<td>Staff: Several organisers. One invited speaker for each seminar. Students: Between 3 and 30 at each site. Participants are a mixture of members of staff from within the Department, from other departments across the University, students (both undergraduate and postgraduate) and staff from clinical areas (hospitals and community health care). Participants often know each other, with members of staff from within the department across the three campus sites.</td>
</tr>
<tr>
<td>Type of use</td>
<td>Research seminars, lasting 1 hour.</td>
</tr>
<tr>
<td>Teaching methods</td>
<td>Speakers present a research seminar paper. The audience then has an opportunity to ask questions and discuss the presentation.</td>
</tr>
<tr>
<td>Length of use</td>
<td>Series of seminars over 2 years.</td>
</tr>
<tr>
<td>Project background</td>
<td>No special funding.</td>
</tr>
<tr>
<td>Sites</td>
<td>Stirling, Inverness, and Stornoway Campus sites of Department of Nursing and Midwifery, Stirling University.</td>
</tr>
<tr>
<td>Prior experience</td>
<td>Most speakers have no prior experience. Author fairly confident about using the technology.</td>
</tr>
</tbody>
</table>

## Technical context

| Conference type | Multi-point 3 sites. |
| Technology used | ISDN 2. |
| Additional equipment | Visualiser, video player. |
| Software | Shared software applications. |

## Contact

| Contact name | Dr Dawn Lamond |
| Contact details | Department of Nursing & Midwifery, University of Stirling, Stirling FK9 4LA. Tel: 01786 466345 |

## Background

The Department of Nursing and Midwifery at the University of Stirling has three campus sites, one in Stirling itself, one in Inverness and one in Stornoway. The Department views research activity as an integral part of its work across all three campus sites.

## Why videoconferencing was chosen

It was felt that using videoconferencing was the obvious way to facilitate research activity and ensure that all campus sites could participate.

## The Execution

The seminars occur in one of two different types of location within the main University site. One location is a traditional lecture theatre which has an ISDN socket. This means that the seating is fairly “traditional” in that the audience sits in rows, with the speaker at the front of the lecture theatre. The videoconference equipment is organised so that the distant sites can see the speaker, but not the audience. The set up in the distant sites is such that the speaker can see the audience.

The second location at the main University site is a classroom which has an ISDN socket. This allows for more flexibility in the set up of the seminar, with the audience in rows and the speaker at the front of the room. The videoconference equipment can be organised so that the distant sites can see the speaker and part of the audience. The speaker can see the audience at the distant sites.

When speakers have presented from one of the distant sites to the main University campus, the organisation is similar. In this instance, the videoconference equipment is organised so that the speaker can be seen by the distant audience, and the audience can be seen by the speaker.

The seminars normally consist of a 40-45 minute presentation by an invited speaker. The equipment used varies depending on the speaker, but has included overheads and slides (projected with the aid of a visualiser), PowerPoint presentations and the use of video clips. After the presentation the audience has the opportunity to ask questions of the speaker, and often a lively discussion ensues, across the campus sites.
What support was needed
As the organiser of the seminars, some training on how to use the equipment was provided by the Media and AV Services Department at the University. They offered full technical support for the seminar presentations, including setting up the equipment and testing it before the seminar commences. This has been crucial, as the variability in the types of presentations given by invited speakers has often necessitated quite complicated technical back up.

Evaluation comments
On the whole the seminars have been evaluated positively by participants across the department. Often evaluations depend on the nature of the speaker, rather than the logistics of the videoconference itself.

The Barriers
Several factors have been identified over the 2 years which seem to inhibit good videoconferencing at the seminars. Firstly, the speakers need to ensure that the materials they use can be seen by audiences at the other end of the videoconference equipment (especially for overheads and PowerPoint presentations). Also, many of the invited speakers have not encountered videoconference equipment before, and find the set up quite daunting. In order to try and overcome this a leaflet has been developed (entitled “Guidelines for seminar speakers”) which is sent to each invited speaker. This has appeared to aid them in their preparation for talking at the seminars.

Another barrier identified in the early stages of the seminar programme occurs during the question phase. If there is a large audience at one site, and someone asks a question from the back of the room, it is often difficult for the distant sites to hear the question, and they therefore cannot gain full benefit from the ensuing discussion. This has been rectified by the Chair of each session repeating the question clearly into the microphone, for the benefit of all audiences.

A final barrier is concerned with feedback (in terms of audience noise or sound echoing) which may occur from the distant sites when the seminar is in progress. This has been easily solved by the distant sites turning off their microphones whilst the speaker is talking, unless they wish to ask a question.

The Enablers
Organising the seminars so that the distant audiences can see the speaker, and ask questions, appears to facilitate good discussion across the sites. If the speakers have clear materials (whether they are overheads / slides or a PowerPoint presentation) the seminars seem to be more successful. If possible, copies of speaker’s materials (overheads / notes) are sent to the distant sites in advance (by fax). This also appeared to aid the presentation of the seminars. Speakers who are clearly spoken are also received more favourably. When the questions asked are clearly presented, whether by the questioner or when repeated by the Chair, this also seems to facilitate a good seminar session.

Advice for new users
The department seminars continue to be videoconferenced. Any advice to be given has been covered in the previous sections, however in summary:

1. Make sure you have good technical support and the ability to use a variety of different methods of information presentation.
2. Speakers should be given some information beforehand regarding the nature of videoconferencing and what to expect.
3. Information presented should be clear, and if possible check that it can be seen on the distant sites.
4. Make sure that any discussion can be clearly heard by participants on all sites.
Teaching by videoconference
- a guerrilla approach

Sean Milligan

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<td><strong>Project background</strong></td>
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<td><strong>Sites</strong></td>
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**Background**

Thurso College identified that there was local demand for a navigation course, but did not have a local tutor available. Staff in Thurso were aware of an existing (very successful) navigation course provided on Orkney, and decided to approach that tutor to teach their course from a distance.

**Why videoconferencing was chosen**

The course relies on the use of navigational charts so an audio-only link would not have been adequate. There was also an interest in both Thurso and Orkney Colleges in piloting a course delivered through videoconferencing. We were able to offer the course to students on Skye, which would not otherwise have been possible.

**The Execution**

The students on this course were well motivated adults - indeed one of them was a lecturer at Thurso College who herself has considerable experience in the use of videoconferencing. There were no students in Orkney, where the tutor was based.

The navigation course has been running for some time, and there are well tried and tested paper based support materials provided. Class preparation was little different to the face-to-face tutorials which have been used in previous years with the primary considerations always being the best way to achieve the teaching objectives.

The typical format for the class was to present material in a tutorial format, to work on some practical exercises, and to check these, and then to have an opportunity for further questions before moving on to the next section of the topic. For navigation much of the course relies on large navigation charts, and it was important to find a strategy which allowed all students to see examples and illustrations presented by the tutor, and for the tutor to be able to check work that students were doing on the charts.

The tutor spent about 15 minutes prior to each session checking that the equipment and camera settings were as desired. One fixed camera was trained on the tutor’s chart (actually the camera was balanced on an improvised tripod made from cardboard boxes), one camera was used to give a talking head image of the tutor, and the visualiser was also available. The
camera trained on the chart could zoom in to show the
detail, including the figures written on the chart, or it
could be used to show an overview of the whole chart.
The tutor had a split screen image allowing him to see
all the student sites at once; the students turned off
voice-switching so that their views were fixed on the
signal output selected by the tutor.

The students worked in groups. While the students
were working their microphones were on, allowing the
tutor to listen to the discussion and conversation
within the group. Students placed their completed
charts onto the visualiser to allow the tutor to check
and comment on their work.

When using the visualiser to build up diagrams the
tutor was careful to draw something, withdraw his
hand, and then pause, to allow the image being
received by the students to settle.

**What support was needed**

At one of the student sites there was technical support,
and this site took the lead in dialling up the other sites
and establishing the necessary links. The students at
the other site did not have technical support, and
initially had to be talked through the steps necessary to
get everything set up as desired. They quickly learned
this process, and were happy using other equipment
such as the visualiser.

Weaker students were supported and encouraged by
the others in the group. This worked particularly well
with a group of adults; it may work less well with
younger students.

The tutor was given about half an hour individual
training before undertaking this course.

**Evaluation comments**

The students quickly gained confidence in using the
system. They spontaneously took to waving their
hands as they interrupted with a question, so it was
easy for the tutor to identify the source of the query.

**The Barriers**

Only during the first session did the students show
signs of being nervous about the technology.

Daylight shining on the chart sometimes made it
difficult to see properly, but by adjusting the lighting
this could easily be overcome.

**The Enablers**

Better not to have a local class as well as the remote
students.

**Advice for new users**

We needed to be able to move equipment to positions
that the teacher wanted. In a teaching space the
teacher is likely to rearrange tables, OHP etc., so this
sort of flexibility is important. The sessions benefited
from a variety of activities, some across the sites and
some locally. If you do anything for long enough
everything that can go wrong will go wrong - it isn’t
your fault. Keep a sense of humour.
Videoconferencing in Mathematics

Neil Pitcher

Background

In identifying a subject of common interest to Mathematics students in different universities, we focused on Mathwise, which is a multimedia system produced as a Teaching and Learning Technology Programme project. Mathwise is in use at many universities, but students require training in how best to use it. The aim of the keynote lecture was to have Mathwise experts present the system to students, who would then use it in their courses.

Why videoconferencing was chosen

Our aim was to present a keynote lecture in Mathematics to students in different universities at the same time. Our intention was to experiment with videoconferencing as a medium to achieve this. We carried out a pilot study and have made recommendations as to how videoconferencing might be used more widely in Mathematics teaching.

The Execution

Two groups of students participated, one at the University of Paisley and the other at Heriot-Watt University. One Mathwise expert was at Paisley and presented the system’s Learning Units, whilst the other Mathwise expert was at Heriot-Watt and described its assessment facilities. The Mathwise software was demonstrated “live” via the MAN from one location to the other, using a PC at each site.

Eight students were present at each site, seated in close proximity to the speakers. At one site the speaker was facing away from the students, which made interaction difficult. In order to promote interaction, each presenter spoke for just 15 minutes and questions were invited from the students after each presentation. However, the amount of interaction which took place was limited. Some questions were put to the presenters, but these were mostly asked of the lecturer at the same site. Students seemed to find it harder to ask questions of the presenter at the other site.

However, in the evaluation study students were very positive about the experience. In general, they felt that they had a good opportunity to put questions, but they did feel slightly more inhibited than in a normal lecture. The students said that the videoconference session was more interesting than a normal lecture, but...
this was because it was a new experience. They would like to have more classes by videoconference if this were possible.

A subsequent videoconference session was used to gather feedback from students on the Mathwise system itself. Here the focus was on students’ opinions and discussion, rather than on mathematical information. In this second session the level of interaction among students was far greater. Students conversed reasonably freely between sites.

What support was needed

We benefited greatly from the training provided by TALiSMAN. In fact, without such training we would possibly not even have attempted to use such technology, as it is such a radical departure from the traditional lecture. The training was invaluable as it provided an overview of the technical aspects and also enabled us to consider what the experience was likely to be like for the students, and indeed for us as presenters.

Excellent technical support was provided by each of the universities. Without this assistance, the videoconference sessions could not have been conducted smoothly.

Evaluation comments

Evaluation was carried out via questionnaire and interview. Formal evaluation was carried out within the SUMSMAN project, of which this experiment formed one part. The students were positive about the overall experience of using Mathwise in conjunction with a demonstration session by videoconference. They felt that the videoconference was a good preparation for Mathwise and that the software provided an effective way to learn a mathematical topic.

The students particularly appreciated the opportunity to see a demonstration of Mathwise by two of the experts who had produced the system. They also felt that videoconferencing would be a good method to present classes, particularly when there are too few students wishing to take a subject at any one university.

The students were also asked how they would like to see videoconferencing used in their Mathematics courses. Their response was that they saw it as a useful teaching method, alongside other classes and as an occasional change. Not one single student was in favour of replacing all lectures by videoconference sessions.

The Barriers

The one significant difficulty was with scheduling. Timetables at different institutions are inevitably fixed and large scale flexibility in terms of moving classes to other time slots is not possible to achieve. For our keynote lecture, which was a “one off” event, it did prove possible, by asking favours of various colleagues, to arrange for both sets of students at the two institutions to be available at the same time, and to book the same one hour slot on the MAN.

The Enablers

The keynote lecture was delivered jointly by two colleagues: Dr. Neil Pitcher at the University of Paisley and Dr. David Wild at Heriot-Watt University. Both presenters prepared thoroughly, to the extent of working to a pre-written script and an agreed agenda. As a result the session was conducted smoothly.

The network proved reliable for the session and the quality of pictures and sound was good.

Advice for new users

Through these initial experiences I came to the view that the best use of videoconferencing with students is likely to be in small group work, where interaction is a vital part of the session. In videoconferencing it is of the essence to get students conversing with each other. Possible activities could be student presentations, problem solving exercises sharing computer applications, or student feedback debates on relevant topics.

Keynote lectures are feasible, but interaction is likely to be limited. It may be that a “chat show” format could be an appropriate model for such a session by videoconference. As for the formal presentation of standard lecture material, videoconferencing may have little to offer beyond the simple expedient of making videos and playing them back to students at home or in the lecture theatre.

A general comment is that far more preparation is needed for a successful videoconference session than for a conventional lecture. Preparation needs to give meticulous attention to detail, even to the point of writing a script and planning camera shots.
A Doctoral viva by videoconference

Michael Pitt

<table>
<thead>
<tr>
<th>Teaching context</th>
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<tbody>
<tr>
<td><strong>Subject area</strong></td>
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<tr>
<td><strong>Participants</strong></td>
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<td></td>
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<tr>
<td><strong>Type of use</strong></td>
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<tr>
<td><strong>Length of use</strong></td>
</tr>
<tr>
<td><strong>Project background</strong></td>
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<tr>
<td><strong>Sites</strong></td>
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<tr>
<td><strong>Prior experience</strong></td>
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<tr>
<th>Technical context</th>
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</thead>
<tbody>
<tr>
<td><strong>Conference type</strong></td>
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<tr>
<td><strong>Technology used</strong></td>
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<tr>
<td><strong>Additional equipment</strong></td>
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</tbody>
</table>

<table>
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<tr>
<th>Contact</th>
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<tr>
<td><strong>Contact name</strong></td>
</tr>
<tr>
<td><strong>Contact details</strong></td>
</tr>
</tbody>
</table>

**Background**

The Viva is the culmination of at least three years’ work on a highly specialised topic, and necessarily involves bringing together the candidate with an internal subject specialist and at least one external expert in the field. The candidate discusses and defends the thesis through about two hours of detailed questioning.

**Why videoconferencing was chosen**

Two external specialists had agreed to take this Viva, Professor Parrish from Cambridge and Professor Fox-Genovese from Atlanta, USA. For health reasons Professor Fox-Genovese was unable to travel, and the Viva had to be cancelled at very short notice. While I had a (rather dismal) holiday and contemplated a lengthy delay, Professor Banfill at Heriot-Watt suggested a videoconference with Professor Fox-Genovese, (in spite of his having no prior experience), and this was arranged. The alternative would have been a search for another suitable external subject specialist willing to take on the commitment to reading through the thesis and participating in a Viva, entailing a delay of at least six months. Furthermore, the thesis topic was closely related to the specialist work of Professor Fox-Genovese, making her the most appropriate examiner.

**The Execution**

Professor Parrish travelled from Cambridge to Edinburgh, and all the examiners had a brief discussion via the videoconference link before I was asked to join them in the room. After some initial strangeness, communication felt quite natural and we were able to discuss the thesis very freely. I don’t feel that the “tele-presence” of one member of the panel in any way detracted from the quality of the discussion or distracted my attention from the subject. While one is naturally a little apprehensive about such a major examination, I don’t feel the videoconference element affected this. Indeed it became quite an enjoyable experience and the time passed extremely quickly.

I gather the conference call cost several hundred pounds, which probably compares quite favourably with the cost of travel from the USA.

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4 See Appendix C for a copy of the guidelines for examination by video link drawn up by the University of Edinburgh.
What support was needed

A week before the Viva I visited the studio on campus with Professor Banfill. The technicians provided a very helpful briefing on what to expect, warning me about the possible blurring of the picture if the person at the other end moved too quickly, and also that there would be a slight time-lag in both audio and video, putting the image out of synch with the sound. We were also able to discuss with the technician what seating arrangement would work best. The studio is a fairly small space, but the table and chairs are movable and we were easily able to arrange to sit around the end of the table so that everyone could see and hear everyone else. While the pre-conference visit did help to some extent, I had no experience of a real videoconference beforehand and so was not sure exactly what to expect.

Evaluation comments

As indicated above, the whole experience was quite enjoyable, and I was able to engage in a lively and detailed discussion with Professor Fox-Genovese quite easily. Professor Parrish commented at the end that he had found this discussion stimulating, suggesting that he too had not found the technology obtrusive. Being able to use the visualiser to sketch some diagrams to illustrate points also helped make the meeting more “natural”.

So far I have had no need to make further use of videoconferencing, but would certainly use it for one-to-one or small group meetings and tutorials if the need arose. I am wary of computers replacing traditional paper-based materials, but found this set-up very straightforward. Videoconferencing does impose a rather formal feeling, and I would be hesitant about using it where a greater degree of informality would be helpful. However it offers many advantages over a phone call, for example.

The Barriers

Because this was a “first” for the University, we had to seek special permission to validate a Viva conducted through this medium.

My initial reaction when walking into the room was that it was oddly like a “Monty Python” sketch, three people and a TV set sitting in a room - and indeed I commented on this. However I very soon forgot about the technology. It became a minor difficulty while we focused on the subject matter.

The time delay caused by the ISDN link across the Atlantic was slightly disconcerting at first, and occasionally caused minor problems of people talking across each other, but this was easily overcome. We experimented with the “zoom” facility on the camera but the normal setting allowed us to see each other clearly enough to allow natural communication. I had to ask Professor Fox-Genovese to repeat herself a few times when the sound was not too clear.

The Enablers

The technical support staff did all the work of setting things up and indeed I still don’t know much about the technical side.

Professor Fox-Genovese was either experienced in such videoconferencing or well briefed, as she made no sudden sharp movements or big gestures. The set-up at her end was such that she appeared to be looking directly at me, which was certainly helpful. At this end we had a single mike on the table, which presented no problems. I did not have to move towards it or raise my voice, nor did the others.

Advice for new users

If circumstances prevent a face-to-face meeting, videoconferencing is an obvious and very good alternative. Within Scottish HEIs it is especially easy because the rooms and technical staff are all there for you.
Videoconferencing to provide highly interactive learning environments

Jonathan Side

Background
This BT UDA was a joint award to Heriot-Watt and Aberdeen Universities, and enabled an exploration of the use of ISDN technologies to support various teaching and learning environments with remote sites. At Heriot-Watt University the staff and students involved with the two MSc courses in Marine Resources, at the Orkney and Riccarton sites, provided the basis for all trials.

Why videoconferencing was chosen
Simply being able to deliver the same module simultaneously at both sites at which students are studying for the MSc courses enables far more cost-effective teaching. One aim of the study, however, was to look at teaching/learning contexts where the technology could provide additional benefits (e.g. in role play simulations) rather than merely supporting traditional teaching/learning forms.

The Execution
A number of configurations were investigated for the different teaching and learning modes. Generally the following were adopted for the performance trials. The sites were a classroom at ICIT in Orkney linked to a teaching room at Riccarton.

Formal teaching
A separate high quality audio link was used in conjunction with the VC8000s. PowerPoint graphics or similar were projected using a tablet and OHP. The remote site saw a video image of the teacher on a monitor, alongside the projected graphics. At the host site, the monitor showed the remote side, and graphic slides were projected alongside this. Tripod mounted cameras were used at both sites to supplement the PC mounted cameras.

Tutorials
Set ups varied depending on the nature of the tutorial. With larger numbers, the computer screen was projected. With smaller numbers, students could group around the PC. With smaller groups the videoconferencing system’s audio was used. However most staff and all students opted to use the higher quality audio link where possible. Images were more important in these settings and again were provided by monitors at both sites, if not being projected.
Summary of evaluation responses, comparison with conventional setting.
(Percentages of responses where participants indicated an average or above average positive response to the questions).

<table>
<thead>
<tr>
<th>Trial</th>
<th>Learning</th>
<th>Interaction</th>
<th>Effectiveness</th>
<th>Performance</th>
<th>Sound</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMAL TEACHING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One to Many</td>
<td>98%</td>
<td>78%</td>
<td>98%</td>
<td>85%</td>
<td>*85%</td>
<td>89%</td>
</tr>
<tr>
<td>Many to Many</td>
<td>78%</td>
<td>83%</td>
<td>78%</td>
<td>40%</td>
<td>*75%</td>
<td>71%</td>
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<tr>
<td>Professional Seminar One to Many (Solitors’ CPD)</td>
<td>100%</td>
<td>80%</td>
<td>80%</td>
<td>20%</td>
<td>160%</td>
<td>68%</td>
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<tr>
<td>TUTORIALS</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One to Several</td>
<td>90%</td>
<td>100%</td>
<td>86%</td>
<td>25%</td>
<td>25%</td>
<td>65%</td>
</tr>
<tr>
<td>One to Many</td>
<td>100%</td>
<td>100%</td>
<td>73%</td>
<td>20%</td>
<td>40%</td>
<td>66%</td>
</tr>
<tr>
<td>MEETINGS</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several to Several (Student initiated trials only)</td>
<td>90%</td>
<td>100%</td>
<td>100%</td>
<td>65%</td>
<td>*100%</td>
<td>91%</td>
</tr>
<tr>
<td>MEAN OF ABOVE</td>
<td>92%</td>
<td>90%</td>
<td>85%</td>
<td>46%</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td>CONFERENCES</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One to Many</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>SUPERVISION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One to One</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Indicates the provision of a separate ISDN audio link. † Indicates a cross platform trial.

Meetings
These were mostly set up and operated by the students, with generally small numbers participating. The favoured set up was video to a monitor and seating around the PC screen and monitor. Again, in nearly all cases, the high quality audio link was used if available.

Conferences
At the remote site the set up was just around the VC8000 using its camera and audio. Most conferences sought to display a projected video image or graphics, but rarely both – in contrast with our own preferred configurations.

Supervision
Usually the same as for a small tutorial group, sitting facing PC screen and monitor.

Simulation Exercises
Each set up was designed to fulfil the requirements of the exercise.

What support was needed
There was no formal training but staff were encouraged to have practice sessions so they were familiar with the room set-ups and could adjust these if required. Preparation time is very important, especially for “little” things like using a mouse pointer on a slide. The system introduces a greater formality, which requires some thought. We had technical and evaluation support staff for many of the earlier trials but there is no requirement in general usage for these. The best encouragement for the students was letting them loose on the system. The most useful form of training would probably have been voice training.

Evaluation comments
All trials were evaluated by questionnaire and debriefing. In general respondents were asked to compare the trial with their experience of comparable but “conventional” teaching/learning settings. A summary of results is given above.

The Barriers
Teaching is a social activity, and the use of videoconferencing was always easier where the class and teacher were already familiar with each other. It takes longer to get to know a class using only a video-based teaching link. In general use on the courses, staff found it helpful to have met the students at the remote site prior to first use of a video-link. This reduces the formality. There is little doubt that the quality of the audio link is of paramount importance. Thereafter, for formal teaching, the graphic image is more important than the video image of the teacher. In nearly every case the high quality audio link was used if it were available. Ironically while the newer systems have improved video quality, for many of them, simultaneous graphic and video transmission is not possible, and the audio quality is still somewhat lacking. This simultaneous graphic and video transmission was a huge advantage of the VC8000.

The Enablers
Once familiar with its use, the students at the remote site are the key to successful use. Encourage use of the system by them, even in little things like setting up a camera to ensure they are all visible. Greater success comes from their feeling they can control the technology as much as the teacher. Ideally, design
some group meetings/assignments where they can use the technology themselves, without technicians or teachers.

**Advice for new users**

Like all teaching, good preparation gives greater confidence. Use of these technologies imposes a greater formality, even on informal interactions (e.g. research supervision); those teachers who have very informal styles of delivery (even in formal situations such as a lecture) probably need to think most carefully about this. Our experience suggests that the voice is the most important element. Well-thought-out graphics (and course materials) in formal teaching can underpin the voice communication, and are more important than the video image. The video image is mostly used by students as a reference. In highly interactive settings the video image becomes more important, but still less so than audio. Silent pauses in presentations can be awkward and should be explained. Good chairing of transactions is essential for highly interactive meetings. Users have to have time to become confident in the use of the technology before highly interactive settings (e.g. role play simulations) can succeed.
Videoconferencing case studies

Entrepreneurship: report on multi-national, multi-disciplinary team projects

Bryan Temple

Teaching context

<table>
<thead>
<tr>
<th>Subject area</th>
<th>New product development / entrepreneurship.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course level</td>
<td>3rd-4th year undergraduate.</td>
</tr>
<tr>
<td>Participants</td>
<td>Staff 3 in Glasgow, 2 in Sheffield and 1 in each of the other locations. Tutors provided advice on projects, but were not present at most videoconferences. Students Up to 6 students in development teams from paired institutions. A total of 100 students from 6 institutions were involved. Participants had not previously met.</td>
</tr>
<tr>
<td>Type of use</td>
<td>Undergraduate group project work.</td>
</tr>
<tr>
<td>Teaching methods</td>
<td>Teams of students in separate universities meet weekly by videoconference to discuss progress and to plan further work on their joint project. They also used email and the postal system.</td>
</tr>
<tr>
<td>Length of use</td>
<td>Two years.</td>
</tr>
<tr>
<td>Project background</td>
<td>No special funding, but in AY 99/00 will have SOCRATES funding.</td>
</tr>
<tr>
<td>Sites</td>
<td>Glasgow Caledonian University – Sheffield Hallam University Glasgow Caledonian University – Université de Liège Glasgow Caledonian University – IUT de St Denis, Paris FHTW Berlin – TEI Larissa, Greece</td>
</tr>
<tr>
<td>Prior experience</td>
<td>None, but enthusiastic about new technology.</td>
</tr>
</tbody>
</table>

Technical context

| Conference type              | Point to point.                             |
| Technology used              | Studio based ISDN2 / Desktop VC.            |
| Software                     | NetMeeting enabling shared software applications. |

Contact

| Contact name                 | Dr Bryan Temple                             |
| Contact details              | Department of Engineering, Glasgow Caledonian University, Cowcaddens Road, Glasgow, G4 0BA. Tel: 0141 331 3549 Fax: 0141 331 3974 Email: bkte@gcal.ac.uk |

Background

Group projects have been used to give students an understanding of how different functions of a company are mutually dependant. In the first instance, business students and engineering students have worked in teams to develop new products within an entrepreneurial environment. The principal novelty of this multi-disciplinary activity is that the two different disciplines are geographically separated. Communication is electronic (e.g. by email, fax) and the use of videoconferencing has proved extremely valuable.

Why videoconferencing was chosen

The use of other forms of communication between geographically separated sites has proven unsatisfactory for group projects. Students had suggested videoconferences when they complained about the difficulty of getting information from the other site by e-mail or fax. The problem is not the medium, rather the twin uncertainty of knowing if the recipients have, in fact, received the message and, if they have, are they doing anything about it? This uncertainty demotivates the students.

The Execution

Contact was made for 15/20 minutes on each of the 12 weeks of the project. Students were seated in a triangular array in front of the PC. One person operated the keyboard (if needed). There were no more than 6 students to a team. Training was minimal, they were told how to operate the machine and to have a pre-agreed agenda. After that they had to learn by themselves. This proved successful in that they learned very quickly and liked the medium.

What support was needed

None, except for those students using ProShare5 who needed careful instruction on the use of shared applications. In practice, those using this package

1 PictureTel and ProShare are systems which support PC-based (desktop) videoconferencing.
were continuously supervised during the first year of operation. Subsequent years will see a training programme followed by minimal supervision.

Evaluation comments

Torsten Geisler and Claudia Nahl, students from the FHTW, Berlin:

“A few month ago we attended a videoconference which was held during a Socrates meeting at our university. We were really enthusiastic about this form of communication. Using videoconferences opens the possibility to answer questions immediately and to see the reaction of the conference partner. This helps to develop a personal relationship and a feeling of responsibility.”

“Last term we worked on a project together with students from a Greek university. Our only possibility to communicate was sending e-mails. Many difficulties occurred during our project because of the missing of a personal contact to our team-members in the other country. It would have been easier for us if we had developed a certain group-feeling which did not exist almost at all in our project-group because of the anonymity of e-mails. Videoconferences could have avoided many misunderstandings and delays because one could have cleared important questions directly or even start a discussion.”

“We are convinced that videoconferences are very useful and this technique should be available for all students in the future, at least for those who work on international projects.”

Here are some extracts from a reflective evaluation that students submitted as part of their assessment of the module:

“unbelievable what body language signals were picked up…seemed to shrink in their seats.”

“it allowed a bond to be created that you cannot get on a phone or by email…”

“definitely improves communication…”

“you can intimidate them when they do not pull their weight…”

“very beneficial for good quality contact and debate.”

“work with Glasgow greatly improved with the introduction of videoconferencing.”

“real life situations are highlighted by the problems encountered.”

“important to have a good degree of communication for successful completion of a project.”

“this is the first group project I have enjoyed…”

The Barriers

ISDN costs money. Internet based applications are cheaper and will most often provide adequate operation. We are conducting a survey to understand the limitations of Internet connections at different times in the working day and between different countries. It is anticipated that for some countries and some times of day ISDN will provide a faster and more reliable connection.

The Enablers

Students love it.

Advice for new users

Jump in with both feet and then evaluate what you’ve got. New users to ProShare should avoid NT at the moment until some bugs are fixed (Windows 95 is fine). Letting students have control of the conferencing, leaving them to get on with it after initial training, seems to work well.

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6 Text of this paper is available on application to the author. It has been presented to the conference on “New Horizons in Industry”, Santorini, September 1999.
Lessons for lessons

Here is a short list of some of the lessons learned in the case studies, and their implications for the planning and design of sessions. The “Further information” section gives details of resources for all aspects of videoconferencing.

Teaching and Learning Styles
As with any teaching event, the effectiveness of a videoconference session will depend on clear aims and objectives.

- Consider the possibilities of seminars, tutorials, group working sessions, and access to multiple media (videos, websites, shared software, etc.).
- Get participants involved by asking questions, encouraging discussion, or setting groupwork tasks. These can be local (i.e. off-line) or across several sites (i.e. on-line).
- Plan for a variety of activities to provide a regular change of pace.
- Plan interactive tasks that are meaningful in terms of the lesson and educationally useful.
- Use the special camera facilities (presets and zooms) to focus on current speakers.
- Take advantage of the technology to use a wide range of “props” and illustrative material.
- A videoconference session may require more detailed planning than traditional live teaching.
- Take account of participant numbers in planning the session, especially for the types of presentation and interaction being used.
- A detailed lesson plan with a timetable is an essential tool for successful videoconferenced teaching.
- Avoid being just a “talking head” on screen, by using visual aids and changing the camera shot.
- A “live” teacher gets feedback all the time from body language, facial expression etc. Videoconferencing doesn’t always give a clear enough picture for this to be useful, so you need to build in pauses to ask for feedback.
- Creating a “remote lecture” is the least effective use of videoconferencing for teaching. Its main use is where a visiting expert could not otherwise deliver a presentation.
- Lecture type presentations should, ideally, include some interaction, such as question and answer or discussion sessions.

Remember - everything takes longer than you expect.

It’s easy for a teacher to slip into addressing only students in the same room, and pay less attention to remote students.

- Build interaction with remote students into the lesson / tutorial plan.
- Stay aware of what remote sites are seeing at any given time. In a multi-point call you may not be visible all the time, or the on-screen image may be very small.
- Locate the camera(s) and remember you need to look at the camera, not the monitor, if you wish to appear to be looking at participants at the remote site.
- Practice giving clear feedback that you’re paying attention. Visually: nod, smile, and if possible place the camera above the monitor so that you appear to be looking at the speaker. Verbally: for multi-point conferences you may not always be visible.
- Remember that gestures or moving around too much may cause problems for remote viewers.
- Forget that you’re “on camera” and try to keep things as natural as possible.

Speaking to strangers in this alien environment can be daunting.

- If possible, arrange for all the participants to have met “in person” before videoconferencing, at least for the participants at each site. This encourages interaction.
- Allow time for local groups to talk and for cross-site introductions, or leave on-air time for coffee and chat.
- Make sure there is a teacher or facilitator at each site, at least at the beginning or for first use.
- Spend time at the beginning introducing the lecturers, facilitators and the students, especially if you are planning group working.
- Make sure all participants are familiar with any technology they may have to use in the session.
- Set realistic expectations of the participants at the start, make sure everyone knows what is expected of them.
- Being “on television” and in a studio can make the conference very formal. Try to use activities which encourage formality and participation. Seating arrangements are particularly important.
- Some studios and rooms have an inflexible layout which may not be ideal for your session. If necessary, think of ways to work round problems such as the speaker not being able to see students in the same room or having to sit in fixed rows.

Although the ATM videoconferencing network is very high quality, there are limitations imposed by the technology.

- Looking at a screen, however large, can be tiring. Plan to provide a change of activity or focus every ten minutes or so.
- Large text and illustrations are needed to appear clearly on monitors and projectors. Text must be at least 24pt. Remember the “landscape” format of the screen. You may need to revise course materials such as slides and PowerPoint presentations to allow for this.
- You can also show 35mm slides and actual objects.
- Some video presentations, websites or animations may move too quickly for clear transmission. Check the quality at remote sites before you use them.
- Use dark or bright colours against a pale background.
- “Busy” fabric patterns and “busy” illustrations can blur or distort in transmission. For ISDN conferencing try to avoid using or wearing anything with lots of small detail.
- Moving around when you are on camera but not speaking can be distracting.
- Microphones can pick up background sounds. In larger groups speakers have to “take turns” and facilitators manage discussion sessions accordingly.
- If a mute facility is available, is good practice to mute the sound from your site while another site is transmitting, to avoid feedback and distraction. Remember to turn the sound back on when you need to speak.
- Similarly, remember to switch from preview to transmit mode for vision, and to refresh still images sent from the visualiser as required.

**Equipment**

You and the other participants will be using unfamiliar equipment, and be dependent on it to make the event run as planned.

- Practice using it before the session begins, to build experience of and confidence in the equipment.
- Take part in a videoconference someone else is running before you run your own.
- Know who to contact for technical help at each site.
- Check the quality of sound and vision is adequate at all participating sites. This is especially necessary if some participants are not using the MAN ATM network.
- Provide remote sites with hard copies of handouts, slides and any other materials to be used, before the videoconference.
- Have backup plans for continuing or re-scheduling the lesson if the connection fails.
- Fixed room bookings mean that sessions using videoconference studios must run to time. Time the lesson plan and practice your time-keeping skills.

**Potential barriers to success**

- **Timetabling.** The complexities of finding a suitable time-slot for students and teaching staff across more than one institution can be formidable. For use as an integral part of the curriculum, students across institutions have to be at the same stage of their courses.
- **Cost.** While the Scottish MAN network is funded centrally and therefore free to individual users, conferencing outside this network incurs charges which can quickly mount up. In some cases they may be high enough to eliminate any savings made on travel expenses etc.
- **Facilities.** Not all videoconference suites or roll-about systems provide the additional facilities which might be required, such as the possibility of sharing applications or providing high-quality visuals. In some cases on-line and off-line activities might have to be modified to take this into account.
- **Flexibility.** The layout of videoconference suites and camera angles, etc. may not be flexible enough for some teaching situations.
- **Staffing.** Some studies found the need to have a staff facilitator at each site limiting. Others advocated letting students control the technology and select a facilitator from amongst themselves.
- **Formality.** Videoconferencing seems to promote a more formal approach than a face-to-face interaction, so teaching styles and methods must be modified to take this into account and if necessary promote informality and interaction.

- **Time-lags.** ISDN2 or desktop (Internet) videoconferencing can introduce significant time-lags. This can inhibit discussion and make students reluctant to interrupt.

- **Unfamiliarity.** The situation is likely to be unfamiliar to both staff and students, and this can inhibit communication. However most studies suggest that this unfamiliarity can be rapidly overcome.

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**In summary**

Using a videoconference to deliver part or all of a course means that some or all of the course content and structure will have to be re-designed. The case studies here show how this can be used as an opportunity to improve what is on offer to students and to re-think and explore alternative teaching methods. For most participants, this will be a new form of interaction, so give everyone involved time to get used to it. Because Scottish HEIs have their MAN links, very cost-effective and high quality videoconference use is possible. As with any teaching situation, careful preparation and planning pays dividends in promoting a successful experience for all.
Further Information

Pedagogic information

Blueprint for Interactive Classrooms

http://www.linov.kuleuven.ac.be/bic/index.html

Site for European Union Telematics Education and Training Project “Blueprint for Interactive Classrooms”, includes links to a wide range of demonstration projects. These make extensive use of videoconferencing and discuss pedagogic aspects of telepresence. Project publications include “Classrooms for Distance Teaching and Learning - A Blueprint”, which can be ordered from this site.

Practical Guidelines for Teaching with Videoconferencing

J Burns, R Lander, S Ryan and R Wragg, De Monfort University. JISC JTAP Report 37/99. These guidelines are based on extensive experience in HE institutions. They are aimed at users of room- or studio-based systems with medium or large groups of students. There is a useful section on using spreadsheets for planning. Available as html or Word 97 format download from http://www.jtap.ac.uk “reports” section.

LEVERAGE: Learn from Video Extensive Real ATM Gigabit Experiment

http://greco.dit.upm.es/~leverage/

A three-year European Union Funded experiment looking at the use of high-speed and high quality networks to give learners real-time video connections to assist language learning. The project finished at the end of 1998 but newsletters and information continue to be available on the website. There is a lot of helpful discussion of the pedagogic implications of this type of videoconference use.

SAVIE - Support Action to facilitate the use of Videoconferencing in Education.

http://www.savie.com

An EU-funded Telematics Applications Programme which maintains a very wide-ranging searchable directory of resources - including guidelines and handbooks. There is a manual, “Videoconferencing for learning”, which can be downloaded as a pdf file, and there are online courses which can be downloaded for a small fee.

Survey of User experience of the University of Wales Video Network

http://www.man.ac.uk/MVC/SIMA/wales/title.html

A report on this survey carried out between December 1994 and January 1995. It includes a tutor’s guide to using videoconferencing and a checklist for use.

University of Ulster videoconferencing services

http://www.ulst.ac.uk/mediaservices/pages/vc.html

The University of Ulster has participated in a number of major videoconferencing projects. This site provides outlines of the technology available and links to details of projects such as ACTOR (Applications for ISDN Communications Technologies to Extend OutReach) and NEELB (videoconferencing in secondary schools).

Video conferencing in a learning environment. A tutor’s manual

http://www.lews.uchi.ac.uk/vcman/

A really helpful manual for the use of videoconferencing for teaching and learning in further and higher education. Produced by Lews Castle College for the University of the Highlands and Islands Project, it is aimed at tutors wishing to make use of videoconferencing. Covers all the necessary points at least at an introductory level, and is sufficiently clear and general to be applicable to a wide range of circumstances including different types of videoconferencing equipment.

Projects and further examples

ECSTASY: Enhanced Collaboration with Shared Tools for Art+Design Systems

http://www.rave.ac.uk/ecstasy/project.html

A JTAP funded project at Ravensbourne College which is exploring a variety of tools and methodologies for supporting collaborative work in art and design, including videoconferencing.
Videoconferencing in the Valleys

Gornall, L, Pengelly, S and Shearn, D. A case study of the “ALPs” Project. University of Glamorgan. JISC JTAP Report 35/99. In this outreach project, the University of Glamorgan made PC-based videoconference support available to adult learners via community centres throughout the valleys of South Wales. The report is available as html or Word 97 format download from http://www.jtap.ac.uk "reports" section.

ICON: Institutional Collaboration over the Network

http://cvu.strath.ac.uk/courseware/cvds2/index.html

The Clyde Virtual University has now hosted two ICON projects as part of the Clyde Virtual Design Studio. These pages outline the aims of the ICON and ICON2 projects and illustrate some of the students’ project work.

Minimal Access Therapy Training Unit for Scotland (MATTUS)

http://www.dundee.ac.uk/surgicalskills/mattus.html

An extensive video training network has been constructed to link seven training hospitals throughout Scotland to the three Scottish Royal Colleges and the SSU MATTUS laboratory training facilities. The network supports live clinical (endoscopic) video material transmission for inclusion during formal MATTUS laboratory based courses or didactic courses. Multi-point transmission of special events and courses is a feature of the system, which has been operational since May 1996.

NEAT: Networked Expertise, Advice and Tuition, University of Wales

http://www.aber.ac.uk/~dcswww/Telematics/NEAT/

This site is an online facility which enables students to receive help at their workstations from remote advisers using desktop videoconferencing and remote application control. A good example of using technology to support learning.

RELATE: The REmote LAnguage TEaching project

http://www.exeter.ac.uk/pallas/relate/

The University of Exeter is developing and testing videoconferencing software for language teaching. The site includes information about this specialist software in use and a number of links to further information.

Using and booking videoconferences:

technical information

Advisory Group on Computer Graphics

http://www.agocg.ac.uk/

Although AGOCG no longer exists, its website continues to host the SIMA Reports (Support Initiative for Multimedia Applications), many of which examined videoconferencing in UK HEIs. Most of these look at technical aspects of videoconferencing, but some consider its impact on teaching and learning. While a little dated now, still useful as there are so few studies of videoconferencing in use in HEIs.

British Educational Communications and Technology Agency

http://www.becta.org.uk/index.html

Useful background information on technology for videoconferencing, including a factsheet which lists suppliers and other sources of information. Use the site’s search facility to find videoconferencing links.

ISDN Technology

http://www.isdn.bt.com

BT’s ISDN site which has a FAQ section on ISDN and current information on services available, installation options and prices.

JANET Videoconferencing Services

http://www.jvcs.video.ja.net/

Outlines the SuperJANET video network and the Scottish Metropolitan Area Networks. Has technical information, current bookings and details of how to book sessions using these networks. Includes a link to the Scottish MANs site and a MAN user guide.

TALiSMAN videoconferencing site

http://www.talisman.hw.ac.uk/studios/index.html

This TALiSMAN site has a directory of Scottish MAN videoconferencing studios, a brief technical guide to ATM videoconferencing, and a number of useful checklists.
Videoconferencing Advisory Service

http://www.video.ja.net/

Part of the JANET Service which provides support for the use of videoconferencing through the UK Higher Education Network. Includes the Multimedia Conferencing Applications Archive, maintained as an archive of downloadable tools developed as part of the JANET projects. Information is mainly on ISDN conferencing.

Videoconferencing Cookbook

http://www.sunsite.utk.edu/video_cookbook/

Online manual from Southeastern Universities Research Association, designed to assist educational users in the Southeastern United States. Clear and well-presented introduction and good links to more technical material.

Videoconferencing glossary

http://www.kn.pacbell.com/wired/vidconf/glossary.html

Pacific Bell glossary of videoconferencing terms, designed for non-technical people! The Pacific Bell site has links to several introductory publications including Pacific Bell’s Manual on videoconferencing and a larger, more technical, directory of videoconferencing terms.
Appendix A

Videoconference basics

Videoconference links
Videoconferences can be:
- point to point (directly linking two sites) or
- multi-site (three or more sites).
These refer to the number of sites linked by the conference, not to the number of people participating.
Multi-point conferences can link all sites equally, or can be a main site linked to remote sites. The efficiency and therefore quality of sound and vision can be affected by the type of link used.

Types of videoconference
There are three main types of videoconference:
- Desktop conferencing using the Internet (IP) network
- ISDN conferencing using special digital telephone lines
- ATM conferencing as in the Scottish MANs (Metropolitan Area Networks).

Desktop IP videoconferencing
This system uses the Internet to link desktop computers running videoconferencing programmes.
The advantages are:
- It is cheap. You need any PC, an Internet link, cheap video camera and microphone, and special videoconferencing software (also fairly cheap).
- It is accessible: you can videoconference from your own desk, at any time.
The disadvantages are:
- Sound and picture are very poor quality.
- You are dependent on an Internet connection, which can be very slow.
- It is not suitable for medium or large groups of people to use, gathered round a PC.

ISDN videoconferencing
This uses digital phone lines (Integrated Services Digital Network) and special connections. The numbers (2 to 32) indicate the equivalent number of phone lines being used.
The advantages are:
- Widely available in Higher Education Institutions.
- Ranges from ISDN2 to ISDN 32. Most HEIs which use ISDN have ISDN6.
- ISDN6 offers reasonable quality sound and vision.
- Often available as a portable “box” which can be used in any room with an ISDN connection.
The disadvantages are:
- ISDN2 is poor quality.
- Installation and equipment can be expensive.
- Availability is restricted to where the lines are connected.
- ISDN line charges for use, especially where ISDN6 or more is used, can be high.

ATM Videoconferencing
Makes use of the cabled MAN connections in Scottish HEIs and special technology which compresses and bundles up the signal (Asynchronous Transfer Mode).
The advantages are:
- Very high quality sound and video.
- Fast and reliable conferencing in dedicated suites.
- Available throughout Scottish Higher Education institutions.
- Free at point of use.
The disadvantages are:
- Can only be used in dedicated suites.
- Some suites are not set up for flexible use.
- Must be formally booked in advance and so may cause timetabling difficulties.

Videoconferencing equipment
All videoconference participants must have, as a minimum
- camera
- microphone
- conference management software
- display monitor.
In addition, dedicated videoconferencing suites in HEIs are likely to have some or all of the following:

- Visualiser (or document camera): used like an overhead projector, can deal with slides or paper.
- VCR connected to conference so that video tapes can be shown.
- Monitors: large monitors used to present the main picture to participants, smaller monitors to present other views or line up pre-set shots.
- Projector and screen: can provide a large image, especially useful for large rooms and lecture theatres.
- Computer and scan converter: allowing computer images to be sent across the videoconference network.
- Data conferencing software. Runs in parallel with the videoconferencing session: allowing participants to share data and applications between sites.

### Booking a videoconference in Scottish HEIs

The booking system for videoconferencing throughout the Scottish MANs is straightforward. All the information you may need for this is available via the UKERNA site on [http://www.jvcs.video.ja.net/](http://www.jvcs.video.ja.net/). From this site you can find:

- A list of sites connected to the Scottish MANs
- A list of current bookings of these sites
- A list of who to contact at your own site.

Check the availability of all the sites you plan to use, and contact the person in charge of bookings at your local site. They will need dates, times and the other site contacts for the meeting.

The checklists in the following section provide further guidance on arranging a videoconference.
Appendix B

Video Conferencing Minimal Manual

**Weeks/Days before the videoconference**
- Share information between local and remote sites.
- How many students/presenters at each site.
- How many sites.
- Mail accompanying literature for support of conference.
- Confirm who is dialling whom and when. Have alternative contact (voice) numbers available in case of technical problems.
- Test compatibility between different systems if this is the first videoconference between the sites.

**Room set up**

**Screens**
- Ideally, each site should have two screens, one showing outgoing video, and one showing incoming video.
- Aim to have no more than as many people per screen as inches across display (i.e. a 28” monitor can be viewed by no more than 28 people).

**Microphones**
- Lapel microphones are the preferred audio system for presenters.
- Add ambient microphones throughout room for added realism and accessibility.
- Try to avoid “push to talk” microphones: they interfere with natural dialogue.
- Voice-activated microphones tend to break up the audio signal.

**Audience(s)**
- Remote: Cameras should be placed so a remote site can see both the presenter and local audience (if present).
- Local: Audiences should be able to see both remote site and local presenter.

**The Presenter**
- Plan and rehearse presentations.
- Allow involvement of remote site and local site: do not forget to involve both audiences.
- Special considerations should be given to the timings of the presentation. A slick performance is especially needed when video conferencing. Think about:
  - Time speaking vs Time summarising.
  - Time explaining vs Time for audience to think it over.

**Just Before The Videoconference**
- Encourage informal interaction between sites. A warm up period will allow you to get the most out of your audience once the videoconference session starts.
- Personal introductions of participants.
- Games for breaking the ice.
- Camera panning around room (if possible).

**During the Videoconference Consider the Following Points**

**Oral**
- Speak clearly and try to maintain a constant volume.
- Pause often for reflection.
- Allow for time delay when in a discussion.
- Clearly indicate when you have finished talking and are expecting a reply.

**Visual**
- Most subtle expressions will either be lost or exaggerated.
- Avoid excessive movement.
- Avoid pointing devices (will not be seen).
- When initiating conversation, use hand signals to highlight who is speaking.
- Keep pictures or images on screen for long periods of time.
- Do not move pictures once they have been positioned.
- Avoid poor quality (second generation or worse) video.
- Wear low contrast clothing (subtle colours).
Keeping the Remote Audience’s Attention

Orally
- Give attention to talking through presentations.
- Explain clearly each new area of the presentation.
- Constantly summarise each section.
- Pause often for questions.
- Actively attempt to involve the remote audience by asking questions, etc.

Visually
- Use different media to keep attention (slides, images etc.).
- Allow for visual gags where possible (cartoons etc.).

Discussions
- Allow for breaking the ice between sites.
- Have one controller or chairperson who oversees interactions.
- Attempt to involve everybody from all sites.
- Attempt to use personal names where possible.
- Begin talking by visually and orally identifying your name and site.
- Allow long time for turn taking.

Just After the Videoconference
- A virtual Coffee bar.
- Allow for period of “warm down”.
- This must be done with the videoconference link still active as there is no informal period after the session when any student can interact with lecturer in an informal “coffee bar” setting.

Day(s) After the Videoconference
- Send out (and get back!) questionnaires to participating students for feedback to incorporate into the next session.

This is an extract from “Video conferencing in a learning environment: a tutor’s manual” produced by Lews Castle College, University of the Highlands and Islands Project. It is reproduced by kind permission of UHI. For full details see the Further Information section.
Appendix C

University of Edinburgh Guidance notes / checklist for oral examinations by video link (PGS 250/3)

The normal expectation remains that the oral examination will be held in Edinburgh. If exceptional circumstances make it necessary for an oral examination to be conducted by video link, the following guidelines should be observed.

The authority for any such decision lies with the faculty PGS committee on written application from departments. In considering applications for the conduct of examinations in this way, Faculty Committee will expect cases to be fully costed. An application to conduct the examination via ISDN link should be considered only if circumstances make it impossible for the candidate to return to Edinburgh within a reasonable period, or if this is the only means by which the most appropriate external examiner could undertake the examination.

1. The oral should normally be held between two sites only, with the candidate accompanied by one of the examiners. A supervisor may attend, if appropriate, under the normal rules of attendance.

2. Exceptionally, three sites may be used. In any such case, the candidate must be accompanied by an approved authority under suitable guidance. If the candidate is abroad, such an approved person might be a British Council representative.

3. The candidate and each of the examiners must signify in writing their agreement to conduct the examination in this way. Prior to making a decision, they should have the benefits and difficulties of the technology explained (i.e. that there may be a break in the link mid-examination; that over long distances, scheduling the examination at a conventional time may be problematic; that there may be some time delay that could slow the flow of discussion; and that normal forms of cueing and interrupting do not work in the same way as in face-to-face contact).

4. Appropriate training must be provided to candidates and examiners. If necessary, skilled operators should be present at one or all sites. Examinations should only proceed when candidates have signified in writing that they feel confident about operating the system. The candidate should not feel under any pressure to acquiesce to being examined by video link, but, having given such an assurance, a candidate will not normally be permitted to appeal against an adverse result on grounds connected with her or his ability to operate the system.

5. Flexible seating arrangements should be made that encourage direct interaction between the candidate and examiner at the same site, rather than with the camera.

6. If the internal and external examiners are at separate sites, they must take account of their need to consult privately with each other on the conduct of the examination; how the pre-oral discussion should be conducted; the form and sequence of questions; who should take the lead at various stages of the oral; what graphics, and document viewing facilities, etc., might be required. Examiners must not be in contact with each other until each has submitted the Part I report.

7. As part of the video link, examiners should discuss and agree privately the content of Part II of the examiners’ report so that their recommendations may be conveyed to the candidate. Their final signed report must then be submitted in the usual way.

8. The candidate’s department will be responsible for any costs which are incurred in the provision of special training to the candidate and/or the examiner(s), and in the attendance with the candidate of an approved person. Examiners’ costs up to the normal limit will continue to be met from central funds for external examiners. If the examination is to be conducted using the ISDN link, the department concerned may be asked to pay only those costs which could be regarded as being beyond the normal limits. If the link is to be used because of the candidate’s inability to return to Edinburgh, the department will have the discretion to require the candidate to contribute all or part of the additional costs.

Discretion to make use of the video facility for examinations should rest with the Faculty Committees. However, it would be useful for the SPGSC to receive detailed reports over the first two years on costs and procedures in order that experience can be profitably shared, and a more detailed set of guidelines and instructions compiled, if necessary. These notes should be made available to candidates when oral examinations are to be conducted by video link.

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