



HUSAT

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The Use of Videoconferencing in Higher Education

**A Report to the Advisory Group for Computer Graphics
(Support Initiative for Multimedia Applications)**

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Executive Summary

This report documents the results of a survey of managers and users of videoconferencing in higher education. It discusses the results in the context of a previous survey conducted in 1994 with the aim of providing a longitudinal picture of videoconferencing use.

The survey used two main data collection methods; electronic mail questionnaire and field site investigations of 5 user sites which included interviews with managers and users. A telephone interview with a representative of UKERNA (UK Education and Research Networking Association) also contributed to the data collected.

Information is provided about the technical aspects of videoconferencing as it is currently used (e.g. network, systems, software), applications of videoconferencing, management structures and procedures (including mechanisms for policy making, financial management, etc.) and finally the subjective views of the users and managers of videoconferencing. The picture is contrasted with that of 18 months ago where appropriate and tentative patterns of videoconference use are suggested.

The report concludes that the main lessons that have been learned in the last 18 months are:

- more support and information is needed when setting up large scale videoconferencing than was previously thought
- network reliability has to be acknowledged as a priority along with the need for good technical support to maintain the infrastructures
- major changes of network or equipment need careful planning
- there is a need to be realistic about expectations.

A polarisation of predicted growth was reported pointing to a) desk-top videoconferencing and b) large scale videoconferencing (particularly for teaching purposes) as being the likely expansion areas..

It was concluded that success of videoconferencing (particularly for studio or room-based systems) was to a large extent dependent on management which requires a great diversity of skills and experience, often spanning the expertise of several academic departments or service groups.

The future of videoconferencing in higher education looks to be assured with new networks planned along with greater ISDN connectivity.

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1. Introduction

1.1 Objectives

The main objective of the project was to provide a longitudinal picture of videoconferencing in Higher Education, giving information about:

- the ways in which videoconferencing is currently being used in higher education
- how things have changed in the last 18 months
- possible patterns of use that may help those just starting to use videoconferencing
- future trends in videoconferencing for higher education

The aim of this report is to be a document of practical use to users and managers of videoconferencing (both existing and new). Videoconferencing is referred to as VC throughout the text; other abbreviations can be found in the glossary.

1.2 Background

This project is a follow-on to a study conducted by the HUSAT Research Institute (Butters, Clarke, Hewson and Pomfrett) in 1994. Part of the original project involved a survey of users of VC in higher education. This provided a small snapshot picture of the way in which some users in higher education were making use of VC facilities. It was also able to provide some advice in terms of lessons learned and successful strategies for new users just beginning to VC.

The new study aimed to extend the original survey by :

- obtaining current data where possible from the original respondents and thereby providing a longitudinal picture of usage
- extending the sample to include additional respondents and retrospectively collecting historical data
- making in-depth studies of a sample of institutions including field site visits and interviews with both the service providers/managers of each site and also with users where possible.

2 Method

2.1 Recruitment

Subjects were recruited from:

- respondents to the 1994 survey
- delegates attending the Universities and Colleges Software Group (UCSG)- Workshop on Conference Systems
- our own contacts
- individuals suggested by other subjects.

2.2 Data Collection

The survey was conducted in two stages:

Stage 1: Electronic mail survey.

An initial invitation to participate in the survey (sent by conventional mail) was followed by the survey itself (by electronic mail). A total of 57 letters were sent to 44 different higher educational institutions.

15 People responded by saying that they were unable to participate or were unsuitable for involvement in the survey.

Those who agreed to take part (in some cases following a reminder) were sent the following email message to establish which parts of the questionnaire they should be sent.

Thanks for agreeing to participate in our survey. We have decided to personalise the questionnaire as far as we can so that we do not clog up the network with too much redundant information. It will also hopefully mean that you do not have to scroll through pages of questions that are not relevant for you. To this end, I would be grateful if you could answer the following introductory question:

*What uses do you currently have for videoconferencing?
Please choose one or more of the options below by deleting any that are inapplicable.*

*Please indicate clearly whether you *personally* are a user for each option or whether you are solely the service provider/manager for that use.*

- A. Personal/informal communication (e.g. with friends/close colleagues to include information not always directly work related)*
- B. Presentations (e.g. of academic nature or for clients but not specifically for teaching or learning purposes.)*
- C. Teaching or learning (e.g. for distant learning purposes)*
- D. Research (e.g. working with project partners at remote sites)*
- E. Collaborative work (but not specifically of a research nature)*
- F. Interviewing (e.g. for recruitment purposes)*
- G. No use yet (intend to buy videoconference facilities or already have access but haven't yet used videoconferencing.)*
- H. Other (not covered in above sections) - Please specify.*

If you have indicated any areas where you are not a user personally, it would be useful if you could give us email addresses of other users (with their permission of course). For these other users, the questionnaire will be very short.

When we know which version of the questionnaire to send you, either myself or another member of the team (Chris Carter and Rob Graham) will forward it to you.

Thanks a lot for your co-operation,

Sue Pomfrett.

Depending on the response given, a personalised questionnaire was sent (again using electronic mail) by choosing appropriate parts of the complete questionnaire. Most participants were asked to complete only a small part of the whole questionnaire. In one case because of time constraints, a very much shortened version of the questionnaire was sent. (See Appendix 1 for the complete questionnaire.)

There were 17 responses to this final questionnaire from 12 institutions of higher education.

Stage 2: Field investigations

Field investigations were conducted in 5 of the survey sites. These included interviews with service providers/managers and also with users. Details of interview structures can be found in Appendices 3 & 4.

A telephone interview was also conducted with a representative of UKERNA (UK Education and Networking Association). See Appendix 5 for the interview structure.

2.3 Profile of respondents (in email questionnaire)

Many respondents to the email questionnaire had two 'roles'; being both service providers and users (10 out of the total of 17 respondents). Four respondents were either service providers (n=1) or users (n=3), and a further two were not currently using VC but hoping to either use it or provide a service in the future. Among the 17 respondents there were 3 users of computer-based desktop VC, the remainder being users of studio-based and/or dedicated desktop VC. Respondents had different job titles; they varied from research assistants, lecturers, to audio visual co-ordinators, system managers, support officers and directors. Most stated their main field of interest to be audio visual services, distance teaching or computing.

2.4 Field sites

2.4.1 Rationale for selection of sites

The criteria involved in choosing field sites were as follows:

- Self selection; it was important to visit only those sites which felt that they could accommodate such a visit.
- SuperJANET administration; Edinburgh was chosen as it plays an important central role in the infrastructure of VC in the UK.
- Geographical location; two of the field sites were located in England, one in Scotland, one in Wales and one in Northern Ireland.
- Type of VC; the sites used a wide variety of systems, including large-scale studios, roll-abouts, dedicated desktop systems and computer-based desktop systems.
- Stage of development; each site was at a different stage of development, with VC well established at Wales and Ulster, recently implemented at Edinburgh and Nottingham, and only just being planned at Loughborough.

2.4.2 Description of the field sites

This section describes brief histories and a background to the VC services at each site.

University of Wales, Cardiff

VC was set up at the University of Wales in 1990, with funding from the UFC (now the HEFC) to foster the teaching and learning of the Welsh language. The University network consists of five sites; Cardiff, Aberystwyth, Lampeter, Bangor and Swansea, as well as a medical college which uses the Cardiff facilities. British Telecom installed the network and equipment, and provide advice and technical support. The system was updated in 1995.

The Cardiff site has a dedicated VC studio which can seat 6 people at a conference table and 30 people in an auditorium seated behind the main

conference table. There are facilities for displaying 35mm slides and OHP transparencies, and for document display. The studio is a university wide resource and individual departments are not charged to use it. The main uses for the service are teaching/ learning, and internal meetings, but the facility is also professionally marketed and hired out for commercial use. In addition to the internal network, the computing centre at Cardiff runs a SuperJANET link, but this was not investigated in the present study.

University of Ulster

The University of Ulster is made up of the four geographically-distant campuses; Coleraine, Jordanstown, Magee (Londonderry) and Belfast, which merged in 1984. VC was commissioned in 1990, in response to the merger, to improve communications between the campuses. Funding for the initial service came jointly from the EC-funded STAR project and the Department of Education for Northern Ireland.

VC is in fairly frequent use, mainly for teaching and administrative meetings. Each of the four campuses has a main studio and at least one roll-about unit, as well as desktop systems, some of which are operated by independent faculties. Most of the equipment is provided by BT and run over an ISDN network (ISDN-2 to ISDN-6 facilitates external use and ISDN-30 for internal communications). There are varying facilities at each location including projection equipment for documents, slides and OHPs, video recorders, and additional microphones, monitors and cameras for the main speaker and audience. An upgrade in 1995 included a new MCU (Multi-point Control Unit) which allows up to 8 sites to be connected in one or parallel conferences, and internal compatibility at the H320 standard.

University of Edinburgh

The University of Edinburgh are contracted by UKERNA to co-ordinate the SuperJANET video network, which was set up in 1994. Their responsibilities include booking calls that use the infrastructure, and setting up/ switching calls via the four MCUs, two of which are located at Edinburgh.

Two distinct types of VC are active at Edinburgh. A permanent studio was set up in 1994 in the Computer Services department and runs over the SuperJANET network at 2Mbps. This facility can seat around 10 people at a conference table and has the provision to display OHPs, slides and documents through a visualiser, and also show and record video. It is used quite infrequently, mainly for technical meetings and some medical teaching.

Computer-based desktop VC has been in use at the University since 1992, using the Mbone network, a virtual network that shares the same physical media as the Internet. The conferencing software generally runs on workstations or PCs, with additional software which allows facilities such as a shared editor and shared whiteboard. Desktop VC is supported by the MICE (Multimedia Integrated Conferencing for Europe) National Support

Centre, which provides software and network support. It is used mainly by individuals to participate in conferences and seminars.

Nottingham University

VC began at Nottingham in 1994 after they were selected to be one of the SuperJANET pilot sites. UKERNA provided them with a GPT Codec and an echo canceller; these were then combined with existing Audio-visual services equipment including a document/ OHP camera and a video recorder. Conferences take place from a dedicated studio over the SuperJANET network at 2 Mbps.

The service is supported jointly by the audio-visual and educational services department and the computing services department. There are only a small number of users, mainly from two departments in the medical school and computing (mostly the latter). Almost all of the conferences are with other SuperJANET sites, but it has also been used for links with sites abroad, via the UCL (University College of London) ISDN gateway.

Loughborough University

Computer-based desktop VC has been in use in the computer studies department since 1994. The service runs over the Mbone network using workstations which support software to transmit and receive video and audio, and use various multicast text tools and a shared whiteboard. The facility is supported by those individuals who use the workstations to VC.

A studio-based VC system is currently being considered for installation within the next 18 months. The facility would be run by the Audio Visual Services department in a dedicated room. It is envisaged at this stage that the facility would be hired out to commercial companies as well as charged out to university departments. Plans are only at the very early stages, but the objective currently is to aim for very high quality capability and to offer ISDN connections.

3. Results

3.1 Introduction

The results presented here originate from two main sources: the email questionnaire (n=17) and the site interviews carried out with both service providers (n=9) and users (n=4) from five different sites. Both the results of the email questionnaire and the site interviews are integrated in the following section, unless otherwise stated. The results are divided into four main sections: (i) technical aspects, which details the type of equipment and networks used; (ii) applications, which describes the usage of VC; (iii) management, giving an overview of the structures and procedures in place; and (iv) subjective views of users and service providers on VC.

The aim behind the study was not to present a comprehensive picture of VC in higher education in the UK, indeed the sample size is not sufficiently large to make such generalisations or statistical analyses. Therefore caution should be taken in interpreting the results. Moreover the aim was to present a longitudinal picture of VC usage within a small group of users in the UK. To this end observations are made about the group results.

It was difficult to get responses from those people who responded to the original study made 18 months ago (Butters et al. 1995). The sample group (who also included respondents who were not involved in the previous study) were therefore asked about any changes that had taken place in the previous 18 month period. Where changes to the pattern of use are not noted, it should be presumed that there have not been any significant changes over last 18 months. At the end of each section, the results are summarised providing comment, particularly on the changes having taken place over the last 18 months and comparisons across institutions.

3.2 Technical aspects

3.2.1 Network & Main equipment

The following tables present an overview of the combinations of the types of equipment and networks used by respondents in the study. Four main types of network were in use by respondents, the SuperJANET ATM network, the JANET Mbone mainly used to support computer-based desktop VC, BT ISDN network, and a dedicated Megastream network.

Network	SuperJANET ATM
Bandwidth	2 Mbps
Examples of equipment used	GPT codec, Manual patch panel (allows audio/visual signals from 5 conference rooms to be imported), GPT MCU and codec, Sony and Panasonic video equipment

Network	JANET Mbone
Bandwidth	100-500 kbps
Examples of equipment used	Sun SPARC workstations 2, 5, IPX 1+ with SunVideo/ Videopix/Parallax, Silicon Graphics Indy workstation with VINO/ Galileo, Macintosh LC-III

Network	BT (ISDN)/ Dedicated Megastream
Bandwidth	128-384 kbps/ 2 Mbps
Examples of equipment used	BT VC 4600, BT VC5000 series codecs, BT VC6000 MCU, BT VC7000, BT VC8000, Olivetti desktop videophone, Videoserver MCU and codecs VC2300 codecs, Rademac robotics, Picturetel 4000

Figure 1- Examples of network and equipment configurations

There seems to be a move towards ISDN-30 with some sites investigating Mercury Switchband (i.e. Manchester University and Nottingham University), which allows the site to pay only for the bandwidth that it uses.

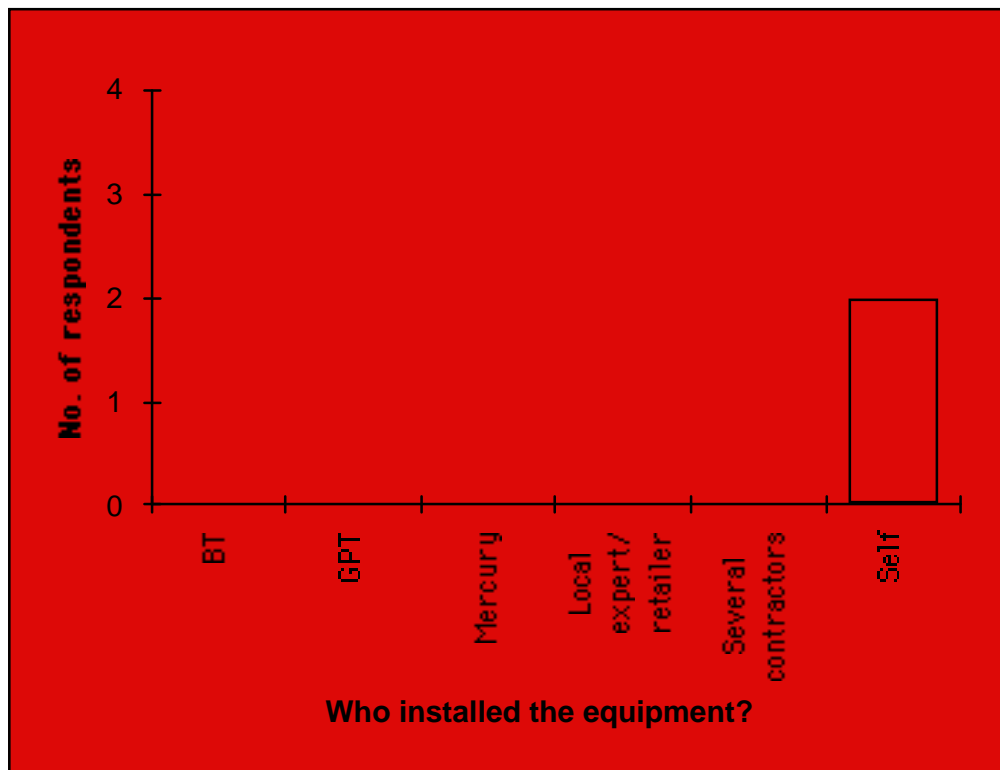


Figure 2- Distribution of VC equipment installers (n=12)

In the remaining five cases the equipment installer was not identified by the respondent.

There have been some changes to the usage of the systems over the last 18 months. At one site the number of people using the system has increased, and at two further sites installation of additional networks has facilitated connection to more sites and international dial-up. In the cases where the site does not have direct access to ISDN it is possible for them to route a conference through another SuperJANET site that does have access. This latter site will then effectively act as a gateway to the outside world. One site had a system upgrade which caused a temporary drop in usage due to technical problems. Many sites reported either a very similar amount of usage or conservative increases.

Generally service providers indicated that the system was bought for the applications they were currently using it for. There were a few exceptions however; one site reported more diverse use than they had anticipated; one further site reported that they had no idea of the level of uptake between teaching and administrative use. One site knew before implementation that the system would have to be used for meetings as well as for teaching in order to pay for its way.

3.2.2 Additional tools and equipment

The most common type of additional equipment cited was a dedicated camera for documents, OHPs and slides, indeed several sites had one. Some sites had VCRs to record and playback images; one site had full tablet-controlled robotics allowing control over the main camera at other sites. Computer-based desktop VC users had access to a range of software tools allowing shared editors, whiteboards and applications, and multicast text tools used to support video sessions. The expectation from the last study (Butters et al. 1995) was that other peripherals were going to be added (e.g. connection with on-line PC), but this had not happened. Most additional facilities that have been added are for sharing hard-copies of information, particularly graphical information.

3.2.3 Technical support

Technical support depends to a certain extent on who originally installed the equipment; often there is a service contract involved between the site and the body who installed the equipment. In this case it is impractical and uneconomical to change such a service agreement with a supplier mid-term. Some Service Providers were having problems, but had no direct opportunities to do anything about it, commenting that they were 'locked' into a service agreement. Only one site using studio-based VC had in fact changed their supplier since the last study; they commented that the reason behind the upgrade was in fact to change to a new direct supplier.

3.2.4 Summary / comment

The most noticeable change in the technology since the 1994 survey is probably the greater variety of networks available and the greater interconnection of different networks used. UKERNA is currently piloting an ISDN gateway in Manchester. This allows any site with an ISDN compatible codec to connect with the SuperJANET sites. Some sites have access to their own and other national and international sites using the Internet. For higher quality applications they may also have access to local sites using their own ISDN or ATM network (or MAN), SuperJANET pilot sites using the SuperJANET, or international sites using SuperJANET and an international ISDN gateway. This provides great flexibility and will probably become commonplace as more and more networks become cost effective and accessible.

Although the results indicate that there is slightly more computer-based desk-top use compared with the situation in 1994, there are still problems with the audio and video quality with computer-based systems and also with reliability. These problems are almost certainly because of the network limitations. In the higher education environment, it is understandable that those wishing to videoconference using their PC or workstation should use JANET to do it. The only costs involved are a camera, a video card if not

already supplied and shareware software. It is possible to use ISDN to videoconference with a PC but of course the costs are much higher both in terms of initial installation unless an ISDN line and ISDN video card are available but also in terms of call costs. It may be worth some academics taking this more expensive route if the requirements for quality justify it.

If the quality and reliability of low bandwidth networks can be improved, however, it is likely that there will be a growing market for desk top videoconferencing in higher education. Apart from the costs being low compared with studio based systems, there is another major advantage: physical proximity. One of the factors influencing usage of VC was ease of access with some users reluctant even to make a 15 minute walk to use the facilities.

3.3 Applications for VC

There were differing numbers of respondents to each application section, since respondents could be using VC in several or just one of the areas. The graph below depicts the number of respondents to the e-mail questionnaire and gives a picture of the applications for which VC was being used in the present study.

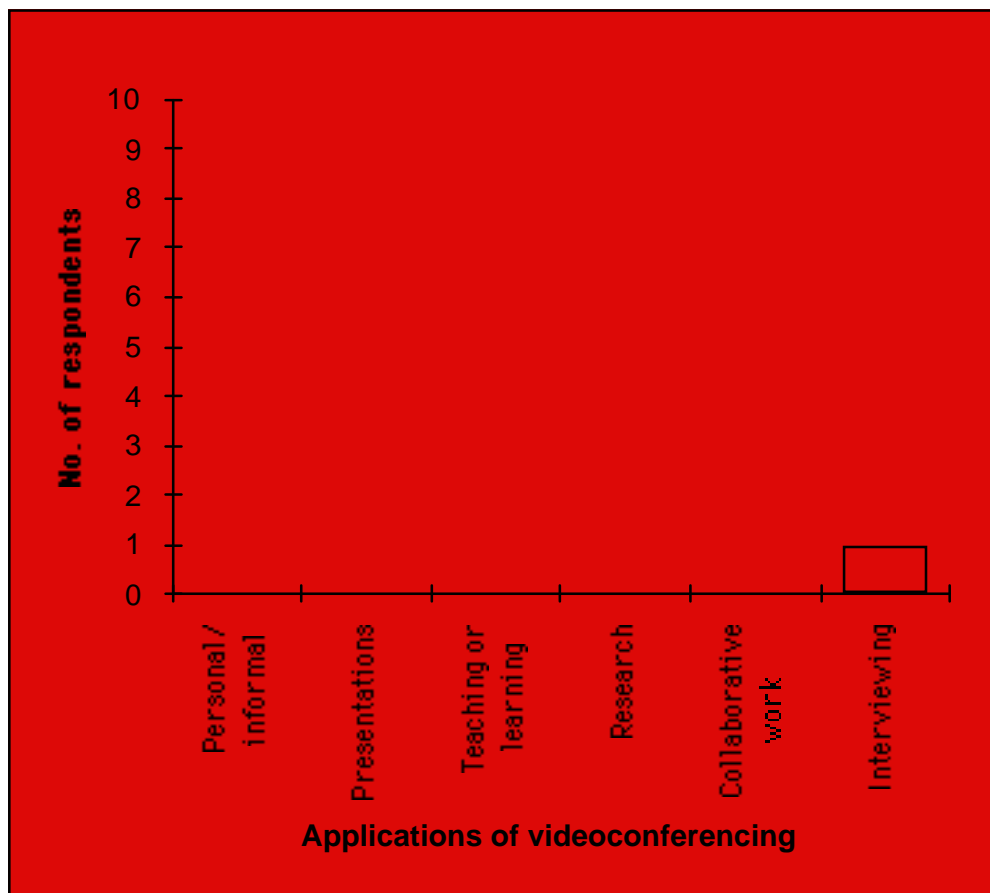


Figure 3- Number of respondents to email questionnaire using VC, by application

3.3.1 Personal communications

Four respondents used VC for personal or informal communications. VC was being used for both point-to-point and multi-point communications, mainly to contact people from the same or other academic institutions on a mixture of topics, from technical issues to demonstrations. Two users used their facility a few times each week, a further one using it a few times each month. The frequency of use had not changed much since 18 months ago, although an exception to this was increased usage by a user of the Mbone network for computer-based desktop VC. There does not seem to be a typical call length, it ranges between 15 and 120 minutes.

Respondents stated that particular advantages of VC were the provision of visual information, ability to share drawings and to illustrate in real time (Mbone user), and interaction (one user stated that he got more useful work done when communicating with VC).

The provision of tools for viewing 3-D objects, more integration with other types of tool, particularly the WWW, and the ability to control the remote camera's direction of view and zoom were expressed as additional things that respondents would like to be able to do now, that were not considered 18 months ago.

3.3.2 Presentations

Five respondents used VC for both sending and receiving presentations to other academics, colleagues and clients, both internally and externally. It seems that there is now a slightly wider range of recipients of presentations compared to 18 months ago, particularly regarding external contacts. Many of the contacts are multi-point. The typical content of presentations consists of multi-media, often video and audio, and sometimes OHP or slides presented separately via a shared whiteboard. Most of the respondents used pre-recorded video during the presentations, although it was indicated that full motion video was not amenable to transmission over the Mbone network.

Frequency of use was typically between a few times each week and a few times each month, with a slight increase in use since 18 months ago. One respondent observed that this was due to his clients becoming more informed about VC. Typical call duration was between 30 and 60 minutes, although there were shorter and longer calls.

Lack of time, client inhibitions and reluctance to use VC were stated as barriers to increased use, although this second reason may have decreased somewhat since 18 months ago. The perceived advantages of VC compared with traditional ways of giving or receiving presentations were that it gave more impressive, dynamic presentations, which were more flexible, allowing

interaction over a distance. Another advantage was that participants could easily record material to refer to later.

Increased pressure and anxiety due to equipment performance, a general lack of VC users, the need to observe strict personal discipline and lack of remote camera control were perceived as disadvantages when using the medium for presentation purposes. One particular need reported was that some respondents would like to be able to share document files and applications over the network.

3.3.3 Teaching/learning

Five people stated that they used VC for teaching or learning applications. However only two respondents answered the questions in the section, and reported using VC for activities, including vocational education and the study of distance learning teaching techniques. Information about using VC for teaching and learning was also obtained from the field sites visited. The teaching was conducted in a variety of manners; one to one, one to distributed individuals, one to a group and one to distributed groups. Multi-way audio and video were used in one case, and recorded videos were used in another. An example was a student teacher showing a video of herself teaching, to a tutor across the network. Questions from students were generally dealt with live, rather than pre-recorded. The facility was used from a few times each week to a few times each month, with frequency increasing in one case over the last 18 months. Typical call length was between 30 and 60 minutes.

The advantages were seen as the possibility to reach students who are at a distance and the variety in participating groups, but the main drawbacks were related to less human contact. One user interviewed said that the students found it intimidating and that they needed to get used to VC. He observed that one disadvantage over traditional methods of teaching was that eye contact couldn't be made, so a particular student couldn't be asked a directed question. At another site a user commented that students claimed to be disadvantaged by not having the lecturer physically present. She further commented that the problems lie in the technology rather than the administrative aspects of the VC service. One other institution reported the desire to use VC for teaching expecting to use it for this application in the future.

3.3.4 Research purposes

Six respondents stated that they used VC for research purposes; four full responses were received to this questionnaire section. The respondents reported using VC for research into telematics, networked information retrieval and discovery, and video coding and related algorithms. VC was used for communication with colleagues, for watching presentations and attending meetings, and for generating network traffic that is then monitored.

The nature of communications using VC for research purposes was very varied, reflecting the diversity of this application. A mixture of point-to-point and multi-point was used. Most of the respondents used VC a few times each week and only one reported increased use of the facility compared to 18 months ago. Typical call length varied from 5 to 120 minutes. The time required to set up the connection and the availability of equipment for potential partners were given as barriers to further use.

The ability of the VC medium to allow access to information was given as the main advantage over traditional methods of research. Email discussions could be read, the WWW could be searched, and shared data files could be accessed during research. Respondents felt that there were few disadvantages, these mainly related to other people's reluctance to participate in VC. One respondent expressed a need for remote control of the camera at the other site.

3.3.5 Collaborative work

Collaborative work was the main application of VC amongst respondents in the email questionnaire; ten respondents used VC for special interest group meetings, committee meetings, trouble shooting, engineering and software projects. A wide variety of people within the HEI site and external to it, including other bodies (e.g. UKERNA) were contacted. The type of work carried out by each site had not changed in most cases. VC was used from a few times a day to a few times each year, with no typical pattern emerging across sites. In only two cases VC use had increased slightly since 18 months ago, in other cases remaining the same. Typical call length was generally between 30 and 120 minutes. Mainly multi-point communications were used, although there were also some point to point communications.

Reduced travel, ability to share documents and drawings in real-time, the ability to go to meetings that wouldn't otherwise have been possible, cost viability and dynamic involvement of conferees were given as the advantages of VC. A reduction in face to face meetings and all of their associated advantages (e.g. usefulness for brainstorming, informal talk) were sited as disadvantages. There were certain things that respondents couldn't currently do and would like to be able to do. These included better control over what is seen at the remote site as well as what is transmitted, more integration with other tools such as the WWW, better spatial resolution and better booking provision without the time associated with contacting service providers

3.3.6 Interviewing

Only one respondent reported using VC for point-to-point interviewing, and had experienced VC just once for an interview lasting between 30-60 minutes. The accessibility of remote participants was the principle advantage stated, and there were no perceived disadvantages over traditional methods of interviewing. One of the service providers reported a case of interviewing at

his site although he was not personally involved (this was a PhD viva with an external examiner based in Australia).

3.3.7 Currently not using VC

Two respondents reported that they intended to use VC sometime in the future. One site expressed an interest in using it to provide remote tutorials, but suffered from a lack of funds and insufficient benefits for their needs to justify investing in the necessary equipment. They reported that they would look into it again in six months time. The other site intended to provide a consultancy service to external companies and university departments. Again the source of funding was the central issue and they were not sure when the facility would be installed.

3.3.8 Summary / comment

The profile of use was very similar to that found in the survey 18 months ago with uses being identified in all the application categories offered. This is also a similar picture to that reported in a survey of users of the University of Wales Video Network where Committee/Meeting use (including research) accounted for 77% of use compared with teaching (23%) (Cannon, R. & Martin, J., 1995).

The dominant use was for meetings to facilitate collaborative work. Where VC was used for collaborative work or for research purposes, the work was often in the field of VC or its associated technology. This was also the case in the previous survey and although this is only a small sample, it was expected that by now, the use of VC would have spread much more to other academic areas.

There is some evidence that computer-based desktop VC is beginning to come into its own for research and especially for participation in virtual conferences and other such 'events'.

There are still some universities that are not using VC for teaching even though they use VC for other applications. It is a specialist application with particular requirements for the technology (e.g. high reliability and high network bandwidth) and for personal skills (e.g. specialist teaching techniques). Where teaching is done, it is spoken about enthusiastically by those involved, with very positive comments being made about value for money and usefulness. Although teaching is done across organisational boundaries, a particular application is teaching within the same institution but across campuses. This can require as great a degree of co-ordination and co-operation as teaching from university to university because individual campuses/colleges can be quite autonomous. However, being able to link separate sites within the same institution has obvious advantages, in particular, the ability to offer more courses to more students and therefore there is great motivation to succeed.

As the use of ISDN grows, interviewing by VC may also get more popular, particularly over great distances (e.g. the USA or Australia) but it would be interesting to investigate the psychological aspects that may inhibit the use of VC for interviewing. (In a survey of commercial organisations using VC across Europe, one of the applications that was thought not to be so suitable for VC was interviewing [Clarke, Pomfrett and Richardson, 1992]).

3.4 Management

Management was dealt with in most detail during the field site interviews and this is reflected in this section, although results are also included from the email questionnaire.

3.4.1 Structure

The Universities examined in this study each have different and unique management structures, and it would be impossible to develop a single model to cover them all. Perhaps this is not surprising, considering the diverse uses to which VC is put. For example, the University of Wales uses VC mainly for teaching and meetings between its five campuses. There are management representatives at each of the five sites who have equal 'status' in supporting the service, and meet twice a year as a steering committee. In contrast, Edinburgh University's SuperJANET studio is used less frequently, mainly for technical meetings with UKERNA or other VC bodies, and is run solely by the Computing Services department.

Probably the most striking finding, and one that has not changed in the last 18 months, is the wide variety of university departments who are involved in managing their VC services. This range includes computing departments, educational services, estates, audio-visual services and dedicated multimedia support centres, and often a combination of two or more of these. This can lead to tension between departments, and also confusion on the part of the users over who to go to for information and support. There are also cases where two different departments of the same university simply do not know what the other is doing. On the other hand, good collaboration between two or more departments can be a major factor in the success of the service.

3.4.2 Funding and financial management

The way in which the capital costs for VC are funded varies significantly between the sites studied and includes both UK and European sources, as well as internal university resources. For example, UKERNA provided partial funding to all SuperJANET sites. Some of Loughborough and Essex's equipment has been funded by JISC, SERC and EPSRC project grants. Initial finances for Ulster's service came from an EC project. Most of these and other VC services also receive some support from central university or departmental funds.

Probably the only common theme is that most institutions can only successfully support a VC service through funding from a number of different sources. The only recent change in the capital funding situation has been in certain institutions who, having received initial funding from one of the external sources mentioned above, are now required to bear the full costs internally.

The provision of running costs is also virtually unchanged since 18 months ago. Most VC services have their costs mainly supported by central university sources. Others receive some UKERNA support for running national services.

At each of the four interview sites which used VC (Cardiff, Ulster, Edinburgh and Nottingham), university departments and individuals were not charged for their use of the service. Situations in which users at Nottingham and Edinburgh did have to pay, was for calls involving links to external ISDN lines via a gateway held at UCL. It is normal for sites that have a gateway from SuperJANET to the outside world to charge for such a service; this enables Nottingham and Edinburgh to provide the service required by their users. Cardiff also had a commercial service which charges users and makes a small profit to support the service, and Loughborough is predicting that up to 85% of the use of its facility may be by commercial users. This latter strategy would allow the service to pay for itself within 3-5 years. Loughborough is also exceptional in that it would expect to charge individual departments for their use of VC.

3.4.3 Booking procedure

Each of the interview sites had a slightly different strategy for booking VC sessions, as follows:

- University of Wales; a representative at each of the five campuses has access to the same networked booking software. Any of the sites can make a booking, which is then confirmed a week in advance to the other sites.
- Ulster; a similar multi-campus structure, but all bookings are made through a permanent secretary at one of the sites, Coleraine. This secretary uses booking software as well as a manual back-up, and distributes printouts to each of the campuses once a week.
- Edinburgh; used less frequently and is booked via Computer Services staff. Their situation is complicated by the fact that they also co-ordinate booking of the entire SuperJANET network. For SuperJANET bookings, the user initially rings up Edinburgh to enter a provisional booking, then must confirm this within 10 days, having arranged the relevant sites.

- Nottingham; bookings all go through the manager of Audio Visual and Educational Services who reserves the studio and arranges the network link through Edinburgh.
- Loughborough; planning to implement a booking system jointly between the Audio Visual Services unit and a university administration office.

All of the field sites mentioned above (with the exception of Loughborough, who did not have a studio-based VC service) felt that their booking procedures were quite successful. Central booking through a single person allowed use of the system to be maximised and meant that this individual could identify new users who needed technical support or training. On the other hand, allowing booking by a number of co-ordinators had the advantage of increased flexibility. None of the sites had changed their booking procedures since their systems were implemented.

3.4.4 Future policy and strategy

Universities generally have a committee who meet to discuss changing user needs, future policy and strategy. At Cardiff, a Network Services Committee meets twice a year. Ulster has informal meetings between site representatives for minor decisions, and formal meetings of the central Educational Services Committee for major strategic changes. Edinburgh's strategy is handled under the Vice-Principal for IT services. At Nottingham, informal meetings take place between members of the Audio Visual & Educational and Computing departments. On a national level the JISC Advisory Committee on Networking meets to advise JISC on future networking procedures.

Despite these bodies, there appears to be little formal evaluation of the services to check whether users are satisfied and identify any changing needs. Users' feelings are generally gauged through informal personal contacts, which excludes less frequent users or those who have no personal contact with the service providers. Also, many potential users do not know of the existence or capabilities of their institute's service so are unable to provide useful feedback to the service managers.

It is interesting to note that the success of strategic management depends largely on the success of the technology. At one site, there were regular evaluations of the service through short questionnaires prior to a recent system update. Since the update, however, the service has been beset by technical and network problems, and this has prevented re-establishment of the evaluations. In addition, the service has not been advertised to new users for fear of instantly losing their confidence through technical difficulties.

3.4.5 Training and user support

Training of new users generally only takes about 10 minutes, via an informal talk or hands-on demonstration by the service provider. Alternatively, new users might just be given a single sheet of instructions on VC etiquette. Some of the sites with more complex equipment have additional written instructions for the user to refer back to after the initial training period. Most, however, report that their equipment is so simple that users have little need for extra support after their first session.

Basic technical support is usually on hand, in the studio building or via a phone-call, should any problems arise. If there is a network problem, the user or service manager would have to contact the network provider (for example, BT or the Edinburgh SuperJANET co-ordinators).

3.4.6 Summary / comment

As with the survey conducted in 1994 one of the most startling results was the variety of ways in which management of VC is organised. It seems to depend very much on the culture of the institution, the history of the various departmental groups within the university, the original funding source, individual vision and the perceived reason for starting VC in the first place.

Clarity of strategic policy also varies. Although most site facilities were grossly under-utilised, management is often not putting a lot of effort into getting new users involved. It is not very clear why this is. Because of the pilot nature of some of the sites, it is possible that managing VC is seen more as a research exercise rather than as providing a professional service such as producing slides or running the mail server. The two field sites that have been using VC for over 5 years did seem to perceive the management of the facilities more in terms of providing a professional service and so it could also be a function of experience and confidence. There could be some nervousness about creating a demand that is not easy to supply or about creating a demand for something that is not well understood and may have unattainable expectations associated with it. There was a policy of prioritising use at one university where for example, teaching use has top priority but this level of policy making was not evident generally.

The funding structures vary widely across institutions but within any one university have remained fairly stable over the last 18 months. UKERNA have and still continue to support the academic network both in financial and practical terms but cannot fund every institution to the point where additional capital and running costs are unnecessary. The pilots can however help to point the way towards viable models of VC. Co-operation between institutions will probably be a key to the future of VC in higher education but it is difficult to see how this can be easily achieved in the current competitive climate.

3.5 Subjective views of users and service providers

3.5.1 Current situation

The sections below give users' and service providers' personal experiences and views of VC, based on the results of the questionnaires and interviews.

Does VC provide value for money?

Unreservedly, all users of VC for personal/informal communications, teaching/learning and research considered that it gave value for money. Most of those who used it for receiving presentations or collaborative working also thought it provided value for money, although one commented that as his department was not paying for the system, this was not really a consideration. In many cases VC was managed as a centrally-funded university resource, so it is necessary to consider these responses in this context. One user of desktop software commented that VC would definitely provide value for money if it worked well, however he experienced problems with the transmission of audio and video, breaks in connections and reliability of the network.

How useful is VC?

Interestingly, all users of VC felt positive about the usefulness of VC for their application. All respondents for teaching/learning or research purposes replied that the facility was 'very useful'. VC for personal/informal communications, presentations or collaborative work was considered to be either 'quite useful' or 'very useful'. It is possible, however, that only those users who were enthusiastic about the technology would have responded to the questionnaire.

What do you think of the cost structure, and costs of equipment/facility?

The running costs for most users of the SuperJANET service are funded either by central university resources or by a department (e.g. educational services) that pass costs on to all other departments through the central administrative system. Therefore cost structure was not an issue for many users, although indirect costs such as additional technician support was a requirement in some cases. For computer-based desktop users the general consensus was that VC incurred relatively few additional costs, as users already had workstations available to them (funded by non-VC sources) that were capable of handling Mbone. They only needed to buy additional equipment such as cameras, microphones and video capture cards, but in comparison to studio-based VC these costs were considered viable. Running costs were absorbed into university support of the Internet, and any technical support was generally handled by the individuals themselves.

How do you rate the internal technical support?

The perception of technical support was to some extent dependent upon the application for which VC was being used. One user (for teaching) commented that he first attempted to fix any problem himself by trying a combination of buttons and switches. If that was unsuccessful, he would call a chief technician. In this instance, technical support had to be provided very rapidly, otherwise the lecture would have to be cancelled and rescheduled.

Many users' actions would be to call either a technician or a system administrator who would try to fix the equipment problem. However, most mid-conference failures tended to be caused by network problems, and the network provider (e.g. SuperJANET or BT/Mercury) would have to be contacted. Dependent upon a number of factors (e.g. the particular mix of equipment, network, how long the equipment had been installed), different users had differing experiences of technical support. One user had not had many technical problems, despite the fact he had been using the facility quite regularly, so could not comment.

One computer-based desktop user commented that the network links were very unreliable and he would stop broadcasting and use a telephone if the link went down. Problems were nearly always network based and he felt that such breakdowns could not be solved sufficiently quickly.

How do you rate the external network support?

Network and equipment support, in the cases where the equipment was provided externally, varied tremendously across sites. The range of comments included poor, very slow and unresponsive, erratic, varying, moderate, fine and good (although only one service provider commented that the support provided was good).

None of the three computer-based desktop users experienced any problems with external support providers; they supported their own equipment and were generally technically competent in their field.

Would you recommend your facility to others?

The strength of personal recommendation for VC depended upon the application to which it was being put.

Of those who used VC for personal uses, two subjects recommended their facility and one did not. Computer-based desktop VC via Mbone was more positively received than SuperJANET for this application, due to prohibitive costs and the distance of a dedicated suite.

All users for presentations said that they would recommend their system, with some reservations. One wanted to try alternative systems and another wanted modifications to his existing system. A computer-based desktop user felt that this form of VC was fine for receiving certain types of presentation, because high visual quality was not a high requirement.

Users of VC for teaching/learning were unreservedly positive. They would recommend VC as it allowed them to reach more students, and provided a new teaching experience.

All users for research purposes recommended VC; one commenting that it allowed more frequent interactions.

For collaborative work, two users said that they would not recommend VC. One studio user commented that the maintenance was too expensive and that many meetings would be served as well by good and cheaper desktop systems. Two computer-based desktop users were very enthusiastic, although one mentioned that the potential user would have to be aware of the limitations of the current technology.

Has VC lived up to your expectations?

Generally VC had lived up to both service providers' and users' expectations. Where it did not, this was generally due to a failing of technology/service support, rather than the concept of VC in general.

Is there any advice that you would give others considering the use of VC technology?

This question was asked about each individual application of VC, and some of the advisory comments are listed by application below:

For personal/informal communications...

- Don't expect wonders; real-time video over the Internet is not with us yet (computer-based desktop user)
- Obtain initial training
- Treat it (VC) with respect: the data rates on the Internet are sufficiently high that they could swamp other types of traffic (computer-based desktop user)

For presentations...

- Prepare clients for institutional implications
- Think of the amount of time that it will take to work up, then double it
- Pay strict attention to audio requirements
- Plan well in advance. Make sure that you check out the room that the presentation is going to be in and find out where the network and power points are. Bring the machine to the room well in advance of the presentation (at least a few hours; this means an early start if the presentation starts in the morning unless you can set things up and leave it undisturbed overnight). Have lots of cables handy, spares of anything you know is vital (computer-based desktop user).
- Have a partner located elsewhere on the network who will do a video and audio check with you (computer-based desktop user).
- Distribute slides beforehand if possible so that people can get them easily before you start sending out lots of audio and video (computer-based desktop user)

For teaching/learning...

- Careful preparation, including time management. Ensure that the students are made fully aware of how to gain from the experience
- Give it a lot of time
- Don't be too ambitious, try it out on a small scale. Make an effort to keep things from being too inhibiting. It would be useful if people using VC could also meet in person from time to time.
- It's not as difficult as you might think
- Warn new users about the shock of seeing yourself on television; it's an important barrier for some people.

For research...

- Allow time to set up and get the system running
- Use it and often (computer-based desktop user)

For collaborative work...

- Make sure that you have face to face meetings as well. It works better if you are reasonably comfortable with the people at the remote sites
- Obtain at least some minimal training on operation
- For Internet-based VC, the technology just won't be up to it. Users should limit themselves to point-to-point use and make sure that the link is good enough before spending any money on equipment (computer-based desktop user)

3.5.2 Future uses

Although most sites who responded to the questionnaire were quite happy with their overall VC set-up, many mentioned extra tools and equipment which they would find useful. Two wanted to be able to control the camera at the remote site and another wanted better control of the local camera. Two respondents felt that better resolution codecs or networks would be beneficial. Other studio equipment felt to be useful included file, document or graphic-sharing facilities, a video recorder and a modem. One subject wanted to be able to instantly set up multi-point links without the help of a service provider, and another felt that the variety of potential links, via ISDN and SuperJANET lines should be increased.

Having said that, few VC service providers had the funds to purchase any significant new equipment in the near future. Manchester were looking into providing further studios across their campus and UCL were planning to upgrade their existing equipment if and when funding became available. Ulster were considering the purchase of a whiteboard for their main system, as well as other aggregators, matrix switches, PCs and software. Nottingham had ordered a document visualiser.

Looking a year into the future, some institutions felt that their use of VC would be much as it is now. A few felt that there would be some expansion for specific applications; teaching at Ulster, distance learning at Nottingham,

conferences at UCL and collaborative work and meetings at Loughborough. Any significant developments would be as a result of reaching wider networks; for example, Cardiff predicted that they would use a local MAN to reach other higher education institutes and Nottingham hoped to install their own ATM network plus ISDN links to facilitate VC teaching.

In five years time, the most significant predicted changes involved linking to a much wider range of international sites and a proliferation of multi-point rather than point-point conferences. Together with an increase in picture quality and facilities such as file-sharing, this would also increase the number of users and the range of potential applications. Four or five respondents suggested that the future of VC was at the desktop software level; users would be more likely to use a desktop computer-based system for uses such as meetings involving multi-point links.

The barriers currently preventing users from implementing the above changes included the cost of equipment or network time (5 respondents), the unavailability of certain network connections (3 respondents), the unavailability of equipment or software (2 respondents), network reliability (2 respondents) and the relatively small number of ISDN users (1 respondent).

The site interviews examined service providers' predictions for the future of VC in their institutions and in higher education generally. The two universities who currently used VC mainly for inter-campus meetings and teaching, both felt that the frequency of external and international calls would increase significantly. This, of course, relied on extensions of their internal networks to allow access to MANs, SuperJANET, and other ISDN connections. Additionally, one felt that non-teaching applications, such as interviewing and keeping in touch with distant students, would grow. The ultimate goal of VC was 'connectivity and ubiquity'; that is, the ability to connect everywhere from anywhere.

Edinburgh were unsure what would happen to the SuperJANET network after the current pilot project ends in 1997. One of the service providers at Edinburgh felt that the future of VC was in computer-based desktop systems only, and that the widespread use of VC would depend on reliable desktop software, faster network links, and good quality standards. A contradictory view was held by another service provider/user who felt that the future of VC was definitely not in desktop use alone. Another, who currently used desktop VC software discussed the benefits of a closer link between VC and the WWW; for example, a user would be able to bring up a web page and simply click on a button to initiate a video conference.

Many service providers were unsure of the future of UKERNA's involvement with VC and the future of the SuperJANET network. Despite this, however, most institutes were excited about the future of VC, at least for certain applications and certain types of system.

3.5.3 Summary / comment

Although teaching was not the application with the highest usage, it was the one that produced the most positive subjective responses with users believing VC to be very useful and providing good value for money, happy to recommend the technology to other users. It is also probably the application with greatest potential for driving the installation of new ATM networks which will then facilitate other applications.

The general feeling about the future seemed to be that change would take place fairly slowly with the most significant advances in the near future being the interconnection of networks to allow access to additional sites.

Predictions for the long term future were a continuation of this to include more international destinations and easier multi-point and file sharing capability along with a growth in desktop use.

The pattern of perception of the future of VC seems to have changed from a focus on equipment and facilities that would be added or upgraded to a focus on new networks and applications.

4. Conclusions

The following sections provide lessons learnt from the survey and possible future directions for VC in higher education.

4.1 Lessons learned, patterns of use and pointers to success

The main lessons that have been learned are:

- More support and information is needed when setting up medium and large scale VC than was previously thought. Skills are needed in a number of very different disciplines.
- The importance of network reliability has been recognised along with the need for good technical support to maintain the infrastructures. (Following from this, it has been learned that the choice of suppliers and service providers must be made carefully. Often institutions can find themselves "tied" to a particular company because of the initial choices made.)
- "Improvements" can cause more problems than they solve. Major changes need careful planning.
- The technology is there but it needs to be respected. There is a need to be realistic about expectations.

The main pattern seems to be a differentiation between the management and use of computer-based desktop VC and that of larger scale VC:

- Computer-based desktop VC systems require less financial cost and also require less in terms of management and support. They are likely to be funded and used by a single department for research or collaborative work purposes using services such as the Mbone. As the cost of both ISDN lines and dedicated 'dial-up' personal VC systems fall, it is likely that these also will be used more and more like PCs as a departmental or group resource for applications such as interviewing or meetings with overseas colleagues. Use of these systems has changed little over the last few years, except that there are more of them and they are being used more frequently. The prediction is of improved quality and reliability for computer-based systems and hence a pattern of greatly increased use.
- Larger-scale VC has required shared funding and has provided shared resources being beyond the budget of single groups or departments. (This situation is likely to continue well into the future.) These systems were set up for different purposes in different ways depending on need, available resources, funding opportunities, individual vision etc. The

pattern seems to be one of limited use to begin with during a learning period followed by identification of existing limitations and new potentials. Significant changes to equipment and infrastructure have taken place in the sites that have been using VC for a number of years, not always with the expected results. The predicted pattern of change for these larger-scale VC services is that there will be expansion in terms of available networks, sites and applications.

To achieve successful management at a strategic level, it is necessary for those involved to have a good understanding of:

- Networks
- Audio-visual technology
- Computing technology
- Managing and evaluating services
- Users' requirements (e.g. an understanding of the nature of research, teaching and learning etc.)
- Specific VC knowledge and experience (e.g. to be able to understand the potential of the technology, how traditional skills may need to be adapted etc.)

It is rare to find all the above in any one department or service group and the most successful cases seem to be the ones which have either achieved co-operation between departments with shared management responsibilities and resources or where a specific VC service is set up and includes all the relevant skills and experience. If a single specialist group undertakes VC responsibilities (e.g. audio-visual services) it must be prepared to admit when it lacks skills and must be prepared to ask for assistance.

4.2 Looking to the future

As in the 1994 survey (Butters et al.), technical support from network and equipment suppliers was patchy with reliability still a major issue needing to be addressed before VC can really be the “medium of the future” that it has the potential to be. Fortunately, the network service providers are investing in enhancements to the infrastructure and we can realistically expect that the situation will continue to improve.

As was stated in section 3.5.3 of the results, it is possible that the perceived cost and educational benefits of using VC for teaching and learning could drive the installation of new ATM networks and increased network connectivity. One of the field sites, although not really using VC for teaching yet, is planning for the future and is running skills training courses for lecturers who could soon teach via VC. The courses cover three main skills:

- teaching in front of a camera
- visual aids for VC
- handling interactive VC (e.g. students questions).

This kind of forethought will be essential if the most is to be made of the technology. Although the impetus towards improving the VC capability for teaching could be financial cost benefits as well as educational ones, it is likely to be important to remember the lessons learned about VC from industry. From the personal experience of the author, case studies reported anecdotally have concurred with the notion that although VC is often justified in the commercial world on the basis of cost savings, in reality these savings (in terms of decreased travel and subsistence costs etc.) often do not materialise. However, VC can pay for itself in terms of increased financial *income* due to increased efficiency, better decision making and competitive edge etc. If this pattern is mirrored in higher education, it may be important to think in terms not only of potential cost savings but also in terms of increased income, for example the ability to reach students that may not otherwise register or the ability to offer a flexibility of learning that is not provided elsewhere. This could influence the kinds of courses considered suitable for VC teaching.

In conclusion, there are those who predict that the future of VC will be desktop and only desktop but the impression gained from this small study is that although the use of desktop (both computer-based and dedicated) will certainly increase, this does not mean that use of studio-based VC will diminish. On the contrary, new networks, along with a possible need to reach new student markets, will mean that applications requiring good quality studio/auditorium facilities will increase.

Glossary

ATM

Asynchronous Transfer Mode networks (based on packet switching). A mode of data transfer in which units of data are not time-related to each other.

CODEC

An item of equipment containing an encoder and a decoder. A device which performs the dual function of encoding two-way analogue data and two-way digital data into analogue data.

Echo Cancellor

A unit of hardware and software connected to the audio system, used to reduce the amount of echo 'reflected' back to the site transmitting the audio, and thus ensuring adequate sound quality.

EPSRC

Engineering and Physical Sciences Research Council

H.320

A series of audio visual communications recommendations which were ratified by the CCITT in December 1990. The aim of the series, which applies to audio visual communications over 56/64 Kbps to 2.048 Mbps channels, is to ensure videoconferencing systems and video terminals will interconnect across any network. H.320 is an umbrella standard encompassing a series of recommendations

HEI

Higher Education Institute

HEFC

Higher Education Funding Council

ISDN

Integrated Services Digital Network. Basically the existing telephone network using existing but upgraded switches and wiring, but all digital, giving a bandwidth for a basic call of 64 kbps. This increased bandwidth allows the transmission of high fidelity compressed audio, as well as the potential for video communication. Broadband ISDN (ISDN-2, ISDN-6, ISDN-30) is a communication channel having a bandwidth greater than a voice-grade channel 1 and therefore capable of higher-speed data transmission.

JANET

Joint Academic NETwork.

JISC

Joint Information Systems Committee (of the Higher Education Funding Councils of England, Scotland and Wales). Responsible for funding SuperJANET.

Kbps

Kilobits per second

LAN

Local Area Network. A system for intercommunication between computer terminals, PCs and related equipment operating within the same general area.

MAN

Metropolitan Area Network. A geographically extended high-speed LAN designed to interconnect users within a city or metropolitan area.

MBONE

Multicast Backbone. A virtual network that has been in existence since early 1992. Originated from an effort to multicast audio and video from meetings of the IETF. Shares the same physical media as the Internet. MBONE today is used by several hundred researchers for developing protocols and applications for group communication. It is a co-operative, volunteer effort.

Mbps

Megabits per second

MICE

Multimedia Integrated Conferencing for Europe

MCU

Multipoint Conferencing Unit.

SMDS

Switched Multimegabit Data Service.

SuperJANET

A national high performance network supporting UK education and research. It currently provides three services: a high performance IP service to all connected sites, an ATM service to a sub-set of the connected sites and a video network to the ATM sites.

UKERNA

UK Education and Research Networking Association. A company that has been set up to manage the networking programme for the UK higher education and research community

VC

Videoconferencing

VCR

Video Cassette Recorder

WWW

World Wide Web.

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APPENDICES

- 1. Electronic mail questionnaire**
- 2. Field site contacts**
- 3. Field site interview structure for Manager/ service providers**
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- 6. Useful URLs**

1. Electronic mail questionnaire

AGOCC Questionnaire : The Use of Videoconferencing

HUSAT Research Institute

We are currently investigating the use of videoconferencing in higher education for AGOCC (Advisory Group on Computer Graphics). You may have participated in the last questionnaire study 18 months ago. If so, we are particularly interested in finding out if your situation as regards your use of videoconferencing facilities has changed. If you did not participate in the last questionnaire we are still interested in your usage of videoconferencing and how this has changed over the last 18 months.

In response to some questions we ask you to describe your situation 'now' and '18 months ago'. If you have been using videoconferencing for less than 18 months then please answer these questions in relation to when you started using your facility and indicate approximately when this was.

It is not necessary for the purposes of this research that you answer every single question. If you feel that your individual situation would be better described by summarising your situation now compared with 18 months ago, then please use your discretion to do this. We are more interested in collecting useful and accurate data than having all of the questions answered.

The data you provide will retain anonymity and will feed into a publicly accessible document. This will aid people considering setting up a videoconference facility in a higher education environment, and will also describe the position of those using videoconferencing and how this has changed over time.

If you know of anyone else in higher education (e.g. lecturers, students, researchers, administrative staff) who uses videoconferencing we would appreciate it if you would forward the questionnaire to them also.

Please add any comments at the end if you do not feel that the questionnaire has covered other issues which you consider to be relevant. The questionnaire should take about fifteen minutes to complete.

Please return by e-mail to: c.carter@lut.ac.uk, by 23rd February.

1. Personal details:

Job Title:

Department:

Main field of interest:

Are you a user of videoconferencing, a service provider for other users, or both?

2. General details:

What equipment do you currently use for videoconferencing? (Please give details of the make, model, hardware, software, etc., if known.)

If you know the bandwidth you normally use please state:

Do you use satellite, SuperJanet, ISDN, a mixture, or another mode of transmission?

Have you changed the mode of transmission since installing the equipment? Please give details.

Do you have any additional media/ tools for use with the equipment? (e.g. graphics, whiteboard, etc.) For what purposes do you use these tools?

Where is your equipment situated? (e.g. In your office, in a dedicated videoconferencing room, etc.)

Have you changed the location of the equipment since installing it? If so, please give details.

Approximately, how long ago was the equipment installed?

Who installed your equipment? (e.g. retailer, manufacturer, local expert, yourself)

Was the installation procedure acceptable to you? Please explain.

Who supports your equipment? (i.e. where would you go if it went wrong?)

How do you rate this support? Please explain.

Have you changed the level of support or the support provider in the last 18 months? Please give details including dates and reasons

How are the capital costs funded? (i.e. UKERNA, research grant)

Now?

18 months ago?

How are the running costs funded? (i.e. user charges, department funding, project funding)

Now?

18 months ago?

Has videoconferencing lived up to your expectations since installing the equipment?

What uses do you currently have for your videoconferencing equipment? Please choose one or more of the options below by deleting any that are inapplicable. Please indicate clearly whether you **personally** use the equipment for each option, or whether you are solely the service provider for that use.

- A. Personal/informal communication (e.g. with friends/close colleagues, not necessarily work related)
- B. Presentations (e.g. of academic nature/for clients, but not specifically for teaching or learning purposes)
- C. Teaching or learning (e.g. for distant learning purposes)
- D. Research (e.g. working with project partners at remote sites)
- E. Collaborative work (but not specifically research)
- F. Interviewing (e.g. for recruitment purposes)
- G. No use yet (intend to buy videoconferencing facilities or already have access but haven't yet used videoconferencing)
- H. Other (not covered in above sections)

Is this what you originally anticipated when you bought the equipment?

Please explain.

Have your uses of the equipment changed over the last 18 months? Please give details, specifying when and why the change(s) was made.

A. Concerning your use of videoconferencing equipment for personal/ informal communications

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

Who do you talk with for the majority of your video calls? (Please delete all inapplicable responses)

Someone within the same academic institute (e.g. university/college)

Someone from another academic institute

Someone from a non-academic institute (e.g. hospital, commercial client, friend etc.)

Other (please specify)

18 months ago did you talk with people from the same group as those above or not? Please give details.

What topics do you usually discuss using videoconferencing? (e.g. personal, news, showing documents etc.)

Now?

18 months ago?

How often do you use videoconferencing for personal/ informal communications? (Please delete all inapplicable responses)

A few times each day

A few times each week

A few times each month

A few times each year

Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for personal/ informal communications, what are the barriers preventing you (e.g. technical knowledge, funding, etc.)?

How long is a typical call for personal/ informal communications? (Please delete all inapplicable responses)

0-5 minutes

5-15 minutes

15-30 minutes

30-60 minutes

60-120 minutes

more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for personal/informal communications, is it mainly point-point, or multi-point? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment to be for personal/ informal communications? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional ways of personal/ informal communications (e.g. letters, phone calls)?

Are there any disadvantages over traditional ways of personal/ informal communications?

Are you happy with your current overall set-up for personal/ informal communications?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for personal/ informal communications (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for personal/ informal communications? Please explain.

Do you find that videoconferencing provides value for money for personal/ informal communications?

Now?

18 months ago?

Would you recommend your current set-up to others considering using videoconferencing for personal/ informal communications? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for personal/informal communications?

B. Concerning your use of videoconferencing equipment for presentations (i.e. providing or receiving information but not specifically for teaching or learning purposes)

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

Do you send or receive presentations? (Please delete all inapplicable responses)

- receive
- send
- both send and receive

If you send presentations, who is the usual recipient? (e.g. client, colleague)

Now?

18 months ago?

If you receive presentations, who usually sends them? (e.g. client, colleague)

Now?

18 months ago?

What is the typical content of a presentation?

Now?

18 months ago?

Who pays for the presentations and the communication time?

Now?

18 months ago?

Do the presentations incorporate pre-recorded material? If so, in what form?

How often do you use videoconferencing for presentations? (Please delete all inapplicable responses)

- A few times each day
- A few times each week
- A few times each month
- A few times each year
- Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for presentations, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for presentation purposes? (Please delete all inapplicable responses)

- 0-5 minutes
- 5-15 minutes
- 15-30 minutes
- 30-60 minutes
- 60-120 minutes
- more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for presentations, is it mainly for point-point, or multi-point communication? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment to be for presentations? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional ways of giving/receiving presentations (e.g. OHP, slides)?

Are there any disadvantages over traditional ways of giving/receiving presentations?

Are you happy with your current overall set-up for videoconference presentations?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for presentations (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for presentations? Please explain.

Do you find that videoconferencing provides value for money for presentations?

Now?

18 months ago?

Would you recommend your current set-up to others considering giving/receiving presentations in this way? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for presentation purposes?

C. Concerning your use of videoconferencing equipment for teaching or learning

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

Do you use videoconferencing for teaching or learning?

Which subjects are taught in this way?

Now?

18 months ago?

Is the teaching conducted...? (Please delete all inapplicable responses)

- one to one
- one to distributed individuals
- one to a group
- one to distributed groups
- other (Please specify)

Has this changed since 18 months ago?

Does your configuration allow...? (Please delete all inapplicable responses)

- two-way audio and video
- two-way audio, one-way video (in which direction?)
- one-way audio (in which direction?), two-way video

one-way audio (in which direction?), one-way video (in which direction?)

other (Please specify)

Has this changed since 18 months ago?

How is coursework, if any, dealt with?

Now?

18 months ago?

How many sessions constitute a typical course?

Now?

18 months ago?

Do lectures incorporate any pre-recorded material? Please explain.

Have the teaching methods changed since 18 months ago?

How are questions from students dealt with (e.g. pre-written, asked "live", etc.)?

How often do you use videoconferencing for teaching or learning? (Please delete all inapplicable responses)

A few times each day

A few times each week

A few times each month

A few times each year

Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for teaching or learning, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for teaching or learning purposes? (Please delete all inapplicable responses)

0-5 minutes

5-15 minutes

15-30 minutes

30-60 minutes

60-120 minutes

more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

How useful have you found your videoconferencing equipment to be for teaching or learning? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional ways of teaching or learning (e.g. face to face group lessons)?

Are there any disadvantages over traditional ways of teaching or learning?

Are you happy with your current overall set-up for teaching or learning?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for teaching or learning purposes (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for teaching or learning?

Please explain.

Do you find that videoconferencing provides value for money for teaching or learning?

Now?

18 months ago?

Would you recommend your current set-up to others considering using videoconferencing for teaching or learning? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for teaching or learning?

D. Concerning your use of videoconferencing equipment for research purposes

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

What kind of research do you use videoconferencing facilities for?

How do you use videoconferencing in this field of research?

Has the way in which you use videoconferencing changed since the last 18 months? Please give details.

Who do you normally communicate with? (e.g. project partner, colleague etc.)

How often do you use videoconferencing for research purposes? (Please delete all inapplicable responses)

- A few times each day
- A few times each week
- A few times each month
- A few times each year
- Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for research purposes, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for research purposes? (Please delete all inapplicable responses)

- 0-5 minutes
- 5-15 minutes
- 15-30 minutes
- 30-60 minutes
- 60-120 minutes
- more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for research purposes, is it mainly for point-point, or multi-point communication? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment to be for research purposes? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional methods of research (e.g. face-face meetings)?

Are there any disadvantages over traditional methods of research?

Are you happy with your current overall set-up for research purposes?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for research purposes (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for research purposes?

Please explain.

Do you find that videoconferencing provides value for money for research purposes?

Now?

18 months ago?

Would you recommend your current set-up to others considering using videoconferencing for research purposes? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for research purposes?

E. Concerning your use of videoconferencing equipment for collaborative work (but not specifically for research)

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

With whom is the work usually conducted? (e.g. service providers, audio-visual department)

What type of work is carried out?

Has the type of work carried out changed in the last 18 months?

How often do you use videoconferencing for collaborative work? (Please delete all inapplicable responses)

- A few times each day
- A few times each week
- A few times each month
- A few times each year
- Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for collaborative work, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for collaborative work? (Please delete all inapplicable responses)

- 0-5 minutes
- 5-15 minutes
- 15-30 minutes
- 30-60 minutes
- 60-120 minutes
- more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for collaborative work, is it mainly for point-point, or multi-point communication? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment for collaborative work? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral

Not very useful
Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional ways of collaborative work (e.g. face to face meetings, postal communications, phone calls)?

Are there any disadvantages over traditional ways of collaborative working?

Are you happy with your current overall set-up for collaborative work?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for collaborative work purposes (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for collaborative work?

Please explain.

Do you find that videoconferencing provides value for money for collaborative work?

Now?

18 months ago?

Would you recommend your current set-up to others considering videoconferencing for collaborative work? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for collaborative work?

F. Concerning your use of videoconferencing equipment for interviewing

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

How often do you use videoconferencing for interviewing? (Please delete all inapplicable responses)

- A few times each day
- A few times each week
- A few times each month
- A few times each year
- Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for interviewing, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for interviewing? (Please delete all inapplicable responses)

- 0-5 minutes
- 5-15 minutes
- 15-30 minutes
- 30-60 minutes
- 60-120 minutes
- more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for interviewing, is it mainly for point-point, or multi-point communication? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment for interviewing? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional ways of interviewing (e.g. face to face)?

Are there any disadvantages over traditional ways of interviewing?

Are there any particular situations where videoconferencing is not suitable for interviewing? Why?

Are you happy with your current overall set-up for interviewing?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do? (e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for interviewing purposes (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for interviewing? Please explain.

Do you find that videoconferencing provides value for money for interviewing?

Now?

18 months ago?

Would you recommend your current set-up to others considering using videoconferencing for interviewing? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for interviewing purposes?

G. If you do not yet use your videoconferencing equipment...

What do you intend to use it for?

When do you intend to start using it? Please explain.

What has stopped you using it up until now? (e.g. technical problems, lack of funding)

H. Use of videoconferencing technology for other purposes

*Please answer the following questions for *yourself as a user* (i.e. not for other users that you are aware of)...*

What do you use it for (e.g. teleworking, remote surveillance, watching TV, etc.)? Please describe fully these uses.

Have you discovered these uses for your equipment since installing it?

How often do you use videoconferencing for these purposes? (Please delete all inapplicable responses)

- A few times each day
- A few times each week
- A few times each month
- A few times each year
- Less frequently

Has your frequency of use changed since 18 months ago? If so please give details.

If you don't use your equipment as often as you would like for these purposes, what are the barriers preventing you (e.g. technical knowledge, funding)?

How long is a typical call for these purposes? (Please delete all inapplicable responses)

- 0-5 minutes
- 5-15 minutes
- 15-30 minutes
- 30-60 minutes
- 60-120 minutes
- more than 120 minutes

Has the typical duration of a call changed compared to 18 months ago?

When using the equipment for these purposes, is it mainly for point-point, or multi-point communication? (i.e. is there just one other site involved at a time or more than one other?)

How useful have you found your videoconferencing equipment to be for these purposes? (Please delete all inapplicable responses)

- Very useful
- Quite useful
- Neutral
- Not very useful
- Not at all useful

Has this changed in the last 18 months? If yes, please give details.

What advantages does videoconferencing have over traditional media?

Are there any disadvantages over traditional media?

Are you happy with your current overall set-up for these uses?

Now?

18 months ago?

Are there things that you cannot do which you would like to be able to do?
(e.g. Are there any extra facilities you would like to see incorporated?)

Now?

18 months ago?

Do you use any associated tools with the videoconferencing equipment for these purposes (e.g. file sharing, whiteboard facilities, etc.)?

Are there any facilities that you find superfluous for these purposes? Please explain.

Do you find that videoconferencing provides value for money for these purposes?

Now?

18 months ago?

Would you recommend your current set-up to others considering using it for these purposes? Why?

From your experiences, is there any advice you would give somebody who was considering the use of videoconferencing technology for these purposes?

Potential uses for the future

How do you expect to be using videoconferencing technology in 1 year from now?

How do you expect to be using videoconferencing technology in 5 years from now?

What are the limitations of your existing equipment that prevent you from using it in these ways at the moment?

Are you considering the purchase of any related equipment? If so, what?

Please add any other comments or feelings about videoconferencing equipment and technology that you do not feel have been covered in the questionnaire.

We would like to carry out some in-depth interviews with a few respondents personally. These would take place at your site, at your convenience and take approximately one to two hours. Would you be willing to be involved in these?

Would you like a copy of the final report?

Thank you very much for your time.

2. Site contacts

The following people interviewed during the field visits agreed to be site contacts:

John Goodwin, Cardiff College, University of Wales
Email: goodwinj@cardiff.ac.uk
Phone: 01222 874000, extension 4161

David Ruddick, University of Ulster, Jordanstown
Email: JD.Ruddick@ulst.ac.uk
Phone: 01232 366120
WWW: http://ms.edsm.ulst.ac.uk/media_services/pages/vc.html

Graeme Wood, The University of Edinburgh
Email: Graeme.Wood@ucs.ed.ac.uk
Phone: 0131 650 5003
Also involved in the Scottish MICE National Support Centre
Email: mice-nsc-scotland@ed.ac.uk
WWW: <http://mice.ed.ac.uk/mice/>

Scott Currie, The University of Edinburgh
Email: s.currie@ed.ac.uk
Phone: 0131 650 4947

Marian Cumpstey, The University of Nottingham
Email: NAZMVC@NAN1.medical.nottingham.ac.uk
Phone: 0115 970 9357

3. Field site interview structure for Manager/ service providers

Name:

Department / Unit:

Date of visit:

(1) Availability Of Services

NB. Include all types of VC (PC, stand-alone, roll-about, studio) in table below

Type of unit (e.g. PC, roll-about, studio)				
No. of units (Approx)				
No. of users (Approx)				
Network used				
Bandwidth				
Hardware/software used (make, model)				
Date(s) purchased/commissioned				
Date(s) upgraded				
Additional equipment/ facilities				
Document camera				
Video recorder				
Fax				
Whiteboard				
Whiteb'd camera				
OHP				
File-sharing				
Extra microphone				
Extra loudspeaker				
Extra monitor				
Extra camera				
Others (specify)				

Are there likely to be many other pieces of VC equipment here that you do not know about? (if so explore)

Do you have an MCU (Multi-point Control Unit)? If not, do you use/hire another body's MCU for multipoint calls?

(2) History of Service

When did VC start?

Who initiated the setting up of the service and why?

Did you receive any advice in how best to set up the service?

Was there any pilot/ trial period? If so, describe.

How was the service funded?

Who chose the equipment, and what criteria were used in its choice?

Were there any specific problems setting up the service?

How did you initially make the service known to potential users?

(3) Service Usage

What are the main uses here for VC? (include rough percentages, in terms of hours of use, for each usage category)

Has this pattern changed in the last 18 months? (include rough percentages for each usage category as at 18 months ago)

How do users currently get to know about the services? Has this changed in the last 18 months?

Are new services introduced as a result of user request or strategy or both?

How are users' requirements analysed and catered for?

What has the general response been from users?

What are the main problems that users report with VC in general?

(4) Management Structure

What is the overall management structure? E.g.

- Is one department / unit responsible -if so who?
- Are the services managed by committee? - If so who?

(5) Financial Management

Who is responsible for financial management? Has it always been this way?
In particular, what changes have occurred in the last 18 months?

Do users pay for using the service?

What is the cost structure?

Do the hire costs cover the running of the service?

How are indirect costs funded? (e.g. purchase of new equipment)

(6) Technical Support

Who is responsible for Technical support (e.g. training, 'online' support, maintenance...)? Has it always been this way? In particular, what changes have occurred in the last 18 months?

Are new users given any training in how to use VC? If so, what does it involve and how long does it take?

What are the most frequent technical problems experienced by users?

What are the technical support mechanisms? E.g. if a link goes down, who would the users go to for help?

What are the main technical problems that you experience with the equipment and the network? How do you overcome these problems?

Has this changed since 18 months ago?

Are there any groups, references, bodies etc. that you have found particularly helpful for technical advice?

(7) Day-to-Day Management

Who is responsible for Day to day management (e.g. booking rooms, scheduling...)? Has it always been this way? In particular, what changes have occurred in the last 18 months?

Who manages booking of sessions internally?

What is the procedure?

Do you think this procedure is successful?

Has this changed at all in the last 18 months?

Who co-ordinates bookings of the network? (Edinburgh?)

(8) Strategic Management

Who is responsible for Strategic management (e.g. evaluation, policy making, future planning...)? Has it always been this way? In particular, what changes have occurred in the last 18 months?

Are there regular evaluations of the service to check if users are satisfied and to identify changing needs etc.? If so, how often, and what does the procedure involve?

Are you personally involved in policy making and strategic planning?

What are the procedures involved in changing policy, investing in new equipment etc.?

What would you say are the main changes that have taken place over the last 18 months in terms of policy/strategy?

What are your predictions for the future of VC here?

What are your predictions for the future of VC in Higher Education generally?

What is your overall opinion of VC in HE?

Has this changed at all in the last 18 months?

4. Field site interview structure for Users

Name:

Department / Unit:

Date of visit:

(1) History of Use

When did you first start using videoconferencing?

Why did you first start using videoconferencing?

How did you get to know about the existence of videoconferencing here?

How did you get to know about the potential of videoconferencing/ what it could do for you?

When you first started using videoconferencing, did you receive any training? If so, what did it involve and how long did it take?

(2) Current Uses

Main Uses	Current system used	Frequency of use	Start date
Personal/informal communication			
Presentations			
Teaching or learning			
Research			
Collaborative work			
Interviewing			
Other...			

Have there been any major changes in your use of the equipment over the last 18 months? If so, what were the changes and why did they occur?

(3) Financial considerations

How do you pay for the service?

Are you happy with the costs/ costing structure?

What are the costs you save by using videoconferencing?

Do you feel that the videoconferencing service here provides value for money?

(4) Technical Considerations

What are the support facilities here? e.g. what would you do if a link went down?

Are there any other external support facilities that you use/ find useful? E.g. other bodies, mailing lists...

What are the main technical problems you have in using the equipment?

Has this changed since 18 months ago?

Are you satisfied with the equipment here?

Are there any other facilities/ equipment that you would find useful?

(5) Administrative considerations

Do you have to book to use videoconferencing?

What is the booking procedure?

Do you think this procedure is successful?

Have there been any changes in the administration of videoconferencing over the last 18 months?

(6) General

Overall, what are your main problems with using VC?

Overall, what do you see as the main benefits of using VC

What advice would you give new users?

What is your overall opinion of videoconferencing here?

Has this changed in the last 18 months?

How do you see the future of videoconferencing here?

5. UKERNA interview structure

1. What were the original objectives in setting up and supporting the pilot sites?
2. Have these been met?
3. What were the main problems in the eyes of UKERNA?
4. Are there now new objectives?
5. What are the plans to continue (expand?) the use of videoconferencing in the future? e.g. is it expected that there will continue to be national support?
6. How does UKERNA publicise its work?
7. Does UKERNA see itself providing advice for any academic institution starting to use videoconferencing or is the focus of the work limited to JANET?

6. Useful URLs

<http://www.agocg.ac.uk:8080/agocg/>

Advisory group on computer graphics. Information about the group, current projects, AGOCG technical reports, SIMA project and workshop reports (including, "The Do's and Dont's of Videoconferencing in Higher Education").

<http://strat.ucs.ed.ac.uk/bookuserm.html>

The SuperJANET Video Network- Users Guide. Includes information on how to go about using videoconferencing, how to book SuperJANET and site contact information and video facilities.

<http://www.ukerna.ac.uk>

UKERNA WWW pages

<http://www.ukerna.ac.uk/technology/video/video.html>

Information on the SuperJANET video network and its expansion

<http://www.ja.net/technology/video/vidoint.html>

UKERNA video project, SuperJANET working groups and papers, TITAN project, Mice, MERCI project, desktop VC, UKERNA facilities

<http://www.ja.net/technology/video/vidlinks.html>

Other links from the JANET/UKERNA WWW pages

<http://www.dipoli.hut.fi/cet-bin/studios.pl/>

Searchable directory of VC WWW pages, split by country (mainly European) and institution

<http://www.ulst.ac.uk/services/intro.html>

Introduction to the University of Ulster VC services and further links about the ACTOR project (Applications for ISDN Communications Technologies to extend OutReach)

http://ms.edsm.ulst.ac.uk/media_services/pages/vc.html

Details about the University of Ulster VC service, papers, reports, surveys, UKERNA reports.

http://ms.edsm.ulst.ac.uk/media_services/pages/controller.html

Instruction manual including pictures for studio VC5000 system and desktop controller.

<http://cent1.lancs.ac.uk/ucsg/index.html>

Workshop held at Lancaster University by the Universities and Colleges Software Group (UCSG) on conference systems