



National Foundation for Educational Research

**WELSH VIDEO NETWORK LOOKING
TO THE FUTURE**

FINAL REPORT

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WVN

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1. Policy Background

‘Videoconferencing is a method of communicating between two or more locations where sound, vision and data signals are conveyed electronically to enable simultaneous interactive communication’ (JANET, <http://ja.net/documents/factsheets/>)

It has been available for some time, but more recently *‘educational institutions and commercial organisations are taking a fresh look at it’* (TechLearn n.d.). It has been reported that the causes of this renewed interest are due to:

- videoconferencing systems becoming more widely available
- changing technology
- decreasing costs
- increasing functionality.

The potential of videoconferencing within learning is also being increasingly recognised. According to TechLearn (n.d.) videoconferencing has a variety of functions. On-campus it can be used for guest speakers, small group tutorials or seminars, sharing teaching sessions between outreach centres or associate institutions and inter-institutional collaboration. Off-campus video can assist non-traditional learners who may not be able to attend campus-based courses, geographically isolated learners and work-based learners.

De Cicco (1997) suggests that, in addition to the above possibilities, videoconferencing can be used to:

- offer classes outside normal college hours
- team up businesses to offer employer training on work premises
- work collaboratively with other education staff and experts on joint projects
- observe and support student teachers
- allow students to take courses not on offer in their region
- allow students to observe and learn specialist skills delivered by experts based hundreds and maybe thousands of miles away

- support staff in sharing teaching methods and curriculum materials.

The benefits of videoconferencing therefore appear to extend across whole institutions. It can support students, distance learners and staff by extending the reach of education, expertise and support.

Research findings have identified the need for certain features to be in place if the use of videoconferencing is to be effective in educational institutions. These include:

- facilities that are reliable and easy to use
- affordable usage costs
- good quality equipment
- rules governing interaction that are established from the start
- an appropriate teaching style to suit the medium.

Videoconferencing in Wales

Research undertaken in higher education and further education in Wales, such as a report commissioned by Heads of Higher Education (C & IT for Collaborative and Distance Learning in HE in Wales: HHEW/UWVCB Joint Working Party 1998, cited at <http://www.wvn.ac.uk/background.htm>) and a further study carried out by the United Kingdom Education and Research Network Association (UKERNA 1999) for the Welsh funding bodies highlighted the demand for a videoconferencing network.

As a result, a pioneering project was established involving both higher and further education institutions. The aim of the project was to provide at least 80 high quality networked video studios for all institutions in Wales. The Welsh Video Network Support Centre was also established and all institutions within the network received equipment and funding to enable them to furnish new videoconferencing studios. All further and higher institutions in Wales are now part of the Welsh Video Network (WVN).

These developments have occurred at a time when videoconferencing is being explored as a means of addressing key issues in the delivery of post-16 education and training in Wales. The Welsh Assembly Government is committed to facilitating changes within the education and training system which will increase cooperation between providers, remove duplication, and

enable learners to access a wider range of provision and learning experiences. The use of videoconferencing has been advocated as part of this process. By 2006, there were 57 videoconferencing studios in the FE sector and 25 studios established in HE institutions. The network is also being expanded into secondary schools and there is evidence that its use is developing, especially in sixth form work.

In October 2006 the National Foundation for Educational Research (NFER) was commissioned to undertake research into the WVN with a strong focus on its current and potential use.

2. Aims and methodology

2.1 Aims and objectives

The overarching aim of the project was to conduct research into the future potential use of videoconferencing in Wales.

The specific objectives were to consider:

- what changes or modifications to videoconferencing facilities users would benefit from, specifically keeping in mind the collaboration agenda within Wales
- the impact of the availability of videoconferencing facilities on the teaching of, and through, the medium of Welsh
- the likely impact on users and the use of videoconferencing should the WVN Support Centre be scaled down or disbanded
- the impact of the provision of advice about videoconferencing for teaching and learning, and the future requirements to encourage teaching and learning by videoconferencing in the future
- how WVN compares with other similar networks both nationally and internationally
- the cost/benefit of WVN
- the potential impact of the cessation of central maintenance for the videoconferencing equipment
- the impact of the funding model to be used
- the potential impact of a change to the funding model
- the desirability of further investment in WVN and the scope for expansion of the network.

2.2 Methodology

The project was undertaken in three phases as outlined below.

Phase 1: Strategic Discussions and Documentation Update

A project initiation meeting was held between the research team and members of the WVN Steering Group with a managerial role on this project. That meeting was used to clarify the aims and parameters of the research, and to discuss the proposed methodology. Details of essential contacts were received and the channels for communication between the Steering Group and the research team were established.

The NFER undertook a documentation review to obtain the background to the WVN project and the recommendations made to HEFCW and ELWa its *Review of the Video Services Network* (2005). Members of the project team obtained details from the members of the WVN Steering Group outlining additional materials to be included as part of this project. Other relevant documentation was also identified.

Through the WVN Support Centre, the project team obtained statistical information about the cost of the infrastructure, its running costs, and the extent and nature of the usage.

A series of scoping interviews were held with representatives of DELLS and HEFCW. These discussions clarified some of the research issues and enabled the research team to obtain strategic perspectives on the key issues.

Phase 2: Collection of Provider and User Views

A qualitative approach, based on a combination of face-to-face interviews and focus groups, was agreed upon.

Research sample

Following discussion with the project management group, the sample was revised to include six FE institutions and four HE institutions. All other FE and HE institutions in Wales were invited to attend one of three focus group discussions.

The range of personnel interviewed during the course of the research included:

- senior managers
- finance officers
- technical/videoconferencing managers
- lecturing staff a) who use the facilities and b) who do not use them.
- members of staff responsible for teaching and learning through the medium of Welsh.

E-mail survey

The NFER developed brief bilingual proformas for completion by a) staff and b) learners. These were agreed with the project management team with the agreement that they would be distributed electronically.

Cost benefit analysis

Various methods were considered as a basis for the cost benefit analysis. The model presented in Chapter 6 considers actual examples where videoconferencing is used for teaching and learning and other functions, and assesses the cost benefit of doing so.

Phase 3 Analysis and reporting

The research team drew together all qualitative data collected during the research phases. This Draft Report presents the outcomes of that analysis.

Structure of the report

Chapter 3 of this report considers recent evidence on the use of videoconferencing in HE and FE, based on a review of relevant literature.

Chapter 4 outlines the extent of the videoconferencing facilities used by the sample colleges, and their experiences of working with the WVN. This chapter then considers how their experience of the WVN compares with other similar networks.

In order to consider how videoconferencing might develop in future, Chapter 5 explores examples of how FE and HE institutions in Wales were using videoconferencing for teaching and learning and other activities which impact directly or indirectly on the quality of learners' experiences, such as research,

and administration and staff professional development. The chapter also focuses on the use of videoconferencing specifically for the teaching of Welsh and provision through the medium of Welsh. The cost benefit analysis is presented in Chapter 6. Drawing on this evidence and discussions of future development with respondents, Chapter 7 considers the key factors which need to be in place to encourage teaching and learning by videoconferencing.

Chapter 8 considers the changes to the videoconferencing facilities that respondents identified as being useful to them. It then considers the likely impact of any changes to the maintenance structure and funding arrangements, and the extent to which key stakeholders believed that there was a need for further investment in the network.

Chapter 9 presents the conclusions of the research against each of the key objectives outlined in Chapter 2.

3. Videoconferencing in teaching and learning

This chapter reviews key policy documents, academic research and literature on the context and development of the Welsh Video Network (WVN). This chapter is divided into three sub-sections that look at the policy context at a national level, the development of WVN in Wales and international research on videoconferencing.

3.1 The policy context

Over the last five years policymakers at all levels have sought to develop education strategies that respond to and harness the benefits of rapid developments in information communications technology (ICT). Policy makers at EU, UK and Welsh levels have all looked to develop what is often termed as '*e-learning*' strategies that recognise the potential contribution of ICT to educators and learners of all ages.

At an EU level the Commission and the majority of member states have supported '*the use of new multi-media technologies and the internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration*' (European Commission, 2007). The Commission has also supported the development of an e-learning portal, '*e-learning europa*', to support research, collaboration and dissemination of good practice on e-learning.

At a UK-level, the Department for Education and Skills (DfES), adopted an ICT in education strategy in 2005 entitled '*Harnessing Technology: Transforming Learning and Children's Services*'. The key aims of the strategy were to offer personalised support and learning experiences to children and learners, to provide good quality ICT training and support for practitioners particularly leaders and develop '*a common digital infrastructure to support transformation and reform*' (DfES, 2005). The DfES hopes that the strategy will improve outcomes for learner, engage hard-to-reach groups and in

particular support the skills and 14-19 strategies. The strategy also noted that it hopes to encourage FE and HE providers to reach out to schools, communities and work-based learners through the use of innovative practices and technologies.

In Wales, there has been a strong commitment to '*exploiting*' the benefits of ICT technology in all areas of public service (WAG, 2005). Beginning with the '*Cymru Ar Lein*' strategy in 2001 the Welsh Assembly Government (WAG) have sought to support greater use of ICT through initiatives such as Broadband Wales which seeks to ensure the availability of broadband to all people and sectors in Wales and through its support of the development of e-learning initiatives and an e-learning strategy (WAG, 2005).

As noted in Section 8 of the Minister for Education, Lifelong Learning and Skills' report to the WAG's Education, Lifelong Learning and Skills committee in February 2007, the Further Education (FE) and Higher Education (HE) sectors have played a particularly important role in the development of e-learning programmes in Wales. Moreover, the Minister noted that:

'Wales ... has access to world-class support from the Welsh Video Network, which has considerable expertise in installing, maintaining and raising awareness of how video-conferencing can support teaching and learning in schools, colleges and universities'

<http://www.wales.gov.uk/cms/2/EducationLifelongLearningAndSkillsCommittee/AgendasPapersTranscripts/a64b290145badf076187c5ad440f1901.html>

In 2003 ELWa (now DELLS) published a national strategy on e-learning for Wales which recognised 'that traditional forms of learning are not in themselves going to be sufficient to meet the needs and expectations of people.' The strategy therefore outlined how e-learning and new ICT technologies could support traditional learning methods, reach out to new groups, provide learners with more personalised choices on how and what they learn and increase the accessibility of current education opportunities (ELWa, 2003). The authors of the strategy felt that a Welsh e-learning policy could help secure 'excellence' in:

- connectivity

- content
- confidence
- competence.

Supporting the messages of the ELWa learning strategy, the WAG document *'E-learning in Wales: Current Developments and Stakeholder Views on Future Priorities, 2004'* reiterates the need to *'use electronic technology to support, enhance and deliver learning'* (WAG, 2004). Stakeholders responding to the consultation agreed with the principles outlined by the ELWa strategy and were of the opinion that e-learning could be of great benefit to all education providers and learners. The strategy however, also outlined the need for more coherence in the development of innovative teaching and learning projects using ICT as opposed to the current situation where innovative but isolated small-scale projects were being developed.

In the most recent consultation document on e-Wales, *'Towards e-Wales: A Consultation on Exploiting the Power of ICT in Wales'* (WAG, 2006), the Welsh Video Network (WVN) is held as an example of a innovative programme that offers a coherent contribution to e-learning in Wales:

'It (WVN) is regarded as one of the most advanced academic videoconferencing networks in the world, independent evaluation has identified that it has delivered savings in terms of cost, travel time and administration: helped to promote the growth of distance learning in Wales; opened up new markets attracting new groups of students and increased access to subject specialists' (WAG, 2006).

Similarly in the Higher Education Funding Council for Wales (HEFCW) *'Statement of the Position of E-learning in Higher Education in Wales'* (HEFCW, 2007), WVN is recognised as an important and coherent contribution to the FE and HE sector in Wales and as a project that has secured technological innovation in the development of simultaneous translation equipment to enable dual language conferencing (HEFCW, 2007). WAG state that WVN has *'provided a basis for pioneering work in areas such as simultaneous translation'* (WAG, 2006).

In general, policy-makers and policy documents on e-learning strategies in Wales note the importance of the development of WVN for Wales and confirm that it has made an important contribution to this policy area.

3.2 Development of the Welsh Video Network (WVN)

The Welsh Video Network (WVN) project established an integrated national video network in which all FE and HE institutions in Wales participate.

3.2.1 UKERNA report

The original demand for a national videoconferencing network for HE was highlighted in a report commissioned by the Heads of Higher Education in Wales in 1998 (C & IT for Collaborative and Distance Learning in HE in Wales: HHEW/UWVCB Joint Working Party 1998, cited at <http://www.wvn.ac.uk/background.htm>). Subsequently the United Kingdom Education and Research Network Association (UKERNA) undertook a further detailed study of both the FE and HE sectors in 1999 for the Welsh funding bodies. This study provided further evidence of the demand for an integrated national video network embracing both Further and Higher Education. UKERNA noted that there was a need to build on the C5C network which had been '*leading edge when commissioned in 1990*' but which they considered was '*substantially obsolete*' by 1999 (UKERNA 1999).

The UKERNA study highlighted that videoconference use at the time varied greatly across the FE and HE sectors in Wales but that '*individual organisations view videoconferencing as strategic and are investing in the technology.*' (UKERNA 1999). A number of institutions had also invested in a range of small scale developments in videoconferencing. However, these were of a low quality and were not judged to be sufficiently robust for teaching and learning across a networked system. A study undertaken by the NFER (2005) found that WVN was perceived to offer greater potential than the C5C network because the latter was largely unsupported. However, C5C had helped to develop capacity to use videoconferencing:

'Those HE Institutions which were part of the C5C network tended to use video conferencing heavily for administration, teaching and learning as well as research. The use of video conferencing for teaching and learning tended to be confined to particular departments with staff who had successfully adopted the technology for that purpose. Although most staff were aware of the potential of video conferencing as a teaching tool it was recognised that more could be done to further raise its profile' (NFER, 2005).

However, the study reported that *'Institutions in both sectors, FE and HE, are keen to develop and/or extend their use of videoconferencing, particularly for teaching and learning purposes. They see opportunities in a number of directions: in-house for teaching between sites and for distance learning; and within and across sectors for collaborative work, including research collaboration.* (UKERNA 1999)

Therefore UKERNA developed a specification for a project to provide high quality networked video studios for all FE and HE institution in Wales and made a number of recommendations for this purpose. These were:

Technology and supporting equipment

- the video network established is a hybrid, using both ISDN and IP technologies
- in relation to ISDN, facilities are provided to support ISDN6
- equipment support (Multipoint Control Units) for the ISDN service is provided from the JANET Videoconferencing Service; and parallel support for the IP service is provided from a Welsh Videoconferencing Centre
- gateways to link the two service networks are co-located with the ISDN support equipment at the JANET Videoconferencing Service.

Studio environment and equipment

- studios on the Welsh Video Service Network should successfully complete quality assurance tests when commissioned and at regular intervals afterwards
- equipment for each studio is provided in the form of a standard basic package according to the size of the studio and its intended use
- equipment is centrally purchased in accordance with standard EU procedures for public procurement.

Management and support

- a Welsh Videoconferencing Management Centre is established to manage the IP based video service; and the continuing requirement for the Centre is assessed 18 months from the start of service operation
- the JANET Videoconferencing Service provides management support for the ISDN service
- an additional member of staff is appointed at each of the two existing FE Support Centres for up to two years in the first instance to serve the deployment and operation of the video network in both the FE and HE

communities; and the continuing requirement for both posts is reviewed 18 months from the start of service operation

- an overall Project Manager is appointed on a fixed term basis for approximately two years at the outset of the project
- the Welsh Videoconferencing Network should use the JANET Web based videoconferencing booking service.

Other

- a central call charge budget is established for Further Education Colleges with a budget quota allocation for each college.

(UKERNA 1999)

3.2.2 Implementation of the recommendations

The Welsh funding bodies adopted UKERNA's recommendations and in September 2001 the WVN was launched. In November 2000, both sectors were informed that FEFCW and HEFCW had been successful in sponsoring a bid for ERDF Objective 1 funding to enable the expansion of the WVN through, *inter alia*, the establishment of additional studios in institutions with sites in the areas with Objective 1 status. This led to the establishment of 81 studios (including one at the funding body's office) as part of the Welsh Video Network.

The Welsh Video Network was therefore funded to £3.1 million by Education and Learning Wales (ELWa) and the Higher Education Funding Council for Wales (HEFCW) and to £2.4 million by the European Regional Development Fund (ERDF) and was the first of its kind in the UK to involve both the FE and HE sectors.

The network was supported by a support centre (Welsh Video Network (WVN) Support Centre) based at Swansea University and the University of Wales, Aberystwyth and managed by UKERNA.

ELWa and HEFCW produced a specification of the service required from UKERNA which included:

- overseeing the work of the WVN Support Centre
- advising the funding bodies on the status of the network to ensure it remained fit for purpose and evolved technically and operationally to meet demand
- managing any required procurement

- advising on and organising such events as may be appropriate from time to time to support the operation and use of network
- acting as the funding bodies' agent for payment for the Support Centre and any equipment and events associated with the maintenance and development of the network and its operation and use
- maintaining the Network's website
- developing and maintaining effective working relationships with appropriate bodies within Wales and with bodies in the higher and post-16 education communities more widely, particularly in respect of network technology and operation.

The remit of the Support Centre included:

- technical training and support
- commissioning and maintenance of the studio facilities
- videoconferencing management and development.

The project steering group considered how to allocate studios to each institution and decided to provide each institution with one studio but provide additional studios where sites were over 25 miles or more than one hour's travelling time apart.

The equipment was procured through European Procurement processes and provided

- a studio equipment controller
- a videoconferencing CODEC incorporating both ISDN and IP
- two remote control cameras and a document camera
- monitors, microphones and a VCR
- data and application sharing facilities
- a projector and an interactive electronic whiteboard.

WVN (n.d.)

The WVN was established as a hybrid ISDN6 and IP (Internet Protocol) system. This system was proposed because it was cost-effective and would provide an integrated solution which would operate over JANET. Furthermore, it would avoid the expense of call charges and the Welsh institutions would be at the forefront of technological developments. Initially, most videoconferencing calls used ISDN6. A call charge budget with an

allocation for each institution was established within the FE sector to allow videoconferencing to develop. All ISDN conferences were managed by and booked through the well-established JANET Videoconferencing Service (JVCS). In order to use the JVCS, WVN studios must regularly pass a Quality Assurance test. As the project progressed a transition was made towards the use of IP for videoconferencing, supported locally through the Welsh Video Network Support Centre.

3.2.3 UK and Wales developments

As a result of the UK wide remit of UKERNA, UKERNA and Welsh Video Network Support Centre staff had been involved in a number of developments in the course of the project. Many of these were technical developments focusing upon the development of Internet Protocol (IP) videoconferencing and the UKERNA team constantly strove to ensure that the Welsh Video Network is at the forefront of technological changes. The WVN website listed a number of projects in which staff were involved including:

- developing equipment monitoring tools and network monitoring tools, so that they can react quickly to any problems that may occur
- refining, developing and testing the touch screen interface to incorporate feedback from users
- assisting UKERNA with the procurement of IP videoconferencing equipment for the JANET backbone
- close liaison with developers of other Internet based videoconferencing networks, to ensure that there is compatibility and inter-operability.

WVN (n.d.)

Additionally, there were a number of Wales specific developments, amongst which has been the development of simultaneous translation facilities.

In July 2001, UKERNA submitted a proposal for a translation pilot project which recognised the need for translation facilities and active encouragement of the wider adoption of the Welsh language, for example by the Welsh Assembly Government's *Iaith Pawb* strategy. In 2001, UKERNA requested funding for a pilot project to investigate and recommend a suitable means of transmitting a translation to participating studios and distributing the translation to individuals within those studios.

This pilot was successful and by early 2005 one studio at each institution had been provided with WVN Rhwydiaith simultaneous translation equipment. A Welsh- English translator was also appointed to the WVN Advisory Group which is made up of FE and HE representatives to provide advice and information to the project (WVN, n.d.).

A number of other institutions have joined the WVN, including the National Library of Wales (NLW) and Fforwm. In 2004, Cymdeithas Ysgolion Dros Addysg Gymraeg (CYDAG - the Society of Schools for Welsh Medium Education) successfully applied to join the Welsh Video Network. CYDAG has developed videoconferencing teaching through the medium of Welsh for teaching in six schools:

- Caereinion High School in Llanfair Caereinion
- Ysgol Tryfan in Bangor
- Ysgol Maes Garmon in Mold
- Ysgol Morgan Llwyd in Wrexham
- Ysgol Aberteifi in Cardigan
- Ysgol Glantaf in Cardiff.

3.2.4 Evaluation of WVN

In 2005 the National Foundation for Educational Research (NFER) undertook an independent evaluation of the WVN network on behalf of HEFCW and ELWa. The main focus areas of the evaluation were:

- the impact of the implementation of the recommendations made by UKERNA
- the extent to which videoconferencing facilities have a positive impact on institutions and students
- the obstacles to effective implementation of videoconferencing
- the desirability of further investment in the WVN.

The evaluation concluded that the UKERNA recommendations had *'provided FE and HE institutions with a robust Video Service Network which facilitated meetings and had the potential to impact further on teaching and learning'* (NFER, 2005).

The evaluation report noted that the success of the network was rooted in the *'compatibility of all studios'* and the establishment of a Support Centre managed by UKERNA (NFER, 2005).

The evaluation highlighted that the major impact on institutions had been the saving of staff time and cost for travel for internal, inter-institutional and other meetings (NFER, 2005). The main impacts on students were the provision of previously unviable courses, and contact with students and experts at distance sites (NFER, 2005). Overall, the report concludes that the WVN network is used in the main part for administration but that its use for teaching and learning would grow in future.

Obstacles to the effective implementation of videoconferencing were also highlighted in the report. These included a lack of training on the pedagogy required for teaching and learning by videoconferencing, a lack of high profile Senior Management support in some institutions, the lack of time for teaching staff to adopt to new technology and differing levels of confidence amongst teaching staff, a lack of awareness of the potential benefits of using videoconferencing, and less advanced systems in other institutions outside Wales (NFER, 2005).

The evaluation report concluded that there *'was need for further investment in the short to medium term to aid the anticipated increase in the use for videoconferencing and to ensure that the system keeps pace with technological change'* (NFER, 2005). It also concluded that more research was needed to identify and disseminate good practice and that there was demand for more training by teaching staff (NFER, 2005). The report also noted that further consultation should be carried out with all parties involved, before further investment, as to the nature of the use made by each institution of the WVN network.

3.3 International research on videoconferencing

The majority of UK and international research on videoconferencing looks at the pedagogy of teaching and learning in using videoconferencing, the potential benefits and obstacles and details case-study examples. There is minimal long-term or large-scale evaluatory evidence on the impact of videoconferencing on learners, educators and institutions. Research tends to be

based on single project examples and reviews. While many articles were written in the 1990s and early 2000s fewer articles have been written over the last few years.

Since the increase in the reliability and therefore use of videoconferencing technology at the start of the 1990s, much has been written on the pedagogy of teaching and learning through the use of videoconferencing. Coventry (nd.) in her paper on the use of videoconferencing in Higher Education argues that *'video conferencing for teaching purposes requires additional skills to those of classroom teaching'* (Coventry, nd.). Several authors argue that training is required to teaching staff to ensure an effective experience for learners. Important aspects listed for effective pedagogy include:

- ensuring the same quality of experience for students at all sites
- avoiding student *'tv mentality'* by setting out clear expectations at the start of sessions
- detailed planning of sessions with interactivity built in i.e. students having a chance to respond, engage in dialogue with lecturers and each other, student presentations
- teaching staff lecturing for no more than 15 minutes without a break and checking frequently for understanding
- training for students on equipment
- preparing additional materials beforehand and distributing to all locations.

(Coventry, L., nd.: BECTA, n.d.: University of Idaho n.d:
ViDe n.d: Reed and Woodruff 1995: University of Warwick, n.d)

Potential/perceived benefits of videoconferencing are documented in general and case study form but there is little statistical evidence of benefit to learners of long-term evidence. Perceived benefits to learners include:

- access to previously unavailable courses
- improvements in communication and social skills
- social learning experiences and support for distance learners
- opportunities for students to access experts in their field and conduct virtual field trips
- opportunities for students with poor literacy skills to overcome barriers of written communication
- reduction in cost and travel time in some instances

- opportunities for students with special educational needs to engage more fully
- allow students to gain first-hand experiences of other languages and cultures
- greater access to lectures/teacher support for some students and opportunities for students to engage in dialogue with each other.

(Coventry, L. nd.: Alexander, W.e, *et al.*, n.d:
BECTA, n.d: ViDe n.d)

In the 2004 DfES review of videoconferencing in schools, researchers found that while teachers could not offer statistical evidence, they believed that use of videoconferencing in classrooms had a positive impact on pupil achievement (DfES, 2004). In particular, teachers noted that pupils showed higher levels of motivation and improvements in their behaviour when learning through the use of videoconferencing. This research was carried out in 26 schools and the report noted that a national policy on videoconferencing in schools was needed if all pupils were to benefit from these experiences (DfES, 2004).

Many authors also document the obstacles involved in using videoconferencing. Most common amongst those mentioned include:

- lack of teacher/lecturer training and confidence in teaching through the medium
- lack of student confidence in/ knowledge of the technology
- lack of awareness of the potential benefits amongst senior staff/managers
- timetabling organisation between different intuitions/organisations
- technical difficulties e.g. distortion or time delays
- difficulties with the appropriateness of conferencing rooms e.g. seating, sound.

(Alexander.W, *et al.*, n.d: University of Warwick n.d: ViDe, n.d:
University of Idaho, n.d)

The importance of a network as a means of facilitating videoconferencing has also been highlighted. For example, in Scotland, the Scottish MANs Videoconferencing Network (SMVCN) used a videoconferencing solution that operated over ATM. In 2002, the ATM network in Scotland was replaced and the videoconferencing equipment reached end-of-life. During the life of the Scottish ATM network, there was funding available to institutions to support

videoconferencing projects and the University of Edinburgh provided technical support to users of videoconferencing. When the ATM network was replaced, the institutions were funded to replace the videoconferencing equipment, so that operation of videoconferencing could continue. However, funding for central support and videoconferencing projects came to an end. This was perceived to have eroded the network and to have impacted adversely on the quality of the videoconferencing experience. According to one interviewee:

In the past SMVCN was a pressure group with manufacturers, pushing the development of videoconferencing for the benefit of the whole academic community. Advantages were derived from economies of scale and SMVCN was considered to be at the forefront of videoconferencing activity in the academic community.

Several years have now passed, and the SMVCN technical group have stopped meeting. An email to the mailing list elicited one response, demonstrating the absence of community. There is a feeling that everyone is doing their own thing, so there is no combined forward planning and valuable shared knowledge has been lost. Research is no longer being funded, so up-to-date examples of good practice and advice about pedagogical issues are absent. The lack of a focal point for support means that it is not as clear where users should go for support.

Most authors note that the implementation of good pedagogy and practice using videoconferencing are essential. Examples in the literature of good pedagogy, and potential/perceived benefits/obstacles can be found in many case-studies from both a UK and International context.

Student Teacher Support

This case-study example is based on a project run by Valdosta State University Faculty and student teachers in remote locations supported by an organisation called Preparing Tomorrow's Teachers to use Technology. The aim of the project is to improve the communication and support that student teachers receive from their supervisors.

Videoconferencing has not replaced the regular visits made to schools by supervisors but has increased the opportunities for communication between

student teachers and their mentors. Students are able to arrange meetings with supervisors if issues arise without having to wait for their mentors' next visit. The case study noted that videoconferencing allowed them to overcome the geographic barriers and cost of travel and provide more 'on-demand' communication and support (ViDe n.d)

In other cases colleges have used videoconferencing to allow student teachers in college to observe teachers in classroom and get a first-hand insight into good teaching practice (BECTA n.d).

Language experiments

One example included in the literature of using videoconferencing for modern language teaching is the case study on the University of Aberdeen included in the Scottish Higher Education Funding Council (SHEFC) review of videoconferencing in Scottish HE institutions. As part of the TALiSMAN video project which made use of the FaTMAN network, first year Spanish students at the University of St Andrews and students at Abertay, Dundee engaged in a videoconferencing session. The session was held for students to practice use of language by discussing the Euro, giving presentations and debating with each other using the videoconferencing system. Preparatory videoconferencing sessions were held between tutors at both sites to familiarise themselves with the technology and to agree on the outline of the session and its ethos. As a follow-up activity students were asked to write letters to their tutors in Spanish with both positive and negative comments on their experience of using videoconferencing.

All students involved were positive about the experience and were keen to plan further sessions. Tutors felt that the success of the session was based on good technical support and good planning and preparation prior to the session (Alexander, W., *et al.*, n.d.).

A second language case-study included in the SHEFC review is the teaching of German for secondary teachers by distance learning. Videoconferencing was used for a course that taught German to secondary language teachers not qualified in the language. Teaching was across three sites in two-hour weekly sessions. Lessons and homework were planned carefully before each session to help communication and sessions were structured so that there was interaction between all three sites and group work at individual sites. Regular

telephone/ e-mail support to participants between sessions also helped to alleviate any concerns felt by distance learners. Initial feedback from students and tutors was positive and agreed that videoconferencing was conducive to effective language teaching. Comparing the videoconferencing students with previous students (Alexander, W., *et al.*, n.d), who had been taught through traditional methods, there was no difference in attainment levels.

Sharing University Lectures

Several case studies in the literature give examples of co-lecturing by university tutors to groups of students at two sites. One such example is the shared-teaching of research methods at Queen Margaret University, Edinburgh and Heriot-Watt University, Scottish Borders Campus. Six one-hour sessions on research methods were taught to second and third year undergraduates at both universities who needed additional support in this area. One session was used to '*break-the-ice*' between students and familiarise them with the technology and the course expectations. In the other five sessions interactive work-books were used which contained notes and questions for discussion to which students at both sites responded. Evaluation carried out after the course suggested that students at both sites enjoyed the course and felt it was an effective learning experience and both groups felt that they received enough attention (Alexander, W., *et al.*, n.d).

NASA: Glenn learning technologies project

This case-study example is based on a project between schools in America following the K-12 curriculum and NASA. A calendar of videoconferencing sessions is run annually and schools can register for sessions that interest them. During the sessions school pupils are given presentations and can talk to NASA scientists, engineers, researchers and education specialists as well as seeing footage of space stations etc. Prior to the sessions teachers are encouraged to access the project's website where there is a list of activities and materials to look at before the videoconference sessions takes place. Initial e-mail correspondence also occurs between the parties involved to help set expectations and tailor sessions to the school's curriculum (ViDe, n.d).

4. The WVN and its effectiveness

This chapter explores the effectiveness of the WVN, drawing on respondents' perspectives. It compares the WVN with other networks, and examines perceptions about its reliability and the quality of the support which is provided.

4.1 Institutions' Facilities

FE and HE institutions in Wales had installed videoconferencing facilities in one or more of three ways. These were:

- studios installed at the start of the WVN network in 2001
- studios obtained through European funding and provided to institutions situated in areas which were eligible for such funding, installed as an immediate second phase of the WVN network
- studios funded by the institutions themselves.

4.2 The WVN and other networks

The WVN was the only videoconferencing network that most respondents had used. Some HE institutions had experienced the C5C system before the advent of the WVN. They expressed a strong view that the WVN was the better of the two systems, mainly due to its reliability, the quality of the links, and the effectiveness of the technical support.

Some respondents referred to the possibilities offered by desktop 'webcam' means of videoconferencing. These were praised as means of enabling easy access to a videoconference from home or office. However, there was a strong view that such facilities should be seen as complementing the videoconferencing network and that they did not remove the need for well-equipped studios. In particular, respondents believed that the quality of the pictures, ease of communication, and the nature of what could be done in terms of presentation limited the effectiveness of desktop videoconferencing.

Although desktop technology could be used effectively for one-to-one work, most stakeholders did not consider it to be an effective way of teaching large groups or conducting meetings involving several people. This view was very prevalent among those who had greatest experience of videoconferencing and desktop communication. These issues are discussed in greater detail in Chapter 8 of this report.

There was strong recognition of the value of having one standard system across the whole of Wales. The benefits included:

- the ease with which repairs could be undertaken
- the way it minimised compatibility issues between institutions in the WVN
- staff could become familiar with the technology which was the same in all institutions
- centralised expert support structure was provided
- economies of scale were brought about by having a standard system
- the maintenance provider is contractually obliged to keep sufficient stock to ensure that replacement items are provided to the WVN Support Centre within 48 hours of a fault being reported.

Many institutions wanted to guard against any alternative which might result in individual institutions gaining greater autonomy. A typical comment by an FE representative was *'If there was no central system, no one purchasing agreement, we could end up with 22 different models.'* Likewise a HEI representative commented *'We have a network now –not a cluster of institutions ... without it then we won't have a network'*.

Respondents in several institutions noted that Wales was perceived as being *'ahead of the game'* in the UK because of the existence of a single network. For example, a manager at one HEI noted *'HEFCW has an enlightened policy because this is earmarked and it [the funding] cannot be used for anything else. Wales has therefore ended up with a better infrastructure than anywhere else in the UK'*. The fact that the WVN comprises state-of-the-art equipment meant that people were less likely to have the type of negative experiences which some had before the advent of the WVN. For example, one technical manager noted *'Before WVN we had pretty rropy equipment which put people off. The beauty of WVN is that it is one network with quality kit'*. It was

emphasised that one negative experience was sometimes sufficient to deter people from considering videoconferencing a second time.

There was a strong view that the collaboration agenda in Wales would be best served by having one system. This was because institutions had access to a standard system, free of compatibility issues and which was supported in the same way across Wales by a central support centre.

4.3 Reliability and support

The WVN was regarded as technically very reliable by all respondents and this was a key factor encouraging its use. This had created a situation whereby there was *‘high standard which people now expect’*. The facilities were judged to be at least 90 per cent reliable and issues were always resolved quickly. A typical comment was *‘They are very good – incredibly good’*. Moreover, it was noted that problems usually arose when the facilities were used to connect with other videoconferencing networks and the source of most problems lay at the other end.

A total of 17 proformas from the e-mail survey were returned, of which 13 were completed by FE personnel, 3 by HE and 1 by a member of staff at another institution. All HE respondents said that they used the facilities once a week. Most (8 respondents) in FE said that they used the facilities once a term or less.

Table 4.1: FE and HE staff perceptions about the effectiveness of videoconferencing for different functions

	FE			HE		
	Technically	For Teaching and Learning	For meetings	Technically	For Teaching and Learning	For meetings
Very effective	5	1	6	2	1	2
Quite effective	4	2	5	1	1	1
Not very effective	2	2	1			
Ineffective		1				
No answer	2	7	1		1	

Source: NFER/UKERNA (2007)

There was a strong view among staff using the WVN who were interviewed during the research that the quality of the technical support was high and

contributed to its success. This reflected both the roles of institutions' own staff and the WVN Support Centre.

In most institutions, technical staff were responsible for providing back-up to practitioners using the facilities. Where such support existed, users rated the responsiveness of the Support Centre highly. In a small number of institutions, however, staff complained that there were no dedicated technical support workers which meant that they had to rely on written instructions, which sometimes did not address the challenges they faced. The lack of technical support was usually attributed to capacity issues within local support teams.

In general, support was allocated depending on a user's experience and needs. For example, it was commonplace for a technician to be on-hand to support a member of staff using videoconferencing for the first time or as a one-off. Where they intended to use the facilities to deliver a full course of lectures, it was usual for them to be trained in the basics of videoconferencing.

Most respondents felt that it was easy to set up a videoconference and paid tribute to their institutions' staff for the efficient way that they handled bookings. However, in a small number of institutions it was felt that the process of setting up a videoconference was challenging and that this affected usage. In those colleges it was felt that the staff responsible for setting up a videoconference should have better training and should have a workload which enabled them to devote adequate time to organising the use of the facilities. In all such cases it was emphasised that it was a lack of capacity within the teams rather than a matter of individuals' competence which affected the service they were able to provide.

The role of the WVN Support Centre was perceived as an essential ingredient in the success of the videoconferencing network. For example, *'The centre gives you a confidence that they are there should any problems be encountered'*.

Staff with supervisory and technical responsibilities referred to the ease with which they could access support and commended the way it was provided. *'They don't talk down to you, they will talk things through and take you through what might have gone wrong'* was typical of the comments received.

Technical staff said that their work would be extremely difficult without the help they received from the WVN Support Centre. This was because of the level of expertise which the Support Centre staff brought to their work and also because institutions' technical support workers had a range of other duties to perform, which meant that they could not attend to videoconferencing themselves.

4.4 Key findings

The only network used by most people was the WVN; those who had experienced other systems believed that the WVN was the most reliable and effective videoconferencing system they had used.

Although desktop video links were seen by a minority of respondents as a potential alternative to videoconferencing suites, the latter offered a better quality and were more effective for group discussions.

There were advantages in one standard system for the whole of Wales in terms of maintenance, compatibility, and user familiarity with the system; there were also economies of scale.

Greater institutional autonomy in the choice of different systems was likely to lead to the break-up of the network and frustrate the development of videoconferencing in Wales.

The ring-fencing of funding for videoconferencing was a positive contribution to the development of the network, as opposed to the growth of a plethora of different systems.

The reliability and high quality of the facilities were factors which encouraged their use.

The service provided by the WVN Support Centre was effective, of a high quality, and crucial to the efficient running of the videoconferencing system.

Very few institutions had the capacity to support videoconferencing themselves without the additional contribution made by the WVN Support Centre.

5. Current and potential usage

The aim of this chapter is to present evidence about the way that videoconferencing is used by HE and FE institutions in Wales and to explore potential future usage. In order to develop an awareness of the necessary conditions to encourage teaching and learning by videoconferencing, the research team examined how institutions were using the facilities. This included, examining quantitative and qualitative data on the extent and nature of usage. The chapter also presents evidence about respondents' opinions on the key features of effective use of videoconferencing by HE and FE colleges.

5.1 Data sources

The following analysis summarises the data relating to the videoconferencing statistics produced by the JANET Videoconferencing Service (JVCS) Booking Service. The dataset includes conferences which took place between 1 March 2005 and 31 December 2006 and relates to the 80 studios across the 35 institutions commissioned through the WVN programme. Initially it was proposed to exclude from the analysis any usage of self-funded studios. However, this was not possible because the detailed level of data required to identify the number of unique conferences at each institution from each studio was not available. For example, if a videoconference was held between two sites at the same college and a third site elsewhere, it would be recorded as one unique conference for each institution. The analysis, however, does exclude the usage of the funding bodies' own studios or those studios located at outside organisations, for example the National Library of Wales, or in schools as part of the CYDAG project.

The data was supplied to the NFER by the WVN Support Centre. The NFER research team therefore wish to acknowledge the considerable assistance provided by the support centre team in collating the data.

It must be noted that no data was available for all 35 institutions for the month of July 2005, nor for HE institution 4 for August or September 2005, therefore the number of conferences reported may be an underestimate of the actual number of conferences that took place.

The analysis followed the same criteria as those used in the review of the WVN conducted by NFER in early 2005. This was done to ensure meaningful comparisons between the two sets of data.

The data was examined to inform the research aim of identifying the extent to which the studios are used and the type and frequency of use.

5.2 Extent of usage

Table 5.1 shows the total number of conferences (12419) in which WVN studios participated in the period 1 March 2005 – 31 December 2006 for conferences booked through the JVCS Booking Service.

It should be noted that where a conference involved several studios at an FE or HE institution in Wales, this is shown as a single and unique conference for that institution. This is because some institutions may have a number of studios located at a number of sites, all of which may be involved in the same videoconference with an external body or in an internal videoconference. This methodology is consistent with that used in the previous evaluation of the WVN in 2005.

The research team are aware that the data may underestimate the total number of videoconferences, as a number of point-to-point conferences may not be booked through the JVCS Booking Service, and as these conferences do not make use of central resources and local administration staff may wish to avoid the overhead of making a booking. Staff have been asked by the WVN, UKERNA, and the funding bodies not to do this as the practice could distort the findings of research and evaluations of videoconferencing.

Table 5.1: Total number of unique conferences recorded by WVN institutions (in the period 1 March 2005 and 31 December 2006)

Month	N	Percent
Mar 05	674	5.4
Apr 05	591	4.8
May 05	537	4.3
Jun 05	523	4.2
Aug 05	187	1.5
Sep 05	527	4.2
Oct 05	610	4.9
Nov 05	754	6.1
Dec 05	455	3.7
Jan 06	659	5.3
Feb 06	768	6.2
Mar 06	934	7.5
Apr 06	475	3.8
May 06	723	5.8
Jun 06	685	5.5
Jul 06	284	2.3
Aug 06	167	1.3
Sept 06	577	4.7
October 06	796	6.4
November 06	916	7.4
December 06	577	4.7

No. of conferences (N) = 12419

Due to rounding, percentages may not sum to 100

Source: NFER Review of Video Services Network, 2007

The JVCS Booking Service allows users to describe the nature of their use of the WVN videoconference suite. The categories of use are:

- meeting / administration
- lecture / teaching / tutorial / training / demonstration
- event participation
- interview
- QA (quality assurance) testing
- research
- system testing
- venue only (i.e. the studio is in use for other purposes, such as an internal meeting)

- venue unavailable (i.e. the studio is not available for use. This may be because it is being relocated).

Table 5.2 shows the types of use as defined by the users of the WVN studios for the 12419 conferences within the dataset.

Table 5.2: Purposes of conferences recorded by WVN studios (in the period 1 March 2005 and 31 December 2006)

Purpose	N	Percent
Administration/meeting	4441	35.8
Interview	124	1
Teaching / Lecture/ Tutorial	2325	18.7
Research	310	2.5
Event Participation	149	1.2
Quality Assurance testing	561	4.5
System testing	179	1.4
Venue only	3596	29
Venue unavailable	734	5.9

No. of conferences (N) = 12419

Due to rounding, percentages may not sum to 100

Source: NFER Review of Video Services Network, 2007

The 4330 conferences identified as venue only and venue unavailable were excluded from the subsequent analysis.

A key aim of the research was to explore the extent to which the studios were used. The research team only considered occasions when the video network facilities were being used, rather than the studio being in use as a room for other purposes. JVCS guidance to users indicated that users should choose ‘Venue only’ to describe use of the WVN studio where the room was occupied but the videoconferencing equipment was not used, although the PC and data projectors may be used, especially if presentations were made. ‘Venue unavailable’ may indicate that the WVN studio at an institution was unavailable for technical reasons or may be in the process of being moved to a new location, and thus decommissioned. In order to prevent other potential users from making bookings for that room during these periods, venue unavailable is entered on the Booking Service.

In the previous evaluation of the WVN in 2005 it was reported that:

The analysis of the dataset revealed occasions when IP or ISDN networks were used against conferences designated as ‘Venue only’ or

‘Venue unavailable’. One institution reported that ‘about 5-8% of conferences we run are one-to-one links and not put through JVCS.’

This is contrary to the practice advocated by the WVN, UKERNA and the Funding Bodies.

In the previous evaluation a total of 358 ‘Venue only’ and a total of 245 ‘Venue unavailable’ bookings recorded use of IP or ISDN network. The nature of this usage was not recorded.

It is acknowledged that a small amount of videoconferencing takes place when a room is shown as ‘Venue Only’ or ‘Venue unavailable.’ This is because it is not possible for JVCS Booking System to record this usage, so it cannot be captured in the data. The overall level of videoconferencing is therefore likely to be higher than that presented in this analysis.

5.3 Types of use

The data relating to the remaining 8089 conferences was analysed to investigate the overall use of the WVN studios for teaching and learning against other uses, including administration.

The research team defined the following five categories of use as teaching and learning purposes:

- lecture
- other teaching
- tutorial
- event participation
- research.

Table 5.3 indicates the degree of use for teaching and learning compared with other purposes.

Table 5.3: Purpose of Conferences excluding ‘Venue only’ and ‘Venue unavailable’ recorded by WVN studios (in the period 1 March 2005 and 31 December 2006)

	N	Percent
Teaching & Learning	2784	34.4
Other Activities	5305	65.6

No. conferences (N) = 8089

Due to rounding, percentages may not sum to 100

Source: NFER Review of Video Services Network, 2007

The table shows that of the 8089 conferences that used the videoconferencing equipment, 34.4% were for teaching and learning purposes. Of the other activities 4441 of the videoconferences were for administration or management purposes. These administrative conferences account for 54.9% of the overall conferences recorded by the JVCS Booking System.

The research team then analysed the data to identify whether overall use was increasing over time as measured by the total number of conferences.

This is shown in Table 5.4 and Figure 5.1.

Table 5.4: Total Number of Conferences per month (in the period 1 March 2005 and 31 December 2006)

	N	Percent
Mar 05	479	5.9
Apr 05	415	5.1
May 05	335	4.1
Jun 05	348	4.3
Aug 05	113	1.4
Sep 05	303	3.7
Oct 05	382	4.7
Nov 05	464	5.7
Dec 05	289	3.6
Jan 06	433	5.4
Feb 06	499	6.2
Mar 06	512	6.3
Apr 06	238	2.9
May 06	413	5.1
Jun 06	358	4.4
Jul 06	192	2.4
Aug 06	113	1.4
Sep 06	379	4.7
Oct 06	626	7.7
Nov 06	726	9.0
Dec 06	469	5.8

No. of conferences (N) =8089

Due to rounding, percentages may not sum to 100

Source: NFER Review of Video Services Network, 2007

These statistics are available on the WVN website at http://www.wvn.ac.uk/usagestats/vcstats06_07.htm

The statistics on the website include conferences involving school-school links as well as those involving the FE and HE sectors.

Figure 5.1: Total Number of Conferences per Month (in the period 1 March 2005 and 31 December 2006)

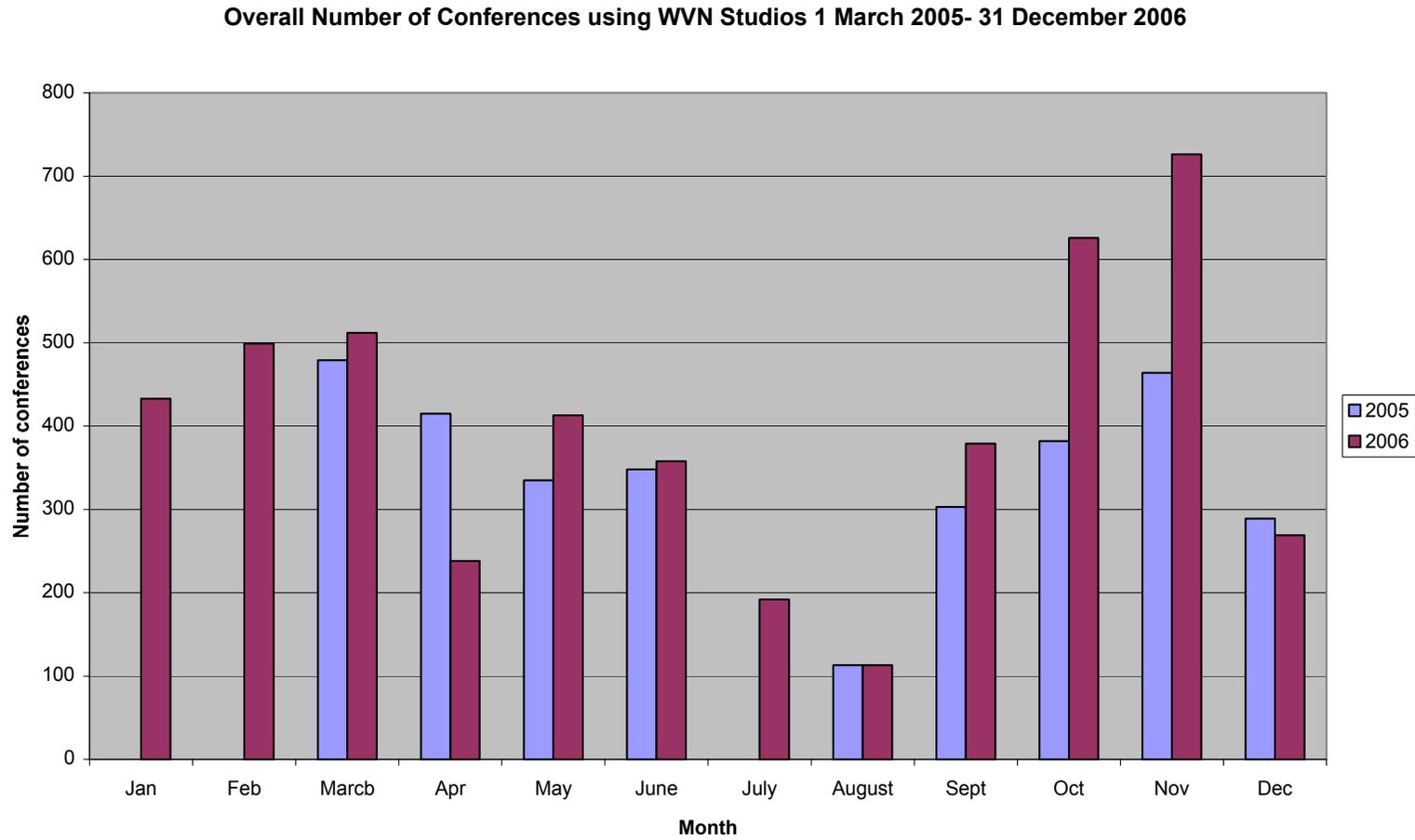


Figure 5.1 shows that the use of the WVN studios increased in 2006 when compared to 2005. In particular, it shows the substantial increase in the number of instances of use of the WVN studios as recorded by the JVCS Booking System in the autumn of 2006 compared to the autumn of 2005. This is encouraging to see, however a closer analysis of the data is required to see whether there has been an increase in use for teaching and learning purposes.

The number of conferences fluctuated across the academic year, reflecting periods of examinations within institutions and student holiday periods. The differing timings of Easter holiday periods for students may explain the differing number of conferences between April 2005 and April 2006. Easter Sunday fell on 27 March in 2005 and in 2006 it fell on 15 April. The consequential adjustment of term dates around this period may explain the fluctuations in conference in March and April in 2005 and 2006.

The research team then established the total number of conferences per month for teaching and learning purposes.

Table 5.5: Total Number of Conferences for Teaching and Learning per Month in the period 1 March 2005 and 31 December 2006

	N	Percent
Mar 05	210	5.4
Apr 05	122	3.1
May 05	97	2.5
Jun 05	63	1.6
Aug 05	17	0.4
Sep 05	54	1.4
Oct 05	133	3.4
Nov 05	172	4.4
Dec 05	89	2.3
Jan 06	141	3.6
Feb 06	194	5
Mar 06	198	5.1
Apr 06	69	1.8
May 06	108	2.8
Jun 06	65	1.7
Jul 06	36	0.9
Aug 06	15	0.4
Sep 06	135	3.5
Oct 06	316	8.2
Nov 06	356	9.2
Dec 06	194	5.0

No. of conferences (N) =3874

Due to rounding, percentages may not sum to 100

Source: NFER Review of Video Services Network, 2007

Figure 5.2 shows the comparative numbers of conferences for teaching and learning purposes during 2005 and 2006.

Figure 5.2: Total number of conferences for Teaching and Learning per Month in the period 1 March 2005 and 31 December 2006

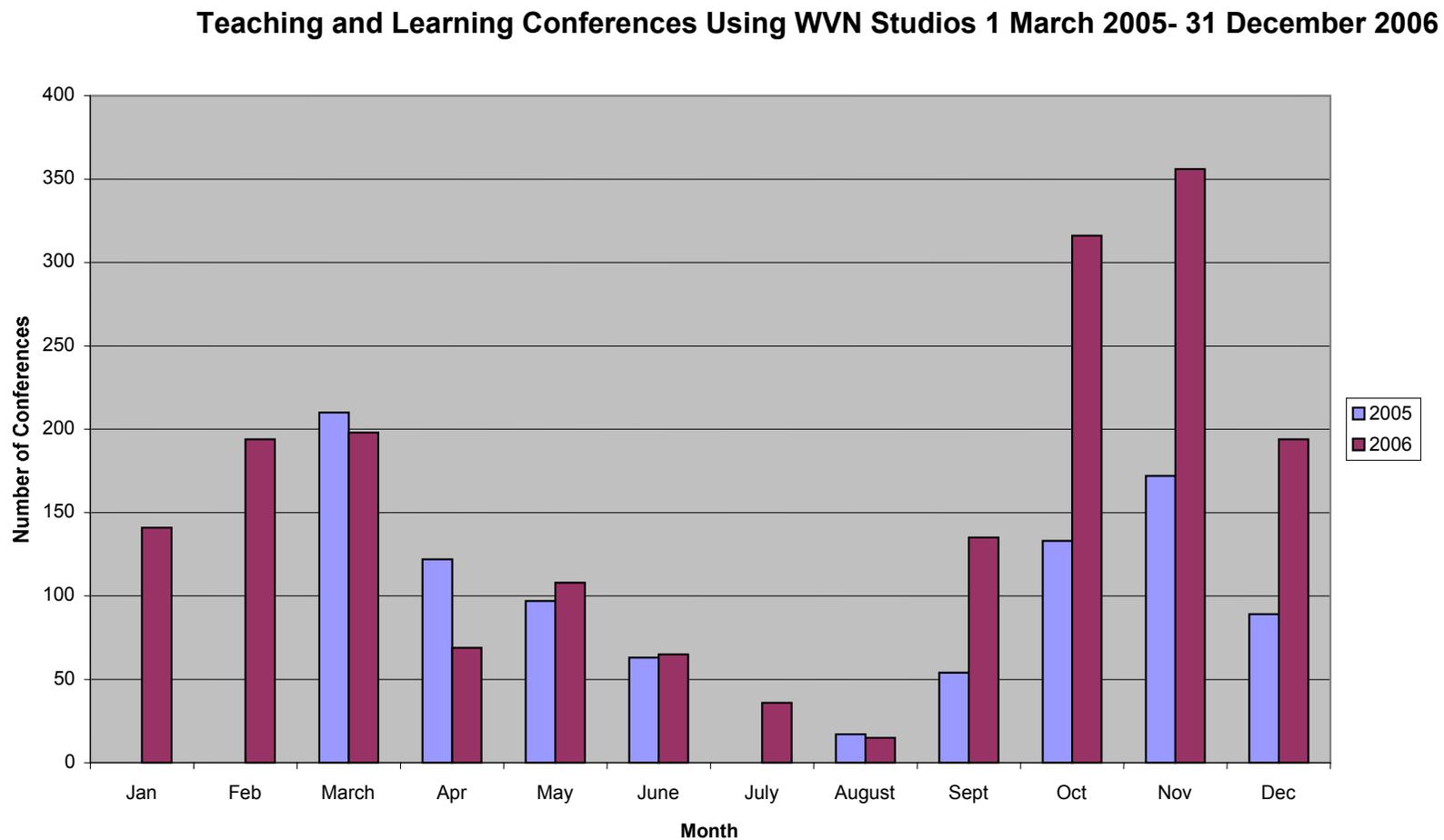


Figure 5.2 shows that the number of conferences for teaching and learning fluctuated across the time period when the data were collected. Almost three times as many teaching and learning videoconferences took place in September of 2006 than in 2005, with substantial increases seen in October, November and December 2006. This could be linked to the employment of the Teaching and Learning advisers within the WVN team. These members of staff visit institutions to advise how to integrate the use of videoconferencing within teaching and learning strategies.

Analysing the data closely showed that a number of teaching staff use the WVN studios on a regular basis each term, whilst other staff make use of the studios on a less frequent basis.

The research team then analysed the data to investigate the type and frequency of use by each institution. These data are presented separately for each sector presented in Tables 5.6 and 5.7 and shown in Figures 5.3 and 5.4.

Table 5.6: Percentage of the Number of Videoconferences at each Further Education Institution split by Teaching and Learning and other purposes in the period 1 March 2005 and 31 December 2006

Institution	Percentage of conferences for Teaching & Learning	Percentage of conferences for other purposes	Total number of conferences
FE1	20.8	79.2	48
FE2	9	91	144
FE3	15	85	40
FE4	50.6	49.4	176
FE5	27.8	72.2	18
FE6	13.3	86.7	75
FE7	10.5	89.5	38
FE8	48.2	51.8	444
FE9	14.9	85.1	161
FE10	62.6	37.4	1157
FE11	16.4	83.6	305
FE12	7.74	92.3	142
FE13	12.9	87.1	140
FE14	27.7	72.3	94
FE15	18.8	81.3	32
FE16	11.7	88.3	17
FE17	13	87	23
FE18	29.6	70.4	27
FE19	63.7	36.3	237
FE20	8.62	91.4	66
FE21	17	83	141
FE22	16.7	83.3	12
FE23	22.1	77.9	140
			3677

Source: NFER Review of Video Services Network, 2007

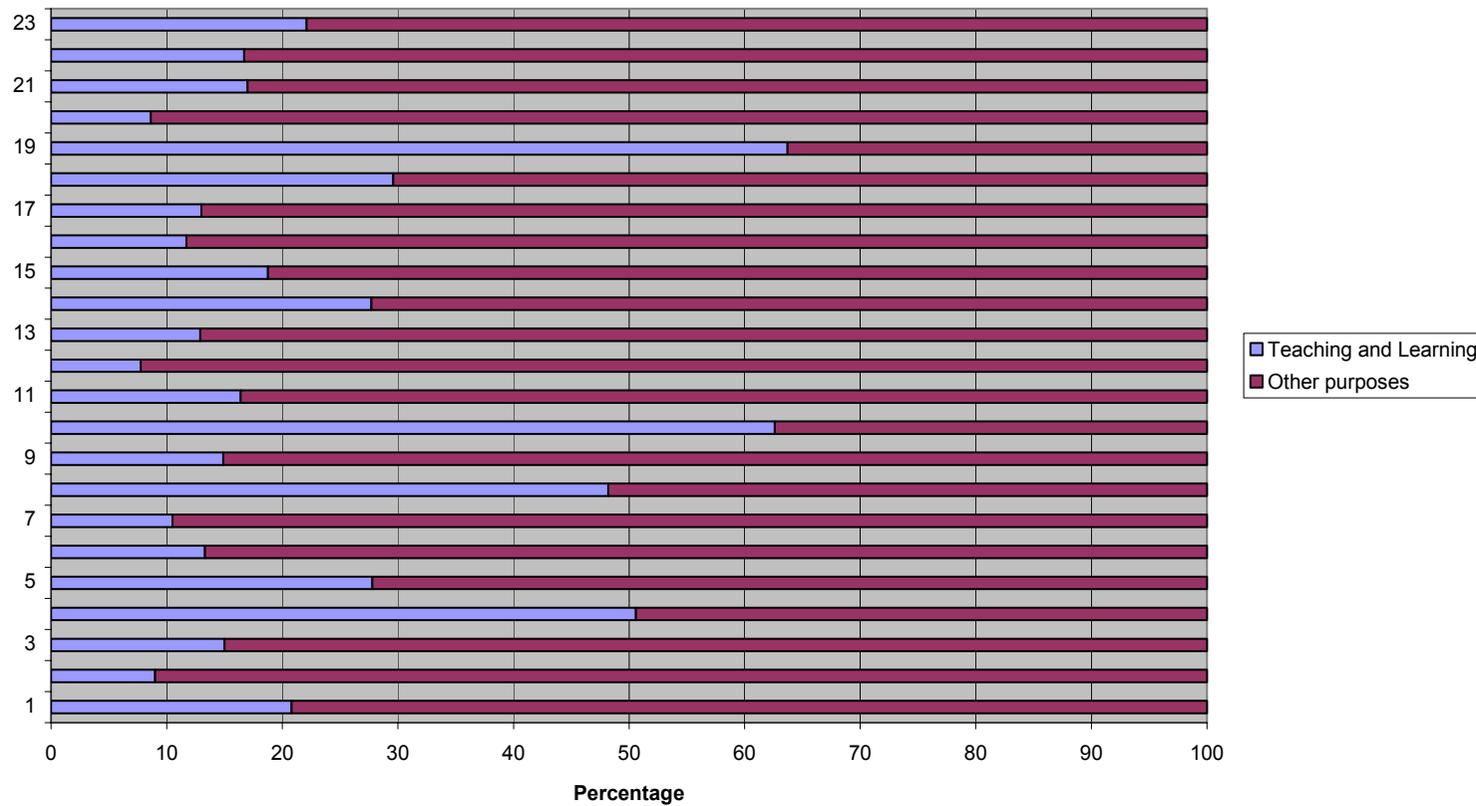
Table 5.7: Percentage of Number of Videoconferences at each Higher Education Institution split by Teaching and Learning and other Purposes in the period 1 March 2005 and 31 December 2006

Institution	Percentage of number of conferences for Teaching & Learning	Percentage of number of conferences for other purposes	Total number of conferences
HE1	35.2	64.8	549
HE2	9.9	90.1	111
HE3	9.8	90.2	41
HE4	34.1	65.9	624
HE5	14.7	85.3	129
HE6	21.9	78.1	1136
HE7	76.5	23.5	379
HE8	14.3	85.7	140
HE9	3.7	96.3	54
HE10	3.3	96.7	121
HE11	31.4	68.6	842
HE12	27.6	72.4	286
			4412

Source: NFER Review of Video Services Network, 2007

Figure 5.3: Percentage of the Number of Videoconferences at each Further Education Institution split by Teaching and Learning and other purposes in the period 1 March 2005 and 31 December 2006

Comparison of use of WVN studios in FE institutions 1 March 2005- 31 December 2006



Tables 5.6 and 5.7 and Figure 5.3 demonstrate the variation in the use of the WVN studios for teaching and learning and other purposes across both FE and HE institutions and confirm what was reported in the qualitative interviews and focus groups. 10 institutions accounted for more than 25 per cent of the total use of WVN studios for teaching and learning. The overall level of teaching and learning has increased across the 35 institutions, but this has been led by a small number of institutions which have increased their use of the WVN studios since the previous evaluation. The number of conferences in both the FE and HE sectors increased since the previous evaluation.

5.4 Comparison of findings with 2005 review

Nine of the FE institutions saw an increase in usage for teaching and learning compared to the 2005 review, with three of the institutions now using their videoconferencing studios for teaching and learning for over half of their total usage. The total number of conferences for the HE sector overall increased but in some institutions overall usage and the usage for teaching and learning has declined.

The early data for the 2006-07 academic year suggests that both overall usage and that for teaching and learning have increased strongly in both sectors.

5.5 Using videoconferencing

This section examines issues which have to be addressed if videoconferencing is to be used effectively in different contexts, and presents examples and opinions based on people's experiences of doing so in different contexts.

There was a strong recognition that videoconferencing offered a valuable tool and that its use was likely to increase where it was appropriate to do so. Staff in FE colleges believed that changes to the way in which post-14 learning was delivered in Wales would result in an increase in the amount of teaching and learning undertaken through videoconferencing. For example, they believed that the use of videoconferencing would prove an essential and natural means of delivering the Welsh Baccalaureate qualification because of the need to bring in a range of different expertise to deliver it effectively. Similar arguments were made concerning the 14-19 Learning Pathways agenda,

because of its emphasis on collaboration in the interests of learners. As in the case of FE staff, HE lecturers emphasised the need for learners to be given appropriate support where they were based.

Addressing pedagogical issues

The need to ensure that videoconferencing was appropriate for courses and learners was emphasised and respondents insisted that it should not be used merely for the sake of doing so.

For example, it was noted in an FE college that some courses required intensive one-to-one work, such as basic skills work, and that the use of videoconferencing might therefore be inappropriate. This was echoed by a representative of another FE college who commented '*There's not much point using videoconferencing to teach hair and beauty or bricklaying when you need the teacher on hand to show the learners what they should be doing.*' However, it was recognised that it could be used for more formal lectures although staff insisted that there should be a member staff of available in each site to whom learners could turn if required, who could answer questions or take responsibility if a problem arose.

Timetabling issues were also perceived as barriers to the use of videoconferencing, both in terms of institutions working together and also when they sought to develop links overseas. Staff felt that there would be a need to coordinate timetables between institutions if videoconferencing was to develop.

HE staff believed that videoconferencing could have a major role in promoting collaboration between institutions. Those who had used videoconferencing believed that the technology offered a number of pedagogical advantages. In particular, it was felt that it helped to create more independent learners by encouraging them to think about how they might learn most effectively.

Teaching and learning

Examples were highlighted where videoconferencing was a key part of the teaching and learning process.

Example 1

One HEI used videoconferencing to bring together two groups of students who were based in different parts of the university but who pursued a common module in Marine Biology. One group of students were based in the town where the main campus was located while a second group were located at another site. Videoconferencing enabled both groups of students to pursue a common module without having to make a journey of approximately one hour (both ways) by bus. This had advantages in terms of timetabling (by avoiding the need to keep the time either side of the lecture free for travel), the use of learners' time, and the environment.

Example 2

HEIs had used videoconferencing to deliver a module in Physics which was taught by staff at three institutions across Wales. The teaching was shared equally between staff at each university. This enabled them to teach a larger group of learners; for example, in one year there had been less than 20 students pursuing the module in each individual institution. The staff involved believed that it was a logical way of addressing the heavy teaching load which fell on staff working in relatively small departments as well as benefiting students by bringing together larger groups. It was noted that a member of staff who worked in that field (though did not necessarily teach the module concerned) was always on hand to give advice or support during the videoconferenced lecture.

Example 3

An FE college which provided a Welsh Second Language A level course used videoconferencing to enable students to access a Welsh first language A level course. This was delivered by staff at a college approximately 50 miles away; the travel would involve a journey of over one hour. The college which delivered the course had developed a number of Welsh-medium learning programmes which it delivered to other institutions (schools and FE colleges) by videoconferencing. Staff identified the main benefits which the arrangement brought as being that it enabled the expertise of staff at one FE college to be deployed in another and enabled students to pursue a course which would not otherwise be offered. In addition to videoconferencing, students communicated with teaching staff by e-mail and periodic face-to-face meetings were held. The learners could also turn to the tutor responsible for Welsh as a second language for assistance.

Example 4

A course delivered by one HE institution was designed to develop capacity to deliver FE and other courses through the medium of Welsh. This included opportunities for staff to improve their proficiency in Welsh. Videoconferencing was central to the way in which this course was taught; the individual responsible for the course was based in North Wales who used the medium to teach to groups in South Wales. Written materials were distributed by e-mail. Students were supported by two part-time tutors in the location where they studied. The member of staff delivering the course had a background in teaching, including the use of innovative techniques such as those developed by the Open University and had devoted time to consider how technology could contribute to teaching and learning processes.

Example 5

A Language and Learning Centre at one HEI has developed links with another institution in Europe in order to provide a module that gave learners in both countries experience of using the medium of videoconferencing. One of the aims was to provide learners with experiences to enable them to develop the techniques of using videoconferencing in a variety of contexts. Most of the learners were ERASMUS exchange students but the group following the module also included languages students. Learners has opportunities to develop a dialogue with their counterparts in that part of Europe in a way that developed their language skills while using videoconferencing. The role of the lecturer was perceived to be that of a facilitator who helped students to learn in ways which suited them.

Example 6

A seminar programme for staff and graduate students was conducted linking participants in two locations in Wales. This enabled research issues to be discussed by a larger group than were they to be held separately. The group met on a weekly basis which would be impossible without videoconferencing.

Example 7

One college had developed extensive use of videoconferencing as a means of delivering provision to other institutions through the medium of Welsh. This was as part of a CIF-funded project to enhance the range of Welsh-medium opportunities. Courses, for example psychology, are provided to schools and

FE institutions through an arrangement which enabled the college concerned to recover some of its costs. A great deal of that provision was in curriculum areas which schools did not provide themselves, either because they lacked the staff to do so or where numbers were too small for such courses to be viable. This was also a way of enhancing FE colleges' Welsh-medium provision; for example, the college concerned provided a Welsh First Language A level course to students at a college where only Welsh as a Second Language was offered (see Example 3).

Other usage

A great deal of the current usage for teaching and learning was undertaken to enable learners to take part in activities designed to enrich their learning experiences. For example, an FE college in South Wales had worked with local schools in a project funded by the Common Investment Fund (CIF), which had enabled videoconferencing facilities to be installed in schools; these were used to enable modern languages learners in the different schools to speak to each other and to staff at the college in the language they were studying. Groups of learners, varying from four to 15 in each group, were given a topic which they were asked to present to other participants in each session. According to a college representative *'There was a positive reaction from users who saw it as a strength. Pupils were very positive about the whole experience. They were given opportunities to speak to people outside their peer group.'*

Another FE college had developed links with British embassies overseas as a means of enriching the cultural opportunities available to learners. Links had been developed with colleges in the United States and in Europe through specific initiatives designed to nurture collaboration between training providers.

Several colleges indicated that they used videoconferencing to access specialist talks, for example by representatives of the WAG, and of professions which learners hoped to join (such as practicing solicitors, barristers, and accountants), senior police officers and senior managers in industry. Other colleges had developed links with organisations like the National Archives in Kew and the NLW at Aberystwyth. It was noted that some professional practitioners often charged substantial fees for their services

in addition to their travel costs and that videoconferencing enabled institutions to secure their services for an hour rather than a whole day, which could mean substantial savings.

Teaching and learning through the medium of Welsh

As is noted in the example cited above, videoconferencing was being used to deliver courses such as A level law and psychology to learners in schools, through the medium of Welsh. This owed much to the efforts made to increase and broaden the range of post-16 learning opportunities available through the medium of Welsh. Collaboration between providers was seen as integral to the successful development of such initiatives. The usage statistics highlighted other examples where schools cooperated with each other and with the FE sector to do so. One college in particular had developed such provision as part of a CIF-funded project. The possibilities opened by videoconferencing in the delivery of courses through the medium of Welsh were emphasised strongly by that college. The provision they made was not available at those schools or colleges which meant that issues concerning duplication and competition did not arise. Staff responsible for working in this way felt strongly that, provided the system was robust, videoconferencing could become embedded as a means of delivering increasing amounts of provision through the medium of Welsh.

This was an area where further expansion was envisaged by representatives in both HE and FE sectors. The technology was perceived by respondents as a means of bringing together learners in different institutions who wanted to study certain courses through the medium of Welsh where numbers meant that courses could not be provided by individual institutions; its use was seen as being particularly appropriate for specialist provision or courses where there was a shortage of staff able to teach through the medium of Welsh.

Representatives of two HE institutions who had responsibility for Welsh-medium provision indicated that there was some use of videoconferencing to facilitate discussions between staff teaching subjects through the medium of Welsh. However, they noted that little teaching was done by videoconferencing. Rather, it was used for example to:

- facilitate discussions between experts
- share good practice in teaching and learning through the medium of Welsh
- discuss the development of agreed terminology in specialist subjects

- develop some common teaching and learning materials.

They emphasised that, notwithstanding the emphasis on collaboration in national strategies, the formula funding models for HE and 16-19 learning worked in ways which did little to promote collaboration between institutions. However, earmarked funding for specific purposes was available, for example CIF and the Strategic Development Fund in HE.

Supporting learners

Two HEIs were examining the development of videoconferencing to provide support services to learners. For example, it was intended to examine how specialist advice and support, including careers guidance, could be provided across more than one institution, using videoconferencing.

Videoconferencing was also used in some HEIs as a means of maintaining contact and supporting students who study off-site for part of their degrees. Examples included those studying modern languages or carrying out fieldwork abroad. According to one HEI manager, the use of videoconferencing offered immense possibilities in terms of the amount of staff travel which could be avoided.

Research

There was strong evidence that the use of videoconferencing was increasing within HEIs as a means of enriching research activities. Although there was little evidence that this had led to joint Research Assessment Exercise (RAE) submissions, it was felt that a great deal of value added had been gained for the research through the easier contact afforded by videoconferencing. This included cooperation across Wales and also meetings involving practitioners in other parts of the UK and overseas. Staff involved in such activities said that the technology enabled them to take part in dialogue which would not take place without the use of videoconferencing which enriched the quality of their own research and of scholarship in their field more generally. An important point was made by a representative of one HEI who commented *‘There’s a need to think much more creatively than simply in terms of the RAE and how institutions are going to fare ... We are here to contribute to the development of scholarship, and that tradition in the research done by the academic community should not be lost’*.

Videoconferencing was seen as a potential means to develop more interdisciplinary approaches which would add value to the quality of the research output in Wales. Moreover, given the relatively small size of the research community in Wales in most fields, collaboration was perceived to be essential. The WVN enabled discussions to take place that would otherwise not be possible. According to one respondent *'There are very limited budgets for research in the university, so it means we can't be going off to meet other staff on a regular basis. We could talk over the phone but that might be alright one to one but not for discussions'*.

At the same time, videoconferencing was an important and growing way of conducting work associated with journal editing in the academic community in Wales. A representative of one institution noted that links had been developed with libraries and other research facilities which opened up the prospect of harnessing staff expertise much more effectively than in the past.

The use of videoconferencing was also growing as a means of enabling staff to work with colleagues outside Wales. This included:

- links with practitioners in other parts of the UK which would not be possible to the same extent were it not for videoconferencing
- work in collaboration with institutions overseas.

Administration, management and staff development

Videoconferencing was used for administrative and managerial functions far more than for teaching and learning in both the FE and HE sector in Wales. This included meetings about the possibility of closer cross-institutional cooperation.

Library and information services staff reported that they used the facilities for regular meetings and that their organisations could not operate as effectively without it, although this did not remove the need for occasional face-to-face gatherings.

According to several respondents, videoconferencing allowed for more effective use of staff time and reduced the need for travel considerably. This

could lead to greater participation at such meetings as well as having cost and environmental benefits.

There was also some evidence that it was used for staff development (especially in FE, for example through events organised by fforwm, and task and finish groups focusing on professional development within institutions), and to encourage research dialogue in HE. Other usages included using the technology to market institutions' provision; for example, a HEI used videoconferencing to enable graduates to talk to prospective students about the career opportunities in their field.

A number of examination board meetings were conducted by videoconferencing in HE. These included examples where experts from overseas were enabled to join in discussions in Wales.

Some HE institutions used videoconferencing to conduct job interviews which enabled them to consider a broader range of candidates than would otherwise be possible.

Some colleges used the facilities for occasional commercial purposes. For example, a HEI had been paid to enable visiting experts to link to colleagues overseas. Regular users included staff at the WAG and some Assembly Sponsored Public Bodies (ASPBs), especially those which had staff located throughout Wales. Both FE and HE institutions said that this was an aspect which they intended to develop.

5.6 Key findings

The amount of use of videoconferencing varied considerably across institutions. The factors which influenced the amount of use are explored in the qualitative sections of this report.

Each of the FE institutions made some use of the Network for teaching and learning. All HE institutions made some use of WVN for teaching and learning, however two of these make very minimal use for teaching and learning. One HE institution and three FE institutions use the WVN for teaching and learning for over half of their total usage.

The use of the Network for teaching and learning ranged from 3 – 77 per cent of conferences in the HE sector and from 9 – 63 per cent in the FE sector. In four institutions teaching and learning accounted for more than half of the overall number of videoconferencing sessions.

On the whole, the use of the WVN for teaching and learning purposes is increasing and the data for the autumn term of 2006-2007 shows a considerable increase in teaching and learning.

Videoconferencing should be used for teaching and learning where this was an appropriate medium and not merely for the sake of doing so; there was also a need to overcome barriers to the use of videoconferencing, such as differences in timetables.

Videoconferencing had the potential to assist college staff in delivering effective teaching and learning experiences.

Videoconferencing offered an important strategy in the increasing collaborative requirements in educational provision, such as in the 14-19 Learning Pathways and the Welsh Baccalaureate; it could further cooperation between HE, FE colleges and schools.

The main reasons for the non-use of videoconferencing in FE and HE were that some staff lacked the confidence to use them, arising from a shortage of training opportunities and lack of time to plan and reflect on how to use the technology, a lack of awareness of available partners in videoconferencing initiatives, and inflexibility in location of the facilities and their availability.

However, the research highlighted many examples where videoconferencing was used effectively in teaching and learning and to provide enrichment activities for learners.

The use of videoconferencing for teaching and learning through the medium of Welsh was increasing; this in part arose because of specific initiatives to expand this provision where learner numbers were too small to allow a course to be provided by individual institutions.

The funding formulas for FE and HE were perceived to do little to promote collaboration and that they did not always reward institutions for taking part in collaborative videoconferencing initiatives; however, initiatives could sometimes be funded through the CIF (in FE) and SEF (in HE).

There was some effective use of videoconferencing to provide support services to learners, such as careers guidance, especially in more specialist areas.

In some HEIs videoconferencing was used to communicate with students off-site, including those studying overseas.

Videoconferencing was contributing to greater collaboration in research across HEIs in Wales and beyond which would not be possible otherwise; this was likely to increase in future and enable greater sharing of expertise and capacity building within and across individual disciplines.

Videoconferencing was used extensively for administrative, management, and library and information and other support services; the use of videoconferencing in the provision of professional development opportunities was limited but increasing.

6. The financial benefits of videoconferencing

This chapter presents the outcomes of the cost benefit analysis undertaken on the basis of usage statistics for the period 1 July 2006 to 31 December 2006.

6.1 Methodology

The booking statistics for the period 1 July 2006 to 31 December 2006 were analysed in order to identify:

- videoconferences booked through the WVN where all institutions were based in Wales, excluding schools, except where schools were taking part in courses delivered by FE colleges
- videoconferences between institutions in Wales and other parts of mainland Britain; all conferences involving overseas travel have been excluded from this analysis
- the institutions involved
- the duration of each conference
- the purpose of each conference.

This information was used in the analysis to provide hypothetical costs of those meetings had videoconferencing not been available. The analysis was also based on the assumptions presented below:

- for videoconferences between institutions in Wales where two institutions were involved in a videoconference, that a representative of one institution would have travelled to the other; an alternative model would be for representatives of both institutions to have travelled to a central point, however, the total mileage under both scenarios would be the same
- for videoconferences between institutions in Wales where more than two institutions are involved, the journeys have been ascribed to the institution most accessible to all parties; for example, a meeting involving participants from Ebbw Vale, Merthyr Tydfil and Pontypridd would be based on a meeting held at Merthyr Tydfil

- for videoconferences between institutions in Wales and others in mainland Britain involving two institutions, that a representative of the institution in Wales would have travelled to the other
- that if more than one institution outside Wales was involved, that the member of staff from Wales would have travelled to the institution closest to Wales, e.g. a meeting involving staff from Swansea, Bristol and London would have taken place in Bristol
- all journeys have been assumed to be return journeys
- it is assumed that the host colleges would have appropriate facilities for all meetings
- staff at host colleges would not have been reimbursed for any travel costs
- no subsistence payments have been included
- each journey has been assumed to have been made in one vehicle, using a mileage rate of 40p per mile
- those bookings described as ‘venue only’ and ‘quality assurance’ in the data were discarded from the cost benefit analysis as were the costs of all travel outside mainland Britain.

6.2 Sample

A sample of 410 videoconferences were analysed. These represented a total of 856 bookings of 5832 over the six-month period (15 % sample). Of these:

- 115 were between institutions within Wales
- 19 were between an institution in Wales and others in mainland Britain
- 24 were used by external bodies
- 42 were between schools
- 29 involved links overseas
- 110 were designated venue only
- 71 were quality assurance calls.

Usage by the external bodies was excluded because the cost benefit would be to those organisations rather than the FE/HE sector. Similarly, the usage by schools to schools was deemed to be outside the scope of this study although school-to-college videoconferences were included in the sample of 115. Those videoconferences noted as Venue Only and Quality Assurance tests were also excluded.

Separate calculations were made for the 115 videoconferences within Wales, the 19 in mainland Britain, and 29 involving overseas travel.

The 115 videoconferences between one or more institutions in Wales were analysed to take account of:

- the mileage between each institution
- the amount of time necessary for each journey.

The mileage and estimates of time were calculated using AA route planner data.

Each videoconference was categorised into one of four types, depending on its purpose. Of the 115 videoconferences conducted within Wales:

- 69 were for administrative/management purposes, including such things as library meetings, examination boards, curriculum development groups, validation etc
- 37 were for teaching and learning
- four were occasional lectures, given by specialists within Wales to HE and FE institutions
- five conferences were held for research purposes.

6.3 Financial savings

Travel costs

Based on the sample of 115 videoconferences, the analysis was projected to give an estimate of the annual cost savings. The calculation of financial savings was based on an assumption that a videoconference avoids the need for staff to travel, at a cost of 40p per mile. The annual savings in terms of mileage costs for each category of activity were calculated on the basis that the sample periods would be representative of annual patterns.

The annual savings by category of usage for videoconferences involving two or more institutions in Wales would be:

- | | |
|-------------------------|---------|
| • administrative | £93,481 |
| • teaching and learning | £39,218 |
| • occasional lectures | £6,400 |
| • research | £7,284. |

Based on the sample, the average travelling cost saving per videoconference within Wales for each type of activity was:

- administrative £111.21
- teaching and learning £79.49
- occasional lectures £120.00
- research £109.26.

It should also be borne in mind that without videoconferencing it is unlikely that the teaching and learning activities would have taken place at all. The technology had therefore brought added value to the institutions' teaching provision. Moreover, the funding received by the institutions for delivering the course is not considered here. However, the annual total saving based on mileage would be £146,383. If teaching and learning is excluded the figure would be £107,165 for videoconferences within Wales.

The 410 videoconferences included 19 between institutions in Wales and one or more institutions outside Wales in mainland Britain. These were in the following categories:

- administrative 11
- teaching and learning -
- occasional lectures 3
- research 5

Assuming that the sample was representative, the annual savings by category of usage would be:

- administrative £30,480
- teaching and learning -
- occasional lectures £11, 540
- research £9,562
- Total £51,582**

Consequently, the total travel costs estimated for videoconferences involving institutions in Wales and in the rest of mainland Britain would be as follows:

• administrative	£123,961
• teaching and learning	£39,218
• occasional lectures	£17,940
• research	£16,846

The total including teaching and learning would be £197,965. The figure excluding teaching and learning would be £156,731.

The 29 videoconferences involving institutions overseas were analysed. The prices quoted by major airlines for 17 journeys within Europe and 12 outside was Europe were analysed. These were calculated on the basis of return fares, economy class, together with rail fares to and from airports within the UK. This produced an average figure of £757 per journey. Based on this analysis, it was estimated that the total amount saved per category of activity was as follows:

• administrative	£151,500
• teaching and learning	£60,560
• occasional lectures	£80,746
• research	-

This would represent an annual saving of £292,806.

Staff costs

A second model was developed to assess the cost benefit in terms of staff costs. The number of individuals was counted as one per institution involved in a videoconference. Thus, a conference between two institutions would be assumed to have involved two people, a conference between three institutions to have involved three people, etc.

As in the case of the calculation for distances, the AA routeplanner was used to estimate journey times. This standard method includes variables that takes account of factors such as the nature of roads and established traffic bottlenecks.

For videoconferences within Wales it was assumed that the member of staff would have committed at least 2 hours per conference in attendance at the meeting/activity. Where the distance and/or travel time meant that a videoconference would save a member of staff from committing a whole day to a meeting, the saving has been estimated at 0.5 days (2 hours used attending the meeting either by videoconference or face-to-face plus 3 or more hours travel time saved by videoconferencing = 0.5 days). Videoconferences where the distance meant that 0.5 days or more would not be spent travelling (e.g. those involving journeys of 30 minutes or less) were calculated on the basis of a saving of 0.25 days. The average salary for staff has been set at £30,902, representing a cost to the employing institution of £55,200 (including on-costs and overheads) or £230 per day. A projection of the sample to provide an estimate of the annual cost savings for conferences within Wales produced the following figures:

Administrative	£159,600
Teaching and learning	£70,533
Occasional lectures	£6,133
Research	£13,800
Total	£250,066.

The savings in terms of staff time attending meetings or gatherings in other parts of mainland Britain assumed 1.5 days per meeting. This would allow 1 day for travel and 0.5 days for the activity, saving 1 day. Assuming that only one member of staff was involved in each case and that the salary was £30,902 (£55,200 with on-costs) the annual savings would be as follows:

Administrative	£33,733
Teaching and learning	-
Occasional lectures	£11,600
Research	£19,333
Total	£64,666.

The savings in terms of staff time attending meetings or gatherings overseas assumed 2.5 days per meeting. This would allow 2 days for travel and 0.5 days for the activity, saving 2 days. Assuming that only one member of staff was involved in each case and that the salary was £30,902 (£55,200 with on-costs)

the annual savings would be £177,800. The savings for each category of activity would be:

- administrative £92,000
- administrative £92,000
- teaching and learning £36,800
- occasional lectures £49,000
- research -

Calculation of savings

On this basis of the calculations outlined above, the total annual savings brought by videoconferencing within mainland Britain, excluding teaching and learning would be as follows:

Staff time	within Wales	£250,066
Staff time	outside Wales	£64,666
Travel costs	within Wales	£146,383
Travel costs	outside Wales	£51,582
TOTAL		£512,697

A separate calculation was undertaken for visits overseas which would suggest that videoconferencing saved an additional **£470, 606** in costs each year. However, considerable care has to be taken in quoting this figure given the need to bear in mind factors such as:

- differences in travel costs within the UK, e.g. rail fares to airports
- different charging policies by individual airlines e.g. discounts, special offers, arrangements for regular bookings etc
- the probability that many of the meetings might not have taken place without videoconferencing.

Environmental costs

The environmental cost benefits of videoconferencing have not been calculated in a financial sense in this study. However, it is estimated that journeys of approximately 500,000 miles were avoided through videoconferencing.

6.4 Key findings

A cost benefit analysis of the WVN was based on the travel costs saved through a sample of videoconferences held during 2005-6; firm conclusions on total savings could not be drawn because of factors such as the uncertainty to what extent videoconferencing was used to undertake more functions (e.g. meetings, teaching and learning opportunities), than would be the case without videoconferencing, and the difficulty of placing a financial value on qualitative gains such as sharing the outcomes of research.

Estimates for the savings for FE and HE institutions in Wales on travel costs and staff days were in excess of £500,000 per annum and more than £900,000 if all international videoconferences are included.

It was not possible to place a financial value on the qualitative benefits for learners of holding FE and HE courses by videoconference which would probably not have been arranged without the technology.

Environmental benefits have accrued that are in addition to the cost savings identified in this analysis. This would suggest that journeys involving approximately 500,000 miles were avoided through videoconferencing.

Additional benefits have been secured through videoconferencing; foremost among these has been the way videoconferencing has enabled Welsh institutions to develop links with universities and other organisations overseas which might not have happened otherwise.

7. Encouraging Videoconferencing

This chapter examines some factors in the use of videoconferencing which respondents believed could promote its wider use in future.

7.1 External influences

A number of senior managers within both the HE and FE sectors referred to some issues of funding, administrative, and student support which needed to be addressed when developing collaboration in videoconferencing. These included:

- the question of which institution would receive the funding for learners taught collaboratively by videoconference
- the reluctance of some colleges to share expertise and research outcomes to the benefit of other institutions
- the need to consider how learners could be supported at the institutions where they were based.

Other staff thought that these issues need not prove to be barriers to cooperation. For example, one HEI representative believed that any reluctance to work collaboratively *'goes against the spirit of academic scholarship.'* Others referred to practical solutions to questions about the *'ownership'* of learners whereby institutions had contributed equal amounts to a module delivered collaboratively using videoconferencing. According to one HEI representative *'These aren't technological questions but matters that are to do with the politics of the issue. This should be seen more in terms of improving the quality of learners' experiences rather than in terms of ownership of students.'* Another senior figure within HE thought that too much had been made of such difficulties and that *'when academic staff recognise that [collaboration] as inevitable then they will have to buckle down to it.'*

Respondents emphasised that videoconferencing was a means of addressing the key goal of public policy that education and training providers in Wales should work collaboratively. It was emphasised that this was true for collaboration between HEIs, between HEIs and FE colleges, and between FE and schools, and that such cooperation should become integral to institutions and their practice. For this to happen, there was a need to reinforce this message to senior managers within institutions and, in HE, at departmental level. Most respondents did not believe that the potential of videoconferencing was being exploited fully by institution. Many key stakeholders needed convincing that *'videoconferencing isn't an encumbrance or a fad that's going to disappear.'*

Many staff had still to be persuaded that courses would have to be delivered in new ways and that videoconferencing had to be promoted as a way of enabling them to do so. The teaching and learning advisors working within the WVN were perceived to be important influences in spreading this message. However, it was also noted that the advisors should be supported at a strategic level to have maximum impact.

The need for a strategic approach to promote collaboration in the 16-19 sector was also recognised. It was felt that recent initiatives, particularly the attention given to collaboration in the 14-19 Learning Pathways agenda, the Geographical and Sectoral Pathfinder programme, and a number of Common Investment Fund (CIF) initiatives had brought these matters to the fore. Videoconferencing had been advocated as a means of nurturing collaboration between schools and FE colleges, including some alliances which owed more to the nature of provision than to geography. One example was the college in North Wales that cooperated with schools in South Wales to deliver courses through the medium of Welsh which would not otherwise be provided.

7.2 Strategies to promote awareness of videoconferencing

Role of Teaching and Learning Advisors

The role of the teaching and learning advisors appointed to work with the WVN was seen as central to its future development. Their roles had included:

- promoting awareness of the facilities

- providing training in the use of the facilities
- developing institutions' capacity through awareness-raising and working with staff to identify how videoconferencing could be used within teaching and learning.

Usage statistics suggested that the advisors had impacted on institutions where they had worked. However, respondents recognised that the advisors were newly appointed and that it would take time for their work to become embedded in FE and HE staff practice. The work is undertaken by two part-time members of staff, equivalent to one full-time post. Their workload was considerable, and this meant that institutions needed to plan in order to maximise the advisors' contribution.

Approaches within institutions

The need for more effective methods to promote awareness of videoconferencing was recognised in most institutions. Institutions currently relied a great deal on informal advertisement, especially word-of-mouth. Other ways in which videoconferencing was promoted by institutions included:

- information posted on institutional intranets
- the use of open days to introduce staff to videoconferencing
- introducing new staff to videoconferencing as part of their induction processes
- the provision of in-service training opportunities focusing on videoconferencing
- the work of ILT and e-learning champions within FE.

In a small number of institutions videoconferencing was not promoted at all. For example, lecturing staff at one FE college reported that they had '*not really thought about it*' but that they might develop it in future. In another FE college it was said that; '*Occasionally an e-mail goes round asking people if they're interested in taking part in a videoconference but staff aren't really interested.*'

In some FE colleges ILT and e-learning champions were perceived to have placed more emphasis on developing the VLE than on videoconferencing, a decision defended by those institutions. They felt that staff capacity issues

meant that they had to prioritise either the VLE or videoconferencing and that it had been right to focus on the VLE in the first instance.

Staff in both FE and HE institutions believed strongly that videoconferencing needed the support of senior managers and departmental or faculty heads in order to develop, although that was insufficient by itself. In particular, it was noted that very few institutions currently regarded videoconferencing as a natural way of conducting their business. Introducing routine procedures to make this happen was seen as one solution. For example, a representative of the FE sector maintained that it should be a given that certain types of meetings such as examination meetings and administrative gatherings should be undertaken by videoconference unless a case could be made to the contrary. Thus, staff would be required to justify the need to travel to a meeting in order to ensure optimum use of staff time and for environmental and financial reasons.

A more effective approach would be based on enabling practitioners to examine and reflect on how videoconferencing might enrich their teaching. This was especially true within HE where many practitioners felt that the structure of those institutions, in particular the level of departmental autonomy, meant that whole-institution approaches were difficult to develop. Much of the impetus to date was perceived to have come from individual teachers and much of this work was undertaken by staff working informally with technicians and media services personnel. This view was summarised by one respondent who noted; *'There are individuals within departments who could be called upon but no equivalent to an [FE] ILT advisor. No person responsible for promoting innovation in teaching and learning.'* They advocated a more formal approach which ensured that staff were targeted at departmental level, especially heads of department.

Within FE it was noted that ILT and e-learning champions had achieved a great deal with the development of the VLE and that similar enthusiasm was required if videoconferencing was to develop. It was felt that ILT and e-learning champions needed to work closely with the WVN teaching and learning advisors and to develop strategies to disseminate information.

Disseminating information about opportunities

Some FE representatives believed that there was a dearth of information nationally about the range of opportunities to use videoconferencing. This gap should be addressed to convince staff of its relevance to their needs and to those of learners. There was strong support for a national structure for a register of events, giving details of possible participants, the nature of the content, and the type of course for which the sessions could be relevant. A representative view was *'It would be useful to have a directory of people willing to take part in videoconferencing, people don't quite know how to make contact.'* This should include information about people's areas of expertise and their teaching and learning styles.

This issue is being addressed by UKERNA through the development of a prototype for a Collaboration Service which would:

'enable those in education to find

- others with shared educational interests, leading to educational collaboration;*
- opportunities for collaboration, especially live educational content being delivered by videoconference or streamed;*
- associated educational resources, e.g. best practice, projects, lesson plans'.*

Forging new types of opportunities to videoconference was also identified as an area for development. For example, one FE representative believed that many of the opportunities were geared towards more academic subjects rather than vocational ones. *'We hear about videoconferencing enabling people to link up to museums and that type of thing but we don't have the same opportunity in vocational courses.'* The institution in question had sought staff opinions about videoconferencing and had found that *'A lot said they would like to use it but that there was no-one to videoconference with.'* This, it was felt, highlighted both the need to disseminate information about available opportunities and to provide staff with opportunities to reflect on and to develop methods of using videoconferencing in their courses.

7.3 Supporting staff and videoconferencing

Developing staff confidence

The importance of staff training was reflected in the proforma survey where 14 (11 FE and 3 HE) respondents indicated that this was the factor most likely to promote usage.

It was noted that staff confidence in using videoconferencing was a major factor affecting usage. Supporting them to develop this confidence was identified as a major requirement if usage was to be maximised. Moreover, respondents said that one negative experience of videoconferencing (not necessarily with the WVN) could deter people from considering the option either for meetings or teaching and learning. This highlighted the importance of a robust network and appropriate support structures.

There was a strong feeling that most staff had not considered the possibility of using videoconferencing in their teaching. A representative comment was; *'Academic staff are not always the first ones to look for new ways of working ... There's a need to give attention to pedagogical issues, how to do things and get people to think about how they teach.'* This emphasised the need to promote the facilities within institutions in a way which reached all practitioners. There was strong support for the development of dedicated training programmes, since staff felt that much of what had been offered so far had been done on an 'ad hoc' basis. According to one senior manager; *'We need to embed the skills to enable staff to use the technology confidently.'* A representative of another college maintained; *'The problem is that if lecturers have to do anything more than sit and use it then they run a mile. So there has to be a high level of support provided by the college itself. The two main technologies used by staff are the internet and PowerPoint. They do not use much else.'* The type of issues identified as areas for training included:

- where to stand/look when delivering a session
- the extent to which lecturers should move around or be still
- how to control the cameras, focus and angles, etc
- issues concerning voice projection and body language.

However, although the value of such training was recognised, it was emphasised that it should be accompanied by clear guidelines about good

practice in the use of videoconferencing in the contexts in which staff worked. A representative of one HEI believed that institutions should not be prescriptive about how to use videoconferencing and that the emphasis should be placed on developing staff confidence to deploy their own individual teaching styles by videoconference. For example, it was maintained that videoconferencing offered opportunities for impromptu presentations, for staging debates representing different standpoints, and for the use of high-impact graphics, in ways which could make teaching and learning a more exciting experience.

Staff at one HEI discerned a change of attitude among new staff. According to one member of staff with responsibility for technical services; *'They are more keen on innovation and IT more generally ... New people in the departments are becoming more pro-active. But it takes a while for that sort of thing to become embedded.'* Likewise, a member of one HEI's teaching staff noted; *'It's a natural progression – once you start making use of it then usage will grow'*.

Opportunities for planning and preparation

There was a strong feeling among HE and FE staff that they could not develop the use of videoconferencing without being given development time. According to one HEI representative; *'To use videoconferencing would require people to completely reassess their teaching styles and the resources they used. It takes at least four to six weeks to develop a 12-week teaching course and that time must be allocated to staff if they are to do this. If departments don't get any funding to release staff and they have to rely on people's goodwill then little will change. People won't give it priority.'* According to a representative with a technical background in HE; *'The academics don't like to use it because of pressure of time to re-jig their courses. They need to be given the time'*. Another member of staff at a HEI commented; *'The ICT champion tried to promote it but people had enough to do.'*

According to one respondent to the proforma survey, *'My perception is that a lot of teaching and lecturing staff are a little apprehensive about the technology and may find it difficult to adapt their existing techniques to incorporate videoconferencing ... There is a massive issue in staff getting sufficient free time to learn how to use the equipment –this is actually due to*

the pressure of their jobs, and demands upon their time, rather than any shortcomings with the equipment or provision of technical support.'

In another college it was noted that '*People are beginning to think about the possibilities at the moment*'. In general, staff wanted to be able to:

- reflect on how it might be used
- develop links with colleagues or other institutions
- develop teaching materials that could be used in conjunction with videoconferencing.

For example, one lecturer noted how he presented data on a screen in the lecture theatre which everyone present could read; this would need to be rearranged to make it visible for learners accessing the provision through videoconference.

Staff also highlighted the need for guidelines on videoconferencing. These should include:

- information about how videoconferencing could be used in different contexts
- an outline of the requirements both in terms of physical issues (such as the lay-out of rooms etc) and in terms of preparation
- an outline of the technical support required
- information on how to support learners and maintaining a balance between teaching done through videoconferencing and face-to-face
- how to develop effective contingency plans in case of difficulties while using videoconferencing.

There was a widespread feeling that attitudes towards videoconferencing would change gradually in the same way that staff had adapted to other technologies. For example, staff with technical roles across Wales referred to how the use of e-mail had become common practice, as had using PowerPoint instead of traditional methods of projecting information.

7.4 Supporting learners' videoconferencing

The need to ensure that learners were provided with appropriate support while using videoconferencing was central to strategies to promote its use. Where this was effective, learners' experiences were judged to be positive. In one college staff reported that; *'When it is used then the students are usually buzzing with enthusiasm.'* Similarly, an institution had surveyed students who had used videoconferencing and had received positive feedback. This was attributed to the way that the facilities had been used by those delivering sessions and the way that *'the enthusiasm rubs off on the students.'* Moreover, it was said that young people were more confident users of the technology due to their familiarity with IT and electronic forms of communication in general. A typical comment was; *'Young people are excited by it and are more willing to try'*.

However, there was a perception among staff at some institutions that students were unsure about videoconferencing, which highlighted the importance of providing appropriate and sensitive support when necessary. For example, some staff had found that learners were wary of linking to sessions with groups of learners whom they had not met. It was felt that groups needed to know each other and have confidence in each other before the start of videoconferencing.

It was said that learning by videoconference required a different set of skills to those demanded by more traditional teaching and learning methods. Respondents believed that learners should be trained in how to use the facilities before embarking on a course using videoconferencing, in order to overcome any inhibitions and ensure that they were equipped with the skills to take full advantage of them. This included issues such as appropriate behaviour, avoiding unnecessary noise, and understanding that everything they said is audible to other participants. However, a representative of a HE institution identified a danger that participants' behaviour might become too formal when using videoconferencing. One solution would be to develop training opportunities for lecturers before they used the facilities, including recording them while videoconferencing and then playing those recordings back to them.

7.5 Key findings

Despite a consensus that collaboration was to be welcomed and promoted, some practical issues such as the nature of funding arrangements, common timetabling needs, and inadequate size or design of rooms earmarked for teaching by videoconference still represented barriers to such cooperation.

The teaching and learning advisors, although relatively new in post, were effective in promoting collaboration through videoconferencing, both by raising awareness of the opportunities and by developing staff capacity to use them.

The development of more formal and high-profile institutional strategies to promote awareness of videoconferencing and to increase capacity to use the facilities could enhance usage.

The development of the WVN could be promoted by institutions adopting the default position that certain activities would be undertaken using videoconferencing unless a strong case could be made for an alternative method.

The research identified a need to disseminate information about the opportunities for videoconferencing, especially for FE, possibly through a register of opportunities and potential partners.

Two differing views of staff development were that practical training was required to equip staff with the skills to use videoconferencing effectively, while others wanted to avoid a prescriptive approach and believed that informality and innovative usage should be promoted.

Opportunities were needed for staff in both HE and FE to reflect on how they might use videoconferencing and then to integrate those methods in their teaching and learning programmes; guidelines or exemplar materials would be a valuable resource.

There was a need to provide appropriate pedagogical and personal support to learners using videoconferencing, especially those who might lack confidence to do so.

8. Sustaining and developing videoconferencing

8.1 Technical development

There were mixed views about the extent to which the current videoconferencing facilities should be replaced. Most respondents felt that the equipment was approaching the end of its life, especially those components which suffered greatest wear and tear.

A multi-monitor or twin monitor display system for use when the incoming signal includes both people and data, was advocated as a means of improving the quality of the videoconferencing experience. Thus, this would enable the image of the lecturer and an in-band PowerPoint presentation to be displayed and seen simultaneously. According to one respondent with a technical background: *'A twin monitor system could improve teaching instead of continually moving from content to content.'* This view was echoed by an FE representative who referred to the difficulty of linking with interactive whiteboards, which made collaboration with schools difficult.

The introduction of the Access Grid System was advocated strongly by some respondents. This, it was felt, would allow for better projection and enable data to be projected more effectively.

The need to improve the visual impact by introducing state of the art screens was also raised, based on whatever was the standard technology at the time of renewal.

Respondents referred to changes needed in the location of videoconferencing facilities, if they were to be used extensively. For example, colleges in the FE sector in particular acknowledged the need to examine whether the facilities were housed in the most appropriate parts of their buildings, especially in view of issues such as the need to comply with the Disability Discrimination Act (2004). Moreover, there was a tendency in some FE colleges for the videoconferencing facilities to be situated in rooms used for meetings rather

than teaching. This often led to situations where rooms were booked for meetings when they were needed for videoconferencing, even though institutions are required always to give priority to their use for videoconferencing.

At the same time, a number of videoconferencing rooms could not include more than a dozen people. This was said to affect usage. This was true of most of the facilities visited during the research although in some HEIs a small number of videoconferencing suites were located in theatres with tiered seating and lighting adjusted to enable larger groups to communicate by videoconference. Even so, few suites could accommodate more than 20-30 people. Moreover, the nature of the rooms meant that in most institutions the use of the facilities for large group teaching was impossible. There was a strong view that videoconferencing should be available in at least one large teaching room in each institution and that a rolling programme to increase the number of such facilities was required.

The use of whiteboards for videoconferencing was raised by some respondents as something which could be explored. However, a number of issues were raised which suggested that this could be challenging. For example, effective communication would require that the videoconferencing camera should be located near to the display that shows the incoming videoconferencing picture as this ensures that participants look at the people with whom they are communicating, i.e. because they make rough eye contact with the camera it appears to those at the far end that the person is talking to them.

However, if the camera and the display are split then a participant will naturally look at the display but the camera will be in a different location. It would therefore appear to the people at the remote end that the participant is looking away from them when in fact they are looking directly at their image on a display.

Moreover, because whiteboards are so large, it is difficult to position the camera above the whiteboard; if the camera is mounted too high it will appear to those at the far end to be steeply angled downwards which can appear unnatural to remote viewers and increase fatigue. If the camera is positioned to the left or right of the board then this problem does not arise to the same

extent. However, because the camera is further away than would normally be the case, the issue about lack of eye contact may arise.

If the camera is located below the whiteboard this becomes a bump hazard, particularly if the whiteboard is interactive; if the camera is positioned too low it will need to look sharply upwards which will cause similar effects to looking downwards. Interactive whiteboards should be installed so that a person of average height can touch the top which makes it difficult to position the camera below the display.

At the same time, projectors emit bright light. Therefore, if the projector (or projected light beam) is in the field of view of the camera, this will affect its auto iris. In a typical setup (required for effective communication) the camera should be located with the display and face the participants, this places the projector directly in the line of sight (field of view) of the camera.

The image displayed on a whiteboard is much larger than a traditional display. The quality of the image received by the videoconference system is the same nevertheless so in order to fill the whiteboard the image must be stretched; this will degrade the quality of the picture and can make participants feel uncomfortable if they sit too near the whiteboard.

If the whiteboard is being used for videoconferencing then it cannot be used for any other purpose such as data and application sharing (i.e. sharing content to compliment the videoconference).

Moreover, some projectors are very noisy and this can be picked up by the microphone and transmitted as ambient noise to remote participants.

A small number of respondents referred to desk-top videoconferencing which they regarded as a possible way to expand the use of videoconferencing. A few believed that this should be prioritised as an item of expenditure. However, the view of most respondents was that although such equipment had its place, especially for one-to-one discussions, the quality of the output was such that it should not replace studio-based videoconferencing facilities.

A number of technical issues were highlighted by a representative of the WVN in relation to desk-top videoconferencing which cast further doubt on their suitability. These were:

- *because a PC is a multi-purpose device it is far more difficult to appropriately engineer a network to deliver an appropriate quality of service required for real-time full duplex, high bandwidth applications such as videoconferencing; a current technique used for videoconferencing systems is to physically (or logically) segregate this traffic from other traffic on the network, this cannot happen with a multi-purpose PC*
- *webcams are generally static and don't pan, tilt and zoom*
- *webcams have a smaller field of view making them suitable for one-to-whatever communication or for very small groups (2-3 people)*
- *PC-based systems can use microphones and speakers as opposed to a headset but this is really only suitable in a dedicated room. A system that can only accommodate 2-3 people is unlikely to be located in a dedicated room and would not be suitable for large scale teaching*
- *many PC based systems are not standards-compliant and will not communicate with other videoconferencing systems; those which are standards-based require a high end PC and the quality is still not comparable with a studio based system*
- *videoconferencing scheduling for PC-based systems is more problematic*
- *it is relatively easy to engineer the environment in a videoconferencing studio to provide the best quality sound and pictures, this is not the case in any other environment*
- *PCs require frequent updates to operating systems, anti-virus software and local firewalls; any update has the potential to prevent the videoconferencing software from working*
- *webcams themselves are mass-market products and are not designed to capture images to the same quality as a professional camera.*

8.2 Institutional capacity

Most institutions did not have the capacity to maintain their videoconferencing facilities without the support provided by the WVN Support Centre. This was reflected strongly by the smaller FE colleges and staff in the larger institutions also referred to the challenges they would face. Although they had large teams the demands on their services were significant and it was extremely unlikely that they would be able to cope with any additional workload. A typical comment was; *'The university take videoconferencing seriously, but it's not*

clear that they understand what's involved ... they have a tendency to underestimate the background work.' This was in part because technicians' work went unnoticed when the system worked, which meant that some users did not fully appreciate the importance of their role.

There was also concern that specific technical expertise in videoconferencing was not available in many institutions.

8.3 Funding future development

There was a strong view across both HE and FE sectors that videoconferencing would not be a priority if institutions had to fund the development of the network or if they had to contribute towards maintenance costs. Institutions said that they would be unlikely to upgrade their facilities in such circumstances. Some institutions' representatives believed that there might be a temptation to 'patch and mend' which would result in a substandard service which would do little to enhance the use of videoconferencing as a teaching and learning tool. Since the equipment could not be kept under maintenance contract after February 2008, institutions believed that the network would gradually decline without outside, ring-fenced investment in it, as very few institutions would make the financial commitment themselves.

One senior manager said that they would have to justify the expenditure at a time when their usage of videoconferencing was limited. Another institution noted *'If colleges had to pay then usage would reduce and we would be left without a network'*. A college which made greater use of videoconferencing stated that without the network it would be unlikely that they would continue to develop that way of teaching and learning because the pool of potential partners would be reduced.

Continued, ring-fenced funding similar to that used since 2001 was advocated by most staff with responsibility for videoconferencing. According to one HEI; *'The core funding model has proved its value and has provided a word-class service. It's something that is reliable and standardised.'*

Models of funding

Various models for funding the videoconferencing network were discussed with representatives of each college. There was some support for a system of funding that was based on usage. This was perceived as targeting funds towards those institutions which had taken the development of videoconferencing forward. Its main drawback was that the lack of funding for institutions where videoconferencing remained undeveloped would hinder development there.

There was strong opposition to any notion of charging users for the facilities. This was seen as having hindered the development of videoconferencing in the past and would be likely to inhibit its future development.

No institution favoured introducing a formula element rewarding those institutions which use videoconferencing. This was perceived to be wrong in principle because it could lead to inappropriate use, for example, encouraging institutions to use videoconferencing for the sake of doing so, and difficult to operate in practice.

The notion that some funding should be provided to institutions with detailed development plans for using additional money for videoconferencing was welcomed by some respondents. Such a model could allocate funding to each institution which would only be paid when institutions produced their detailed plans. This would encourage institutions to consider carefully how videoconferencing could be developed. The main arguments against this model were that it would place an additional bureaucratic burden on institutions and would need to be monitored carefully by the funding bodies. This model could also result in inappropriate exploitation. It could also generate tensions within institutions if staff felt that they were being required to teach in a particular way in order to secure funding.

There was a strong feeling that any decision that would require individual institutions to fund either the capital costs or the maintenance of the WVN would result in some of them withdrawing from the network. A videoconferencing network could only be maintained if every institution had at least one WVN studio. Refurbishment could be undertaken through a rolling programme that prioritised those making the greatest use of videoconferencing but which did not exclude other institutions where the use was yet to develop.

8.4 Impact of changes to the WVN Support Centre

The role of the WVN Support Centre was central to the success of the WVN. There was a strong view that it contributed to the network by providing effective technical support, and by coordinating usage and conducting activities which promoted the use of videoconferencing. Staff at all institutions said that the WVN would be weaker without it.

A minority of institutions said that even if the WVN Support Centre had to charge for its services, they would continue to use it. This was because of the quality of the support they received through it and also because the alternative would be to obtain such support from commercial companies who charged a great deal for their services. However, other institutions' representatives, while acknowledging the value and effectiveness of the WVN Support Centre, maintained that they would be hard-pressed to justify a substantial financial commitment to the Support Centre, both because of other financial pressures and because many of them made limited use of videoconferencing. This would make it more difficult to sustain the WVN network.

8.5 Key findings

The current videoconferencing equipment, although effective, was coming to the end of its shelf life; there was strong support for its replacement by state-of-the-art technology for the future, just as the current equipment had represented the cutting edge when it was installed.

Videoconferencing studios were preferred to alternatives such as desktop facilities by most respondents because the equipment offered better quality and was more appropriate for discussions involving more than one person at either end.

Some changes were required to the location of the videoconferencing equipment within some institutions.

The role of the WVN Support Centre was crucial to the success of the videoconferencing network.

The way that the WVN had been funded, the funding structure adopted for the Support Centre, and the role it played, had supported the development of the WVN as an all-Wales network.

If funding for the Support Centre were withdrawn, few institutions would be likely to fund videoconferencing facilities from their own resources as it would be a low priority for most of them.

The funding model most favoured for the future development and maintenance of the WVN involved the provision of at least one studio per institution through a rolling programme, possibly beginning with the heaviest users.

The economies of scale brought about by having one network would be lost were procurement decisions left to individual institutions.

9. Conclusions

This chapter presents the conclusions of the research against each of the key objectives outlined in Chapter 2.

Changes or modifications to videoconferencing facilities users would benefit from, specifically keeping in mind the collaboration agenda within Wales:

- The main changes to the videoconferencing facilities were:
 - a need to introduce updated equipment that was the current standard technology, including a means of displaying people and in-band data content simultaneously
 - there was a need to retain the use of studios as opposed to desktop systems, with the possibility of the latter being used for supplementary work, especially one-to-one discussions
 - studios should be adapted to enable larger groups to take part in videoconferencing activities; users would also benefit from the introduction of additional/wide angle cameras.
- In some institutions there was a need to change the location of studios, in order to maximise usage.
- The development of field-based systems for certain types of usage (e.g. fieldwork) could be pursued.

The impact of the availability of videoconferencing facilities on the teaching of, and through, the medium of Welsh:

- Videoconferencing was beginning to develop as a means of providing courses through the medium of Welsh, mostly through collaboration between schools and other schools or between schools and FE colleges.
- Videoconferencing was emerging as a means of delivering courses in Welsh or through the medium of Welsh that would not be provided otherwise either due to issues of staff capacity or because learner numbers meant that providing them in individual institutions would not be viable.
- There was some evidence that videoconferencing was used to a limited extent in teaching HE courses, especially where staff had made a conscious choice to use the medium.

- A great deal of the usage made in HE institutions was to discuss provision, develop marketing and promotional strategies, and share good practice in teaching through the medium of Welsh.

The likely impact on users and the use of videoconferencing should the WVN Support Centre be scaled down or disbanded:

- The role of the WVN Support Centre was central to the smooth running of videoconferencing in Wales; the Support Centre enabled it to be used as a national network rather than as a means of communication used by a minority of institutions.
- Very few institutions would have the capacity to support videoconferencing themselves; the contribution made by the Support Centre was therefore vital.
- Any reduction in the work done by the WVN Support Centre would lead to fewer institutions engaging with videoconferencing and a break-up of the national videoconferencing network.
- This would affect individual users in all institutions and would retard the development of videoconferencing at a key period in its evolution.
- Experience of countries outside Wales indicated that the network had been lost when their Support Centre had come to an end.

The impact of the provision of advice about videoconferencing for teaching and learning, and the future requirements to encourage teaching and learning by videoconferencing in the future:

- The work of the teaching and learning advisors, although at an early stage, was having an impact by raising its profile and developing staff capacity.
- The use of videoconferencing was developing where senior managers were committed to its development; in HE institutions it was developing fastest where Heads of Department promoted its use.
- Introducing whole-institution approaches to promote videoconferencing would be a positive step, especially in HE.
- Strong messages were needed from staff with strategic roles in planning and funding HE and FE in Wales that videoconferencing was a key tool in the collaboration agenda.
- Institutions could introduce procedures that assumed that certain activities would be undertaken through videoconferencing unless there was a strong case for the alternative.
- A register of opportunities to use videoconferencing, especially in FE, would promote its use in those institutions.

- The role of the Teaching and Learning Advisors was essential in providing practical training to develop staff confidence in using videoconferencing; staff emphasised the importance of this training in developing their capacity to use videoconferencing.
- Where videoconferencing had developed effectively, staff had often used their own time to develop its use in their teaching and learning activities; the use of videoconferencing was likely to increase if staff were given additional time to reflect on how it could contribute to their work and to plan or adapt their courses to enable the technology to be used.
- Pedagogical and personal support should be provided to both staff and learners in order to encourage teaching and learning using videoconferencing; this could be addressed by making the role of the Teaching and Learning advisors a permanent one.

How WVN compares with other similar networks both nationally and internationally:

- There is a need for further research into international good practice in the use of videoconferencing as a teaching methodology; this would address a serious gap in recent evaluative research into the use of videoconferencing.
- The C5C system had enabled HE institutions in Wales to develop staff and technical familiarity with videoconferencing which had paved the way for their success in using the WVN; institutions with previous experience of the C5C network were more likely to make use of the WVN; few FE institutions had experience of videoconferencing networks other than the WVN.
- Their experience of such networks had been before 2001 and it would be unfair to compare the technology available then with the WVN.
- Some in the institutions had used desktop video links; most people believed that these were effective for one-to-one work but that there were limits to what they could do in terms of group discussions; such technology would not remove the need for videoconferencing studios capable of being used by groups.
- The WVN had added benefit because it was a national network; these benefits would be lost if institutions became part of other networks; this could happen if individual institutions were responsible for their own arrangements.

The cost/benefit of WVN:

- Assessing the cost benefit of the WVN was based on a number of hypothetical assumptions.

- There was a need to consider the gain brought by videoconferencing (in terms of enabling collaboration through more frequent dialogue and the provision of courses which would not otherwise take place).
- Based on a sample of videoconferences, it is estimated that the costs saved through videoconferencing for administration meetings, occasional lectures and research purposes were in excess of £500,000 per annum and more than £900,000 if all international videoconferences are included; it is also clear that videoconferencing added value to education and training in Wales by enabling courses to be delivered which might not otherwise be provided, the development of links with institutions overseas, and enabling more people to attend meetings than would be possible if they had to travel.
- Environmental benefits brought about by the saving of approximately 500,000 miles per annum within mainland Britain through videoconferencing should also be noted.

The potential impact of the cessation of central maintenance for the videoconferencing equipment.

- As the equipment was coming to the end of its life, any cessation in central maintenance would reduce the effectiveness of the network as individual institutions lacked the capacity to maintain it themselves.
- Because individual institutions lacked capacity, the WVN would disintegrate as a national system if central maintenance was to come to an end.
- The videoconferencing facilities were unlikely to be maintained to such a high standard if individual institutions bore the responsibility for maintaining them.

The impact of the funding model to be used and the potential impact of any change to the funding model.

- A strategic decision had been taken at a national level to install videoconferencing facilities; this had overcome any possible reluctance on the part of institutions to commit to videoconferencing and had been beneficial in overcoming an important hurdle to its development as a mainstream way of working.
- The funding model used had enabled a national network to be developed; it had also enabled the development of a situation where the equipment and Support Centre were part of a package available to institutions; experience had emphasised the value of this package arrangement.
- Not all institutions would be in a position to fund the development or maintenance of videoconferencing from their own resources; however, all

institutions recognised the value of the network, made possible through the top-slicing arrangements.

- Institutions should be provided with at least one studio; the upgrading of further studios should be based on levels of usage.
- Videoconferencing development in schools had taken place largely on the back of the financial investment in the WVN.

The desirability of further investment in WVN and the scope for expansion of the network.

- Further investment was required to meet the technical requirements outlined above and also to retain the WVN as a technically reliable and effective system.
- There was scope to further expand the WVN as a major public sector network.

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