


Education Departments' Superhighways Initiative

Group B: Vocationally-Focused Projects

Final Report

Computer Based Learning Unit School of Education
The University of Leeds

Jeremy Higham (Project Director), Malcolm Byard (Project Manager), Parvez Engineer, Prof. Roger Hartley, Paul Horbury, Isobel Jenkins, David White

Evaluation Methodology and Procedures

1. The evaluation procedures for the projects in Group B necessarily varied according to the context of individual projects, however the following general methodology was employed for all projects.

2. All educational institutions involved in the ten projects were visited by members of the evaluation team, though where a large number of institutions was involved (e.g. London Colleges Multimedia Initiative) a large representative sample was visited.

3. Data was obtained through the use of observation of teaching and learning, through semi-structured interviews with participants at all levels, and through the use of questionnaires using fixed and open-ended response items. Emphasis was placed on eliciting and representing the views of a range of those involved in each project, from learners to teachers and managers.

4. In addition, the evaluation teams analysed project documentation, students' work and minutes of management meetings and, where possible, a member of the team attended project management and steering group meetings.

5. Regular evaluation team meetings were held to ensure a commonality of approach and to inform and refine the methodology adopted and the evaluation foci as findings emerged.

6. THE CARLISLE SCHOOLS VIDEO-CONFERENCING PROJECT

6.1 This project is part of the Cumbria Broadband Pilot Project. The Broadband Pilot comprises two separate projects linked by the common theme of a communication network termed 'FeatureNet', which is designed to connect the large majority of County Council premises and organisations. FeatureNet is a virtual private switched network offered by British Telecom (BT) to organisations such as Councils whose activities are spread over a large geographical area. The network will be installed and operated by BT and will use voice, data and video to connect users. ISDN lines will be available to most, but not all, users (some establishments are so remote that the installation of digital lines is not cost-effective).

6.2 It is estimated currently that, by the end of the 1996/97 academic year, 50% of the Cumbrian schools will have been connected to FeatureNet, the remaining schools having temporary charge-card access. Starting in September 1997, the next phase of the FeatureNet connection programme to complete the connectivity of the remaining schools will begin. The County Council has set the FeatureNet pricing structure. It will offer similar quarterly rental charges to the Public Switched Telephone Network (PSTN) but call charges for voice, fax, voice-mail, internal e-mail and video conferencing will be free across FeatureNet with reduced rates to the PSTN. Additionally, Grant Maintained (GM) schools and FE colleges within Cumbria will be offered a discounted cost connection.

6.3 It is to be noted that, at the time of the EDSI evaluation, there were no schools with the FeatureNet connectivity.

6.4 The two projects which were evaluated are:

1. The Carlisle Schools Video-Conferencing Project
2. The Furness Highway Project.

The evaluation outcomes will inform some aspects of the development programme for educational initiatives and applications which will be undertaken when the installation of FeatureNet is complete.

6.5 For the EDSI evaluation, these projects are reported on as separate projects (see also Report B2.7).

Project context and description

6.6 The Carlisle Schools Video-Conferencing project started in September 1995 and involved three 11-18 schools in Carlisle: Newman School, North Cumbria Technology College (NCTC) and William Howard School.

6.7 The project is funded by the Cumbria Education Service, the three schools, BT and the Greater Carlisle Post-16 Co-operative scheme.

6.8 The project was initially the brainchild of an ex-deputy head at NCTC who was interested in obtaining sponsorship to set up video conferencing in the school. Her particular interest was in developing contacts between schools and industry as she had seen sophisticated video-conferencing facilities operating in schools in Florida, and it was after meetings between herself and representatives of the LEA that the project was set up.

Project aims and objectives

6.9 The overall aims and objectives were the same for this project as for the Furness Highways Project, namely:

- to investigate and assess the various strategies for using modern information superhighways in the provision of learning opportunities
- for teachers to learn how to develop and apply relevant IT skills which will enable them to test and use the new communication technologies across a wide range of teaching and learning styles.

6.10 In addition, and specifically for this project, the focus of the activities was planned initially to be concerned with using video conferencing to provide curriculum enhancement to the A-Level Communication Studies Course through the use of the technology between Newman School and William Howard School, and to enrich the GNVQ Manufacturing Course at North Cumbria Technology College (NCTC) through a video-conferencing link between NCTC and a local manufacturing organisation, Carnaud Metal Box.

Technical issues (hardware and connectivity)

6.11 Each school is equipped with identical hardware, namely Olivetti 486 Personal Communication Computers (PCCs), with BT VC8000 boards. In addition, NCTC has (on loan) a PC with an Intel video-conferencing board, which is used for video conferencing with a supplier of technology equipment based in Brighouse, West Yorkshire.

6.12 Connectivity is by ISDN2 lines.

Project location

William Howard School, Brampton

6.13 Brampton is a market town about nine miles East of Carlisle. The William Howard School is a very successful 11-18 Grant Maintained (GM) comprehensive of 1,050 boys and girls. The majority of the pupils (80%) come from the immediate Brampton area and, in effect, have no choice of secondary school. Some pupils do make the nine-mile journey from Carlisle because of the school's excellent reputation, good examination results and well-balanced curriculum.

Newman School

6.14 Newman School is a Roman Catholic Aided Comprehensive School of 600 boys and girls aged 11-18. The school buildings, although modern, have character and are situated amongst pleasant playing fields to the East of the Carlisle town centre. The Head of English is in charge of the video-conferencing initiative at the school.

North Cumbria Technology College (NCTC)

6.15 North Cumbria Technology College is a Grant Maintained school with Technology College status. On roll there are about 600 boys and girls between the ages of 11-18, most of whom come from the area immediately around the school. The school is situated in the middle of a housing estate on the eastern side of Carlisle. The school buildings have been refurbished recently to create a very pleasant, purposeful internal atmosphere. It was indicated to the evaluation team that 70% of the school's pupils have a reading age between one and four years less than their chronological age, when they first come to the school.

Project evaluation

Project management and organisation

6.16 The project is managed by a Steering Group, chaired by the Director of Education, with representation from each school, BT, and the Cumbria Local Education Authority. Meetings are held on a regular termly basis.

6.17 The day-to-day management of the project in the schools is the responsibility of the IT co-ordinators at William Howard School and NCTC, and of the Head of English at Newman School.

Project activities

6.18 This section focuses on the activities in each of the schools, particularly in terms of the teaching and learning undertaken as part of the project. Also included are reports of interviews with staff and pupils. Paragraphs 6.76-6.81 include a summary and commentary of the main teaching and learning issues which have arisen during the course of the evaluation.

6.19 The material is presented on a school-by-school basis.

William Howard School, Brampton

6.20 The video-conferencing equipment was installed during the Summer of 1995. It is housed in a computer room in which there are 16 other computers. The school has experienced problems with the use of the video-conferencing equipment, namely, break up and poor quality of the sound, room-booking difficulties, and restrictive class use because the equipment is suitable only for small-group working. A further problem was indicated concerning the sound/vision delay times, difficulties which are effectively the result of the compression/decompression algorithms of the data transmission. Experiments have been undertaken using a large video screen and a larger camera in an attempt to overcome the small-group working issues. There are plans to relocate computers throughout the school to support use by different subject areas and it is proposed to put the video-conferencing equipment in a new 'communications' room situated in the English department.

6.21 There has been only modest curriculum usage of the video-conferencing facilities to date, for example, in an A-Level consortium. William Howard School and Newman School are part of this consortium by which A-Level Communication Studies students are taught at Newman School by a member of the English Department. Students from William Howard School go to Newman School twice a week for their lessons. Whilst there has been no serious expectation that students at William Howard School could participate, through video conferencing, in a lesson at Newman School, it was anticipated that a more feasible use of video conferencing would be for the Head of English to discuss work with students and follow up any recalcitrant ones. However, even this use has been difficult as contact has to be prearranged and is not spontaneous. Additionally, there is little coincidence of the times of break or lunch which might allow any follow up to take place. It would be easier for students to contact the Head of English, but there has not been the motivation for this from the pupils. All that has happened is that contact has been made with students who were absent from classes at Newman and a review of the missed work given.

6.22 Several initiatives are planned for the future and include:

(i) Video conferencing for Modern Foreign Languages

6.23 Pupils study French and Italian at William Howard School, and are part of a language-diversification programme with St Martin's College, Lancaster. The aim of the programme is that all pupils from Years 7-9 should study two modern foreign languages. The Head of Modern Languages has e-mail links with an Italian school and it is hoped that this can be further developed with video-conferencing links established between the schools.

(ii) Initial Teacher Training (ITT)

6.24 There are no local ITT institutions. Students come from Newcastle and Lancaster Universities for their teaching practices. There is considerable potential for contact between the providing institution and the students in the school. This again has not happened, largely because the ITT institutions do not have video-conferencing equipment readily available to staff, in the respective Schools of Education. However, it is an initiative which is planned for the future.

(iii) Religious Studies (RS)

6.25 William Howard school is situated in an area of the country in which there is very little ethnic or religious diversity. The RS department would like to use the video-conferencing equipment to contact ethnically and religiously diverse schools to allow pupils to find out about different points of view, attitudes, practices, festivals, etc. It was also felt that discussion about issues, such as blood sports and the environment, would be valuable.

(iv) Use of video conferencing by the English department

6.26 The English department has used video conferencing as an introduction to a multimedia project. The Head of English is working with a group of Year 9 pupils to produce a multimedia package about the school and the local area. Illuminatus is the authoring package being used in this project. The multimedia application is intended to be used as an introduction to the school when video-conferencing links are established with other institutions. Video conferencing has, as yet, played only a very small part in this project.

Newman School

6.27 The video-conferencing equipment was installed in July 1995 and is located in a small 'seminar' room (suitable for 10-15 people). As with William Howard School, video conferencing has had modest use and there is, as yet, no timetabled video conferencing in the school curriculum. An indication of the activities in video conferencing is given below.

(i) A-Level Communications Studies Consortium

(see the William Howard School report for a description of this activity)

(ii) Use of video conferencing for Modern Languages.

6.28 Relatively little video conferencing has happened to date. Spanish and French are taught at Newman School, with Spanish being the main language. Contact has been made with a Spanish school in a casual way by using a small directory of video-conferencing addresses. The Head of Modern Languages also has contacts with the Polytechnic University of Madrid and it is hoped that the sixth-form AS-Level would exchange with students there.

(iii) The 'chat up' line

6.29 A contact was originally made by telephone from some Year 10 boys from William Howard School who wanted to try the video-conferencing link with Newman School. A group of Year 9 girls responded. An interesting 'chat up' line developed and the groups contacted each other twice or three times per week for several weeks. This proved to be an interesting experiment as the girls at Newman found this an unthreatening way of communicating because it was at a distance and involved no commitment.

(iv) Demonstration session at Portland Square

6.30 The Head of English wanted the A-Level Communications group to have experience of the potential of video conferencing. This was obtained through video conferencing between the school and the Education Offices at Portland Square, Carlisle. The group of students was split. Some remained in school while the rest of the group went to Portland Square. The task was for groups of three students to send information to each other in the form of text, using the whiteboard and file transfer. It was a successful experience as it showed the potential of the video conferencing for collaborative learning. However, it was felt that any future experiences of this type would need structuring much more tightly.

6.31 If teachers are to use video conferencing effectively it must be fully integrated into the curriculum and teachers must change the way they teach. For example, in the A-Level Communication Studies course, the Head of English wants to set up a project where students, working from different centres, have to collaborate and make decisions about, for example, a publicity campaign. Thus, the pupils could discuss and design a product on screen using video conferencing as a means to achieving an educational goal, rather than as a new-found toy with which to play.

(v) A computer magazine

6.32 A Year 9 English group is involved in the creation of a computer magazine (using Illuminatus) which features articles about Carlisle and about Newman School. The intention is that, having made contact with another video-conferencing institution, the multimedia magazine could be file transferred to provide interesting introductory information about the school and the area. The magazine has been created in English lessons and is a useful exercise in creating an application with a distant audience in mind. The skills involved are complex, for example taking photographs using an ION camera, DTP skills and computer skills using the multimedia application. The package is being created by a group of boys who work at lunch-time and after school.

6.33 The original intention was that Newman and William Howard School should collaborate through video conferencing to produce a common package using Illuminatus. This has not happened and each school is clearly concerned to produce its own. This is comment in itself about the practical difficulties of schools collaborating by video conferencing.

Developments planned for 1997

(i) Use by the RS department

6.34 The Head of RS at Newman School would like to use video conferencing to break Newman's relative isolation. The school is the only RC school in North Cumbria. Cumbria is not a multi-religious or multi-cultural community and the Head of RS would like to establish contacts with other schools to allow Newman's students to contact and speak to students of other faiths.

(ii) Talking to the experts - for example school-industry links

6.35 At the moment, these have not been successful. 'Experts' in industry and commerce seem unwilling to spend valuable time talking to school students. This may be because contacts have been fairly casual. Such contacts need to have real purpose and not be contrived and it is hoped that, during this year, links with local industry will be revived and that this will lead to more use of video conferencing, particularly in terms of careers guidance.

North Cumbria Technology College (NCTC)

6.36 The school has a long history of obtaining finance for IT and other purposes through sponsorship, thanks chiefly to the work of a former deputy head, who was responsible for a computer network which was obtained through ICL sponsorship. The school has good facilities for IT, with four computer rooms used to support different subject areas. In addition, each subject area has several computers in its classrooms with some of these rooms also having networked facilities. The room containing the video-conferencing unit was also used as an IT room and contained 25 Archimedes computers arranged on tables placed in herring-bone pattern down the room, in addition to the two video-conferencing PCs.

6.37 Many of the staff are IT literate and the majority use IT in their work. IT has taken priority in staff training during 1996 and the equivalent of three staff-training days have been delivered, largely through twilight sessions. The use of IT throughout the curriculum is largely pupil-led. Pupils want to use IT, for example to DTP their course work, and also to use databases and spreadsheets, and staff respond to this demand.

6.38 The school has strong links with schools in the USA which resulted in a visit to NCTC last summer by a Media Studies teacher from John Marshall High School, Milwaukee, USA, and contacts between NCTC and Hugh Christie School, Kent, developed because of the Kent school's contacts with the American school. Some of the video-conferencing activities which have been undertaken from NCTC are described below.

(i) John Marshall High School, Milwaukee

(a) A-Level English Language students at NCTC speak to students at John Marshall High School to compare language use as part of an A-Level project.

One sixth-form pupil commented, "There was an exchange of information on both sides... I think that both sides got a lot out of it..."

(b) There are plans for a joint study of *Macbeth* between Year 10 and Year 11 pupils at NCTC and older students in the USA.

(c) An A-Level Geography class established a common environmental project between the two schools, but unfortunately this has not continued because of staff illness.

A Year 11 pupil at NCTC observed, "It was really good to get information from overseas straightaway...and answers to questions, you can ask someone and get a response immediately..."

(ii) Hugh Christie School, Kent, Year 8 Geography project

6.39 This project was set up to compare farming and land-use issues in Cumbria and Kent. The contact was very successful and it is intended that the file-

transfer facilities are used next time so that good quality diagrams, maps, pictures and other resources can be shared.

6.40 For class organisation, the Geography teacher divided her class into two groups of 15, with each group using the video conferencing in turn. Within each group of 15, smaller groups of three or four pupils were given the responsibility of finding out about a particular area of Cumbria and presenting the information to groups in the 'visiting' school. As a result of this project, the pupils became very friendly over the video-conferencing link and invited each other over for holidays!

(iii) Thorncliffe School, Barrow

6.41 Pupils from Thorncliffe 'rang up' via video conferencing and asked if they could talk to some Year 10 students about doing a possible project. The Thorncliffe students were required by their teacher to attempt to set up a video-conferencing project. The Head of IT at NCTC asked three Year 10 pupils who happened to be in the computer room to respond. The pupils 'met' each other regularly for some weeks via the video-conferencing link and taught each other to use the various aspects of the equipment, for example file transfer.

6.42 The pupils collaborated on a joint technology project. Each group built equipment using 'Fischer Technik', for example a robotic arm and a conveyor belt. They wrote computer programs to make the robotic arm pick things up from the conveyor belt and transfer them to another nearby location. They used identical software to write their programs and then transferred them using the file-transfer facility. Following the success of this project, it is hoped that it will be repeated.

6.43 Some teacher supervision was essential for the project, despite the informal way in which it was established. For example, it was essential that the pupils involved identified the expected outcome of each video-conferencing meeting and that they set an agenda of tasks to be completed before the next 'meeting'. During this project, the group developed video-conferencing skills through carrying out the technology project.

(iv) Denfords, a provider of technology equipment for schools

6.44 This is a relatively new use of video conferencing, and one which led Denfords to loan the school an Intel-based video-conferencing unit so that there was a measure of compatibility between the two institutions, which would allow whiteboarding and application sharing to take place. The video-conference usage is essentially for pupils at NCTC to communicate with staff at Denfords so that a specification for the manufacture of an article may be sent to Denfords, and the pupils can see the manufacturing process being performed on the equipment located at Denfords. In addition, pupils at NCTC may also wish to consult staff at Denfords over the use of their own equipment when they have a problem with manufacture.

(v) Provision of facilities for other schools

NCTC's feeder primary schools are setting up joint projects with primary schools in the USA near John Marshall School and are using NCTC's facilities.

(vi) Pupil mailboxes

6.45 Every pupil at NCTC has their own mailbox, and they are able to send messages to their friends at school and indeed to anyone else who may be reached by e-mail. This is a relatively new facility and, consequently, the

curriculum applications have as yet not been fully explored, but there appear to be considerable applications, for example for inter-school projects and in Modern Languages, where material can be prepared off line before transmission.

Future uses of video conferencing at NCTC

6.46 It is hoped that there will be a continuation of the initiatives described above, as well as new ones, some of which are detailed below.

(i) Modern Languages

6.47 French and German are the main modern languages taught in the school, with Spanish and Italian being taught to less-able pupils. It is anticipated in the school that it is the sixth-form language groups who would get most out of video-conferencing links as they will have the requisite language skills, but the staff do believe that even younger students need to have a reason to use their target language.

(ii) Business Law

6.48 This is a particularly exciting project with Dixons CTC in Bradford, in which pupils studying Law for A Level will become involved in a project whereby the pupils will enact part of a trial using video conferencing, with the NCTC pupils acting for the defence and the pupils from Dixons acting for the prosecution.

One sixth-form pupil said: "This puts pressure on to us to really know our stuff...it'll sharpen us up to really know our course work..."

(iii) Religious Studies

6.49 This is another joint project with Dixons CTC at Bradford, and is aimed at pupils in Year 9 who are working on an activity concerned with Beliefs and Cultures. NCTC is an all-white school and the racial mix of Dixons should provide an interesting cultural experience, particularly for the pupils at NCTC.

(iv) My Fair Lady

6.50 A sixth-form pupil from NCTC has been asked to take part in the production of *My Fair Lady* at Milwaukee. The production is scheduled for the Summer Term 1997 and the pupil will go to the US for the production, but meanwhile some rehearsals are planned using video conferencing.

(v) History

6.51 It is hoped to involve pupils from three schools in this project: NCTC, Dixons and Boston Spa, West Yorkshire. Carlisle is rich in medieval history and Bradford has a strong industrial history. Pupils at NCTC will develop the use of the Illuminatus software to put together a project which illustrates the history of the area and the pupils in the other schools will use some similar multimedia authoring tool to provide their contributions. This is a really exciting project, and although not really dependent on video conferencing, should provide strong motivation to the pupils, as well as developing their skills in IT and History.

6.52 In addition to the projects mentioned above, it was hoped that video-conferencing links with industry could be used by GNVQ Manufacturing students. Contacts have not been successful in the past because many firms are not yet equipped with video conferencing. The firms which do have video-

conferencing facilities are using them full-time for their own commercial purposes and so have no 'space' for school contact.

6.53 It was stressed that in using video conferencing it was important that any project was clearly structured and had a definite pedagogical purpose. Ideally, video conferencing should be used for its unique characteristics and to achieve outcomes which could not be achieved in any other way. Video conferencing was time-consuming to set up, and it often meant that syllabus structures were disturbed and timetables had to be rearranged.

Staff development and pupil training

6.54 At NCTC, the school put a lot of funding into staff development in 1996 and one of the emphases was video conferencing. Approximately six to eight staff took advantage of this opportunity for training and a few have since looked at how video conferencing could be used in their subject area, for example Geography, History, English, Special Needs and Technology. Most staff have taken advantage of the opportunity to come into sessions during the times when video conferencing was being undertaken.

6.55 At Newman School, staff training had been undertaken on a departmental basis, with staff from RS, English, Modern Foreign Languages and the senior management team having undergone a training session. These sessions usually took place at lunch-times or after school. The recurrent problem was that staff who had been trained quickly lost their competencies because of lack of regular use of the facilities.

6.56 It was generally felt that the equipment for video conferencing was relatively straightforward to use and that IT-literate staff had experienced few difficulties and, as a consequence, required little training.

6.57 Pupil training was also undertaken at Newman and NCTC, and NCTC had experimented with using the video-conferencing facilities at the County Education Offices in Carlisle by sending a group of pupils to Carlisle to video conference with a group at NCTC, and so practise the use of such facilities as whiteboarding, and application sharing.

Summary and comments

6.58 There is a wide diversity in the use of the technology between the three schools. At William Howard School, at the time of the evaluation visit, only modest progress had been made with the introduction of video conferencing technology, and there appeared to be little take-up within the curriculum, although plans had been made for the future. The location of the video-conferencing equipment within the school appeared to be an important issue at William Howard School, and, indeed, one which was recognised by the school, as proposals had been made to relocate the hardware to a more suitable room which would ensure better access by staff. The problem of 'who do we video conference with?' was raised by the school, and it was felt that the lack of a video-conferencing directory of schools and institutions was a further difficulty which had contributed to the infrequent usage of video conferencing at the school.

6.59 At Newman School, some progress had been made, but, once again, difficulties had arisen, this time with staff being ill, which had prevented some anticipated usage being undertaken. The expected use of video conferencing to support the A-Level Communications Studies programme did not occur, because of incompatible timetable arrangements and a perceived lack of motivation on behalf of the pupils. Although some experiments had been undertaken and there was an indication of interest amongst the staff, video

conferencing had had little effect on the curriculum at this school. The Head of English, who was in charge of the project at the school, felt that, whilst the technology had much potential, its usage depended on the unique characteristics of video conferencing being identified for clear curriculum purposes before any use should be undertaken. In short, the IT should be used as an integral part of the learning process and not simply as an adjunct, to say, "Look, we are using video conferencing". One particular difficulty, cited by the staff, was the lack of time to ensure that the experiments with the technology could indeed take place. It appeared that staff were given no release time from their current workload for the management and operation of the project.

6.60 At NCTC, the picture was different. The school, being a Technology College, had an IT-literate staff. They were ably led by an experienced Head of IT, who was supported in turn by an ex-deputy head who had considerable experience of the applications of video conferencing through her frequent visits to the USA, and her involvement with schools in Florida and Milwaukee. In addition, the school was able to rely on technical support staff. One member of staff commented, "Our Systems Manager is excellent. He has thrown himself into learning about it, and having his back-up service is invaluable... you maybe do not need a lot of training but it is very good to have someone who is very competent and confident with the equipment."

6.61 The result of all this was that the school had become involved with many different applications of video conferencing, in a variety of curriculum areas, but particularly in English and Geography, where the school's links with Milwaukee had proved very useful as a means of generating project work.

6.62 It is interesting to note that one of the original suggested uses of video conferencing was to link with local industry as part of the GNVQ course in Manufacturing. Links with local industry have proved difficult to establish and, despite the efforts of the schools, such applications have not occurred. However, one of the plans for the future is for links to be made with some of the local Small and Medium-sized Enterprises (SMEs) which would involve training, the use of video conferencing and the creation of WWW pages for the firms.

Technology issues (connectivity and reliability of hardware)

6.63 Although no reliability problems had been indicated at any of the schools, there were other problems which had interfered seriously with the video-conferencing usage.

6.64 A major problem concerned sound and, even with the added benefit of echo-cancellation units, the sound was inadequate for anything other than individual or small-group usage. It is unclear where the fault lies. One possibility is with poor connectivity with the ISDN2 line. This may also account for the heavy pixellation effect which occurs and leads to a minor distortion of the screen image. It may also have been that only one of the ISDN2 lines was operational. If this is the case, then the bandwidth during transmission would be halved, resulting in a poor image and sound quality.

6.65 At NCTC, there had been few reported problems with the ISDN connection, but it was indicated that there were significant time delays when video conferencing was with the USA, so that lip-synchronisation was totally lost. The school in the USA had reported similar problems when video conferencing with NCTC, but the puzzling problem was not so marked when other schools in mainland Europe were involved.

6.66 There were the inevitable problems when video conferencing was undertaken with other users who had different equipment, in that, whilst the H320 standard for video conferencing was maintained, the T120 which governs the text-talk, whiteboarding and shared applications was not adhered to. Thus, whilst video conferencing between institutions with different equipment was possible in a restricted sense, the adherence to standards is now a priority by all the equipment manufacturers.

6.67 It is interesting to note that, traditionally, the installation of ISDN2 lines is often to a single access point. However, at NCTC, two access points were made available when the ISDN2 link was installed, one in a classroom and the other in a quiet area. Having two locations for the equipment ensures better access and, as a consequence, a possible greater take-up in use of the technology. It was reported by the school that up to six access points may be linked to a single ISDN2 connection.

Progress and achievements

6.68 The overall aims of the project have been achieved to some extent, in that there has been some investigation of the strategies for using information superhighways, and some teachers have acquired the technical skills of using the equipment and gained experience in applying the technology to the curriculum. In terms of the stated aims specific to this project, then these have clearly not yet been achieved. There has been only a limited use of video conferencing to support the A-Level Communications Studies course, and difficulties with timetables and pupil motivation have meant that this area of usage has had only modest success. Links with local industry have also proved difficult, though it must be stressed that the schools have been enthusiastic in pursuing this feature, but have found that, whilst the initial response from industry has been positive, there have been no subsequent developments.

6.69 The benefits to the pupils have been considerable, particularly at NCTC, and all schools have plans for more curriculum usage in the future. In general, the pupil benefits have not been restricted to IT skills. Right across the curriculum, there have been some good examples of usage which have been based upon sound ideas, so that video conferencing is seen as the appropriate tool for the exercise and not simply as an added piece of technology which is looking for an application.

6.70 Although there has been no regular timetabled usage developed in any of the schools, the usage has grown considerably over the time-scale of the project, so that now, certainly at NCTC, video conferencing has become simply a part of the curriculum.

Project finance

6.71 Finance for the project has been arranged through a partnership between the three schools, the Cumbria LEA, BT, and the Greater Carlisle Post-16 Co-operative scheme. The initial breakdown of the costs is as follows:

From *each* school, for the purchase and installation of the hardware	£ 2,358
From *each* school, for staff training	£ 2,000
From BT	£10,000
From Cumbria LEA IT Services, for the telephone charges	£ 3,300
From Cumbria LEA IT Services, for project management	£ 5,000

From the Greater Carlisle Post-16 Co-operative Scheme, for training and evaluation	£ 1,500

6.72 The project started in September 1995 and was due to be completed in July 1996. At the Steering Group Meeting held in May 1996, it was decided to continue the project for a further term, with the schools themselves then meeting the running costs for the project (that is telephone charges and ISDN line rental).

Project replicability

6.73 This a tightly-focused project, with an informed management structure, which is based in schools which are receptive to new ideas, but which also contain staff who are aware of their responsibilities and who are critical of simply using the technology for its own sake when there is no real curriculum benefit indicated. Consequently, the results of the project, in terms of curriculum development and enhancement, have been limited but, nevertheless, most appropriate as the activities detailed above have shown.

6.74 Replicability should present few problems, providing that the following prerequisites are in place:

(i) an adequate financial base for the purchase of equipment, management, training and support

(ii) a project base in a small number of schools with existing strengths in IT

(iii) regular Steering Group management meetings which are used to monitor the project and to oversee and stimulate curriculum applications as well as to disseminate information

(iv) a restricted responsibility load for the project co-ordinators in the schools, so that time is made available for the local management of the project and the inception of curriculum initiatives

(v) agreed support from the senior management teams at each school, at an appropriate level to ensure that project initiatives can be developed

(vi) planned staff-development sessions to raise awareness of the possible benefits of the technology to the school curriculum.

Commentary and recommendations

6.75 With any project which involves the introduction of new technology into schools, there are going to be difficulties, some of which can be foreseen, and others of which no amount of planning will foresee. In this project, the difficulties have arisen with the type of equipment used, which, with the additional echo-cancellation units, has still suffered from inadequate sound, thus effectively making the use of the video conferencing restricted to individuals or small groups. The size of the monitor screen has also meant that any extension of usage to larger groups of pupils has had to be avoided. Other problems have arisen from the lack of time available to the schools' project co-ordinators, who, with an already heavy workload, were also expected to develop the usage of video conferencing in their respective schools.

6.76 The management team for the project has been effective in that regular meetings have been held which have involved representatives of all the schools, the LEA and BT. This has ensured that developments were

monitored and some dissemination of ideas was undertaken. With projects concerned with video conferencing, where there is no existing expertise amongst the school staff, it is important that a mechanism for dissemination is arranged so that experiments and investigations can be undertaken and reported on. It is also important that any expertise which exists in the team is used to the full. The value of this is seen from the work at NCTC, which has undoubtedly benefited from the knowledge brought to the NCTC part of the project by the former deputy head who acted as a consultant to the project.

6.77 The curriculum applications have been well-chosen and reflect an understanding of the benefits of using this technology. It is to be hoped that the projected use, particularly with modern languages, will occur, since this is one curriculum area which is eminently suitable for video conferencing. Of significant note are the proposed links with Dixons CTC in Bradford for video conferencing for the pupils studying Law at A Level, and with Dixons CTC and Boston Spa School for the History project, where IT is central to the whole learning experience. These two initiatives have arisen as a consequence of the evaluation exercise and the subsequent dissemination of information.

6.78 Although staff development has taken place, it has been on a limited basis and, perhaps, this is a reflection of the opinions of the project co-ordinators in the schools, since as one has remarked, "I don't think that there is that much to it... we have a fairly IT-literate staff.... people talk about putting a lot of money into training people how to use video conferencing and I really don't think that there is much to it." Whilst this point is accepted by the evaluation team, it is probably an indication of how easy the technology is to use, but, nevertheless, teachers need to understand the possible curriculum applications of the technology, and it is important that time is made available for this to occur and that informed discussions take place.

6.79 The lack of any links with industry has been disappointing, since this was one of the proposed aims of the project. That this has not occurred is really no fault of the schools, who anticipated that industry would be only too willing to set up video-conferencing links to support the delivery of the GNVQ Manufacturing Course. The proposed venture with SMEs appears promising. It certainly provides clear benefits to such firms and it is hoped that it will be successful.

6.80 Carlisle is a relatively large, historically important border town of 90,000 population, but it is geographically isolated and, from a population mobility viewpoint, there is little movement out of Carlisle. Video conferencing has helped the pupils to develop a wider perspective. The curriculum applications from this project have brought benefits to the schools involved and, to this extent, it has been a very worthwhile project.