


Education Departments' Superhighways Initiative

Group B: Vocationally-Focused Projects

Final Report

Computer Based Learning Unit School of Education
The University of Leeds

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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.

7. THE FURNESS HIGHWAY PROJECT

Project context and description

7.1 This project is part of the Cumbria Broadband Pilot Project, which comprises the Furness Highway Project and the Carlisle Schools Video-Conferencing Project (see Report B2.6 for information on the other part of this project).

7.2 The Furness Highway Project is in two strands and commenced in January 1995, linking by e-mail two colleges, two special schools and all six secondary schools in the Furness region of Cumbria. Access was also provided to the Internet through Campus World. The second strand of this project concerns the use of video conferencing, using the BT/Olivetti system (specifically for careers guidance and student advice services), between the secondary schools and Furness College, which is in turn linked with the University of Central Lancashire.

7.3 The Furness project was financed by a consortium composed of the LEA, BT and TVEI 14-19.

7.4 The initial project was due to finish in January 1996, but the Furness Education Consortium supported its continuation until July 1996. The project was then superseded by another project, concerned with the use of video conferencing in school liaison. This new project (based in three of the same schools as the original project) is supported by funds received from BT and directed by a senior manager at Furness College. All of the institutions involved use ISDN connectivity. Furness College is in the process of connecting by a direct link to the University of Central Lancashire, which will give the College, and probably the schools, access to the Internet via the Joint Academic Network (JANET). The careers co-ordinators in the three schools have all been trained in use of the equipment, which is to assist pupils making choices regarding post-16 progression and careers. Contact has been made with schools in other parts of the country to develop projects and with schools on the continent for modern language work.

7.5 The EDSI evaluation team has been made aware of developments in the new project through correspondence with Furness College and reports from the Project Steering Group. However, the basis for this report remains the activities of the original project up to July 1996.

Project aims and objectives

7.6 The aims of this project were:

- 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.

Project location

7.7 The project involved one FE institution, Furness College; two special schools; a sixth form college; and six secondary schools. All of the schools are in the Furness region of Cumbria, centred around the town of Barrow in Furness, with one of the special schools on Walney Island. Details are now provided for each of the institutions visited during the course of the evaluation.

FE college

Furness College

7.8 Furness College is a general FE college serving the Furness region of Southern Cumbria. It is an associate college of the University of Central Lancashire.

7.9 The seven FE colleges in Cumbria have formed the Cumbria Colleges Network. All have Personal Communication Computers (PCCs) with VC8000 equipment. It is intended that there will be initiatives which will lead to collaborative development of curriculum materials and multimedia courseware.

7.10 For video conferencing, the college is equipped with three sets of BT/Olivetti PCCs with connectivity via ISDN2 lines. Internet access is though Campus World and it is intended that, in the very near future, open student access will be provided in each of the college libraries. The college also has access to the Internet via a 14.4 Kbps modem connection with the service provided by Demon.

Secondary schools

Alfred Barrow School

7.11 Alfred Barrow School is an 11-16 mixed comprehensive school with 510 pupils. Progression from the school is to Barrow Sixth Form College or Furness College. The school owns approximately 100 PCs, which are a mixture of 286, 386 and 486 machines, and which also include 20 laptop computers. There are two computer rooms within the school and these two rooms are well equipped with hardware. Internet connectivity is via a 14.4 Kbps modem to BT Campus World.

7.12 There is no ISDN connectivity at Alfred Barrow School and, consequently, no video conferencing.

Thorncliffe School

7.13 Thorncliffe School is an 11-16 mixed comprehensive school of 950 pupils in Barrow.

7.14 The IT facilities at the school are chiefly a mixture of 286, 386 and 486 PCs, with some older BBCs in the Special Needs Unit. There are two computer rooms on each of the school's two sites and each department has access to its own computers. The video conferencing is undertaken on a modern Pentium PC (16Mb RAM) which is on loan from BT, using ISDN connectivity. Internet access is from a 486 PC using a 14.4 Kbps modem connection.

St Bernard's RC School

7.15 St Bernard's is a Roman Catholic 11-16 mixed comprehensive school of 750 pupils.

7.16 The school has some 50 PCs with a new IT room opened in 1996. This room is equipped with 16 IBM compatible PCs and a Pentium server, the server being on loan from BT. The school library has three multimedia PCs, one of which houses the video-conferencing facilities, and another which is used for the Internet access and also doubles as the school's fax machine. Connectivity is via an ISDN2 line for video conferencing and via a 14.4 Kbps modem for the Internet access.

Special school

George Hastwell School

7.17 This is a school for children and young people with profound and multiple learning difficulties. It is located on Walney Island off the coast of Barrow. In the school, there are approximately 40 pupils whose ages range from three to 19 years and who are arranged into five classes. The pupil/staff ratio is very low and there are a large number of non-teaching assistants in the school.

Technical issues (hardware and connectivity)

7.18 The video conferencing is undertaken only in three of the secondary schools, using Pentium PCs equipped with VC8000 boards and Olivetti software.

7.19 Connectivity for the Internet and e-mail is achieved through 14.4 Kbps modem units attached to a variety of hardware configurations, usually PCs, but also including an Apple Macintosh computer at George Hastwell Special School. All schools are connected to BT Campus World for their e-mail and Internet facilities.

Evaluation

Project management and organisation

7.20 Project management was undertaken by a Steering Group, comprising representatives from each of the schools, BT and the LEA. This group met on a regular basis at intervals of between one and two months, and was chaired by a representative from Furness College.

Teaching and learning issues

7.21 The following IT-related activities have been undertaken on the superhighway in the schools and FE college which have been visited. The information presented has been obtained from evaluation visits to the schools detailed above and through questionnaire responses from other schools.

Project activities

E-mail

7.22 One of the special schools in the project had undertaken some very interesting work using e-mail.

7.23 For special school pupils, e-mail has particular advantages over synchronous forms of communication such as video conferencing and the telephone. E-mail has the benefits of anonymity and avoids preconceptions, time is not a factor and messages can be prepared offline. Pupils who have learning disabilities can take their time in composing a letter and, with a word processor, their mistakes are rectified easily before they need to send their communication. It matters little if it takes an hour to type five words when that result is regarded as an achievement for that child.

7.24 Information and Communication Technology (ICT) has had a major impact at this special school. There have been contacts with many other schools around the world. Flags have been exchanged, and assistance given and received for project work. Of particular interest is the work which was undertaken with Røvær School in Norway, whereby the pupils at Røvær School sent much information about the Vikings, and wrote about their village and the connections which it had with the Vikings. Such worldwide communication has meant that the school has ceased to be isolated, the children have

developed wider frames of reference, and, consequently, developed in their self-confidence and motivation.

Fax

7.25 Alfred Barrow School school has organised several successful projects through the use of fax.

7.26 The school had previously carried out an exercise with some merchant ships which are based in the Furness area. The exercise arose out of a Maths/Geography project on co-ordinates, and latitude and longitude. In essence, it comprised contacting the ship *Pacific Pintail* by fax and satellite telephone at regular intervals, and plotting its position as it sailed to Japan and then returned to the UK. The route taken by the ship was plotted on a large Admiralty chart which was exhibited prominently so that the progress of the ship could be followed by all. Additionally, various officers and members of the ship's crew sent souvenirs, and faxed descriptions of the places the ship visited and of life on board ship. This project was repeated for a second ship on a similar run with a different group of children a year later.

7.27 For another project, as part of a worldwide weather day in Geography, the fax number of the British Embassy or Consulate in virtually every country in the world was obtained. On the appointed day, the school sent a polite fax with a brief appended questionnaire relating to the weather conditions, rain, temperature, humidity, sunshine, etc. and requested a faxed reply. The project was an enormous success with an excellent response rate.

7.28 Such projects, whilst stimulating the pupils and enhancing the curriculum, are essentially one-off events and not ones which can be emulated easily by other schools because of the need to rely on the teachers' personal contacts here, for example in the Merchant Navy, and at Embassies and Consulates.

The Internet

7.29 Schools found that Internet access through slow modem connectivity was not fast enough and not sufficiently reliable for it to be of use directly in a lesson. Indeed, any prospective use was through downloading material at a convenient time. Additionally, there were often organisational problems related to whole-class access, which were usually overcome through a planned circus of activities, mounted in the course of project work.

7.30 Only one school reported any regular use of the Internet in this evaluation. An indication of the cross-curricular applications of the Internet are indicated in Table 1 below.

Table 1. Curriculum applications from the Internet

Curriculum area	**Activity**
Creative Arts	Viewing the Vatican Arts treasures, Viewing the Cézanne exhibition Searching the WWW for pop song lyrics
English	Searching the WWW for information on the *Titanic* Using the FT profile and The Times on-line for news for a class newspaper
Humanities	Downloading information from weather satellites
IT	Creating a school WWW page
Mathematics	Downloading TV viewing statistics for analysis
Modern Languages	Using MINITEL
Science	Downloading information on the genetic mutation of fruit flies

Video conferencing

7.31 For the schools, there has been no regular timetabled usage of video conferencing. The usage which has taken place has been on an ad-hoc basis. The applications indicated in paragraphs 8.32-8.34 provide a flavour of the curriculum usage which has occurred in this project.

7.32 Links have been established by two of the schools with schools abroad for work in Modern Foreign Languages. Using shared applications, one school set up a joint project with North Cumbria Technology College for the design and construction of a robotic arm. Through video links to other schools, a school produced a class newspaper using live news reports. Pupils at a further school contacted the Student Services Enquiry Desk at Furness College and downloaded course information and application forms.

7.33 At Furness College, video conferencing has been undertaken in the areas of application sharing, for example the completion of College application forms, tutor-tutor conferencing, careers interviews, and counselling and student course reviews, and, outside the project, video conferencing has been applied in the Motor Vehicle Engineering course with collaboration with Gulmers Gymnasiet, Nils Erikson Gymnasiet and Trolhatten-Udevalla University, Sweden (see also Report B2.4 on the Burnley LIFE Project).

7.34 Generally, the schools have experienced the usual challenges with video conferencing, in that any video-conferencing session requires forward planning, room booking, making arrangements with another school or institution, and timetable matches. The schools have found that it has been difficult to consolidate any experience which has been acquired and any further use of video conferencing is likely to be on a similar ad-hoc basis.

Location and access to equipment

7.35 The location of the project equipment varied from the school library to the IT classrooms. This immediately raises problems concerning accessibility. It is far easier to arrange for small groups of pupils to use equipment which is located in a library than for access to be obtained to a room which is already in

use. With location in the school library, direct supervision of use is not so easy, but one school instituted a booking system for staff and pupils, so that access was recorded and monitored, and another allowed supervised open access to pupils and staff for video conferencing and the Internet, with supervision undertaken by staff on a rota basis.

7.36 In all of the schools, access is available only to an individual or small group (that is two or three pupils) at any one time and, hence, teachers are faced with the problem of withdrawing pupils from lessons to work on the computers, or organising the activities as part of a 'circus', so that all the pupils eventually gain experience. Thus, problems related to teaching and learning include insufficient access points for a whole class (or even half a class) with both technologies. Video conferencing work requires a good deal of forward planning. For example, one school has found a French school with video-conferencing facilities and guards its name against all-comers. However, they have the usual difficulties of changing staff, different time zones, school holidays, staff availability and the problems of consolidating any gains made.

Curriculum benefits and the development of skills

7.37 Many pupils have benefited substantially from activities associated with this project. They have developed their IT skills in new ways and many of the staff, particularly at the schools which have been active in the use of the equipment, have had their awareness raised as to the benefits of IT in the curriculum. There have been many worthwhile and interesting activities which have arisen in all forms of ICT as a result of this project, and which have contributed to the enhancement of the curriculum and at the same time helped to indicate the potential benefits of working with the new technology. The schools have also realised the limitations of aspects of the technology which have been used and, whilst some have tried to develop ways to counteract these, others have felt that the organisational drawbacks have far outweighed any possible curriculum benefits.

Access to undesirable Internet pages

7.38 It is thought by the schools that unsuitable access is difficult because of the time to download information, the use of passwords and the attention of staff. Schools also feel that they can rely on the good sense of students which, together with the apparent security of Campus World, has not made undesirable access to WWW sites a concern.

Future plans

7.39 The schools have been undaunted by their experiences and all appear to have interesting plans for the future. The school which had gained considerable experience in the use of the Internet will continue to develop these activities and, if it had to choose between Internet and video conferencing, would maintain the Internet connection. Another school has plans to use the Internet in Design Technology for information and research, and the school's Music department wishes to use the Internet with all Key Stage 3 year groups, with the Science department interested in video conferencing.

7.40 One school hopes to develop its global contacts, and discussions (via e-mail) are under way with staff and pupils at a school in New Zealand. Additionally, the school reported that collaboration with Furness College was soon to take place to evaluate the 'Creative Labs' analogue video system which will enable low frame rate video to be transmitted via a modem and BT analogue telephone lines. However, to date, there has been no indication as to the outcome of this initiative.

7.41 In another school, all faculties are to provide aspects of the IT National Curriculum as a student entitlement and this will include use of the Internet. The IT Co-ordinator has worked with colleagues to identify responsibilities and to ensure that there is planned progression. Pupil self-assessment is being developed and students will photocopy examples of work as evidence for their IT portfolio.

Technical issues (hardware and connectivity problems)

7.42 In company with several other projects, this project has suffered considerably from technical unreliability, which has severely affected the development of ICT in the curriculum of the schools.

7.43 A major problem has been in the usage of the 14.4 Kbps modems linked to 486 PCs. The modems themselves are slow, when compared to current specifications, a problem which is compounded considerably when it is associated with a PC which has an equally slow serial-port connection. This has meant that the speed of data transfer was approaching only 9.6 Kbps, a speed which is pedestrian and unsuitable for any on-line classroom applications. Indeed, one school reported that they had never managed to download any files using their File Transfer Protocol (FTP) before the connection was lost, and another experienced no success with downloading files which were greater than 0.5 Mbytes.

7.44 Internet and e-mail provision was reported as being the source of some of the problems. One school related that it was six months after the project started before the Internet facility was working satisfactorily, and they had encountered similar difficulties with the e-mail. Indeed, on the date of the visit, e-mail was not operational. Another reported similar difficulties and, until Easter 1996, they did not have local dial-up facilities, but had to dial to Liverpool if they wished to use e-mail or the Internet. Both schools found the BT helpline polite and friendly, but singularly lacking in answers to their problems. It was reported that the configuration of Campus World appeared to change without notification, so that sites which were once accessible, suddenly became inaccessible, a difficulty which was awkward to explain to subject teachers. The special school much preferred the Apple Global Education system which students could operate themselves.

7.45 The difficulties were associated not just with the connectivity. Two schools had hardware failures, which were dealt with promptly by BT.

7.46 In brief, the problems encountered have contributed significantly to the disappointments which have been experienced in the schools. It is somewhat surprising that the positive outcomes have occurred in the ways in which they have. It is a tribute to the staff at the schools that they have overcome the problems and have achieved the successes they have.

Staff development

7.47 There has been no evidence of any rigorous staff development programme in operation in this project. The schools visited reported that they had not received any training on either of the technologies, but nevertheless the IT Co-ordinators (most use was by them) found using the equipment very easy. Technical support had been provided by telephone calls to Furness College and staff at the college had been most helpful.

7.48 Staff in all the pilot schools met after school once per term. However, the main theme of these meetings was concerned with financial rather than curriculum issues.

Progress and achievements

7.49 To a large extent, the aims of the project have been realised, but possibly not to the extent originally envisaged.

7.50 Technically, much has been learned, in terms of *what not to do*. It is hoped that the disappointments which have resulted from the technical difficulties have not been so deep as to prevent similar experimental work from occurring in the future.

7.51 For all the schools visited, the benefits to the pupils and staff have been clear. They demonstrate, to a greater or lesser extent, how technology can be usefully employed in enhancing the curriculum, as the many examples detailed in the reports from the schools show. The extent to which the technology has been integrated into the curriculum has been limited and, consequently, in terms of the aims of the project, there are few examples of the strategies for developing curriculum applications of the superhighways. What strategies have been developed have been affected by the hardware and connectivity problems, and, perhaps, by the effectiveness of the overall management and set-up for the project.

7.52 The progress which has occurred has depended on the enthusiasm and imagination of the teachers, and has been helped in some schools by the existing IT cross-curricular base. For any pilot project where the outcomes are to be used to inform subsequent developments, it is important that there is strong leadership and close monitoring of developments, with regular meetings of the staff involved, so that ideas can be pooled and initiatives discussed as well as explored. Time also needs to be made available for staff to develop their ideas of using the technology. As it is, the project is now complete and, armed with the experiences from this project, it is to be hoped that the new developments will be successful.

Project finance

7.53 The project was supported by finance from the LEA and BT, with some additional funding from TVEI 14-19. The video-conferencing equipment (Pentium PCs) has been supplied on loan to the schools by BT. In addition, BT supplies funding, amounting to about £500 per year, to each institution in the project to help defray telephone charges.

Commentary and recommendations

7.54 Any project concerned with the introduction of new technology into the classroom requires a whole series of different requirements to be in place before the project gets under way, including the accessibility and reliability of the technology; assured and continued technical and pedagogical support; strong support and encouragement from senior management. In this project, slow modem speeds, coupled with slow serial-port access, have led to a disappointing performance from the hardware so that any form of real-time access has had to be abandoned. It must be recorded, however, that one school would download material to be used in an off-line mode. When connectivity was established, the schools generally were dissatisfied with the Internet provider, BT Campus World. There were several instances when e-mail connectivity was not available and alterations seemed to result in World Wide Web sites being no longer accessible. Although the help facility provided was readily responsive to the schools' queries, it was not seen as effective in remedying the problems which had occurred.

7.55 Video conferencing did not suffer from the same problems and, indeed, any technical problems were dealt with efficiently by BT, but from the schools visited there was only limited use made of this facility. The setting up of video

conferencing with other schools is fraught with organisational difficulties, and it is only a determined and enthusiastic teacher who is convinced of the curriculum benefits who will eventually conquer these obstacles. Timetables have to be largely compatible, rooms have to be changed, and only a few pupils may be involved. Whilst there are many very useful and clear benefits for the learning process in terms of motivation and development of IT skills, and in some cases for the enhancement of the curriculum, the overall use on a regular basis is limited. From the point of view of this project, there were only a limited number of exemplars produced.

7.56 The schools visited did not seem to have adopted a whole-school approach to the use of the new technologies, and this was reflected in the lack of formal staff training either for the IT Co-ordinators or other staff. Schools had not made provision for their IT Co-ordinators to be given special time to develop use of the technology and, hence, there is a recommendation that such match-funding should be built into all future projects.

7.57 Additionally, IT Co-ordinators and schools would benefit from an increased level of senior management support so that the whole process of integration into the curriculum can be more adequately investigated and appropriately implemented.

7.58 When such a project is under way, it is important that developments and initiatives are monitored carefully and, whilst the setting of short-term goals may not be appropriate in this case, there should be adequate mechanisms for the dissemination of ideas. This is usually achieved through regular meetings of the staff involved and/or through the publication of a newsletter which is sent to the schools involved in the project. The purpose of the meetings should be clear, that is based on the objectives of the project which were, in this case, to investigate and examine the strategies involved for successfully implementing the technology into the curriculum.

7.59 The project is now complete and, despite the difficulties encountered, much has been learned. Experience has been gained which will be invaluable in developing the new project to bring about successful outcomes. Sometimes, it is only through the experiences of a pilot project that worthwhile developments can be achieved, and the difficulties inherent in applying new technologies into the teaching and learning situation can be appreciated and overcome.