



Education Departments' Superhighways Initiative

Group B: Vocationally-Focused Projects

Final Report

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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.

The Projects

1. The nine Group B projects were mainly vocationally-focused projects for secondary school pupils, further education (FE) students and adult learners.

Project B2.1: Virtual Workplace Project (formerly named Broadband Support for GNVQ IT Courses)

Description of the project

2. This project is located in the Greater Manchester area and arose after the original project (at the suggestion of the DfEE) was subsumed under the GEMISIS 2000 project umbrella during the summer of 1996. The GEMISIS 2000 project (Government, Education, Medical, Industrial, Social Information Superhighway) is a partnership between the University of Salford, NYNEX CableComms and the City of Salford which seeks to explore the economic, sociological and technological potential of the information superhighway.
3. The Virtual Workplace project is concerned with the support and delivery of the Advanced GNVQ information technology (IT) course by the use of broadband communications technology as a mechanism by which students will have access to relevant interactive multimedia resources, narrowcast programming and video conferencing. The choice of curriculum area is based on the fact that IT is both a key skill and a transferable skill and thus the potential market for the material extends beyond that of Advanced GNVQ.
4. The project is currently located at four institutions: Salford University where the CD-ROM server is located, Bolton College, Manchester College of Arts and Technology, and Salford College. The latter three colleges are responsible for the GNVQ courses and supervision.

Aims and outcomes

5. The overall aim of the project is to support the delivery of GNVQ information technology through the use of broadband communications and, in so doing, to bring the Virtual Workplace into the classroom.
6. The initial objectives are:
 - to identify the elements within the Advanced GNVQ IT curriculum which can be delivered and certificated using the broadband network
 - to identify suitable case-study material which can be used in the teaching of IT
 - to present the case-study material in a multimedia format for use on the broadband network
 - to commence the training of teachers in the use of the materials

- to develop methods of assessment and accreditation for the certification of the students'/trainees' capabilities.
7. Because of the late start and the need to bring this project into the GEMISIS stable, the progress achieved has been relatively modest. Project materials have been produced by Royal Mail in CD-ROM format and evaluation trials planned in three FE colleges during the spring term of 1997.

Sponsors/partners

8. This is a GEMISIS 2000 project, and specific to the production, trialling and delivery of the project materials the sponsors/partners are: CBI/UBI, Manchester Training and Enterprise Council, NYNEX CableComms, IBM, Royal Mail, British Gas, Bolton College, Manchester College of Arts and Technology, Salford College, Salford City Council and NCVQ.

Costs and cost benefits

9. The overall funding for the GEMISIS 2000 project has been provided by the European Regional Development Fund. The estimated budget for the first phase of this project is as follows:

Material development costs	£20,000	Administration/Project support	£10,000
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10. Since the project is at an early stage of development, there are as yet no tangible benefits which can be observed. However, it is important to note that this project does rely for its successful outcome on the co-operation between its industrial sponsors and partners at all stages of the development and delivery of learning materials, and thus provides an interesting example of how industry, commerce and education can combine for the mutual benefit of each partner.

Project B2.2: Students Across Europe Project

Description of the project

11. This project is based at Monkseaton Community High School, Whitley Bay, and concerns the development of modern language skills, with pupils communicating with their French, German and Spanish counterparts through the use of intermediate (ISDN2) and narrowband technology. The school is a mixed comprehensive 13-19 high school, with 850 pupils. It has established video-conferencing links with two secondary schools abroad: the Lyc_e Europ_en Montebello in Lille, France, and the Eppendorf Gesamtschule in Hamburg, Germany. It is intended that similar links will be made with a third secondary school in Spain, the I.B. Adormideras in La Coru–a, during 1997.

12. The equipment used at each end of the two operational video-conferencing links is identical, namely 486 PCs running under the Windows 3.1 environment and using PictureTel hardware and software over ISDN2 lines.

Aims and outcomes

13. The aim of the project is to implement new forms of language teaching and learning based on peer-group tutoring with pupils abroad through a range of affordable broadband and narrowband technologies and, as a consequence, to improve the language skills of pupils through an integrated course of voice-based interactive technologies (telephone and video conferencing) coupled with the use of multimedia (CD-ROM and television), all of which are linked to traditional teaching.
14. To a large extent, these aims have been achieved and the specific task of integrating video conferencing into the sixth-form modern languages curriculum has been an unqualified success. Peer-group tutoring in modern languages and small-group conversation with partners abroad, essentially the major themes of the project, have been established on a weekly, timetabled basis for all pupils studying French at A Level. Success in establishing a similar activity with the German school has initially been limited, principally because of timetable difficulties between the schools. It is anticipated that these constraints will be overcome with the installation of a second video-conferencing machine at Monkseaton, giving greater flexibility in access.
15. The French and German schools report similar success and it is planned that, in the future, a greater emphasis will be placed on strengthening links to other aspects of the curriculum, where English language is the vehicle of communication, which will enable further information interchanges to take place.
16. Major findings of the evaluation indicate the effectiveness of peer-group tutoring using video conferencing for the development of language skills.

Sponsors

17. The sponsors for this project are International Computers Limited (ICL), Research Machines (RM), United Artists and PictureTel.

Costs and cost benefits

18. The school has received financial support from various sponsors which has been used to set up the project in the UK and abroad. The annual running costs for the video conferencing are estimated at £6,000. The bulk of this amount is taken by telephone charges and the quarterly ISDN tariff. It is important to note that the video conferencing is always initiated at Monkseaton, and not at the schools abroad, so those schools do not pay telephone charges.
19. The benefits accrued have been considerable and include:

- improved results at A Level
- improved motivation of pupils
- improved conversational skills in languages
- development of French and German cultural understanding
- enhanced reputation and profile of Monkseaton school which has led to increased sponsorship and involvement in other projects.

Project B2.3: GEMISIS 2000 Schools Project

Description of the project

20. The GEMISIS 2000 Schools project is designed to explore and demonstrate ways in which broadband connectivity between schools and the University of Salford can be used to enhance the curriculum, particularly through the use of a central CD-ROM library which is held on a server at the University and also through video conferencing, the Internet and e-mail.
21. The project involves two secondary schools in Salford, namely Little Hulton Community School and Swinton High School. However, it is anticipated that the project will be extended to include Eccles Sixth Form College and two primary schools, and ultimately provide broadband connectivity to all schools in Salford.
22. Connectivity is achieved through fibre-optic cable which has been supplied as part of the cabling infrastructure by NYNEX CableComms in the Greater Manchester area, with Pipex as the Internet service provider.
23. The equipment used by the schools for the project comprises (at each school) three multimedia 486 ICL/Fujitsu PCs, all of which have Internet connectivity, with one PC also equipped with a Nokia video-conferencing board, with camera and microphone built into the monitor.
24. The main focus of activity concerns access to a remote CD-ROM server at Salford University, and the use of the Internet. Although video conferencing has been attempted between the two project schools, restrictions on access beyond the NYNEX cabling have limited wider usage of this facility.

Aims and outcomes

25. The project has four specific research objectives:
 - to demonstrate tangible benefits of the cable network and associated equipment to the schools sector
 - to investigate the suitability of video-conference systems to meet the

stated need of providing the target schools with access to a diversity of foreign-language speakers

- to investigate the type of information source, off-line or on-line, which may be the most effective basis for an educational virtual library
- to provide a demonstration project for GEMISIS 2000.

26. In terms of the specifications detailed in the GEMISIS 2000 Schools project implementation plan, the project is considerably behind the envisaged schedule. Video conferencing is possible only between the two schools and delays have also affected the e-mail facility. However, the Internet service has been available to the schools for almost the entire duration of the project.

27. In spite of the delays which have occurred, many pupils have developed considerable skills in IT, for example Year 11 pupils at Little Hulton acquired considerable skills through creating a World Wide Web (WWW) page for their school. The virtual library open integrated learning systems (OILS) materials are used in different curriculum areas and, particularly, with pupils with special needs. Use is also made of the Internet at both schools.

28. Staff development has been undertaken as follows:

- OILS courses organised by Systems Integrated Research (SIR) in mathematics, English and modern foreign languages attended by selected staff from both schools
- Internet courses at Salford University attended by selected staff from both schools
- internal faculty-based courses arranged for staff at Swinton High School. The strong measure of staff development has led to a raising of awareness of the curriculum applications of the technology.

29. Major findings indicate:

- increased motivation, development of technical skills and enthusiasm of pupils
- that broadband connectivity provides fast Internet access and permits on-line class usage
- the importance of effective management at school and at project organisational level
- the need for acceptance of responsibilities by project partners and sponsors
- that staff development should emphasise pedagogical applications as well

as technical skills

- a need for both technical and pedagogical support
- that limited access can preclude exploitation within a school, but does not necessarily militate against successful usage.

Sponsors

30. The sponsors for this GEMISIS 2000 project are: NYNEX CableComms, ICL and SIR.

Costs and cost benefits

31. For this project, the network infrastructure has been provided by NYNEX CableComms. ICL has provided the applications hardware and software, including the file server and OILS software at Salford University. The video-conferencing equipment and associated applications software have been provided by Nokia. The schools have not been charged for the use of any hardware, software or support during the project, and the project, with all the equipment and access to the Internet, etc., has involved no capital or running costs.
32. The benefits to the two schools have yet to be fully seen, but already there are indications of improved motivation amongst pupils who use the technology, as well as a development of their technical skills. The use of the OILS materials with pupils with special needs at one school has been particularly effective. Initial technical difficulties precluded many initiatives being undertaken, but it is anticipated, now these have been resolved, that the technology will bring additional curriculum benefits to the pupils of both schools.

Project B2.4: Burnley LIFE Programme (Learning via Interactive and Flexible Education)

Description of the project

33. The Burnley LIFE programme is intended to unite further education and local secondary schools via a centrally-managed ISDN network, and thus to exploit the educational potential of the latest video-conferencing technology and the Internet, and to support telematics for student development, training and curriculum enhancement.
34. The chief focus of activity concerns video conferencing through links established between eight local 11-16 secondary comprehensive schools and Burnley College.
35. Connectivity is via ISDN2 lines for video conferencing and Internet usage. The hardware installed at each school comprises an Olivetti 486 Personal Communications Computer (PCC) equipped with a BT VC8000 board.

Aims and outcomes

36. The main objectives of this initiative were:
- to introduce educational staff and students in the local area to the principles and operative applicability of the new communications technologies
 - to strengthen links with local schools and so attract students to the college
 - to make the college a centre of excellence for IT in the area, which would in turn prove attractive to local businesses and help to foster the continued development of IT within both the college and the local community.
37. In terms of this evaluation, the objectives indicated above have been achieved, more so in some areas than others, but it is likely that the strong links established with the schools (with the excellent Internet and intranet facilities provided free of charge by the college) will lead to increased usage and to consequent improvement in both IT skills and expertise amongst school staff, thus enabling these facilities to be integrated into the curriculum of the schools.
38. Perhaps the two most impressive achievements have been in the growth of the Telematics Certificate, which was pioneered by the college as a direct result of this project, and in the effects on the recruitment to the college from the schools. Both of these are quantifiable and provide a clear indication of success.
39. The project has enabled considerable development in the IT skills of the pupils and members of staff in the schools. However, achievements in other areas of the curriculum (that is non-IT-related) have been less pronounced since there has been only occasional usage of video conferencing other than by pupils wishing to achieve their Telematics Certificate.
40. Staff development, in particular for the use of the Internet, has been provided by Burnley College, and the college also provides technician assistance for the customisation and setting up of the equipment on the school sites. Additionally, schools are provided with an illustrated booklet, Video Conferencing: A User Guide, which explains in detail how to use the equipment and software. There has been no direct staff development undertaken at the schools as a way of developing expertise or raising awareness in the use of video conferencing across the curriculum. What staff development has occurred has been as a result of individual staff interest and through the use of personnel at Burnley College being involved in a 'schools' IT day'.
41. Evaluation outcomes of particular note include:
- the success of the Telematics Certificate for developing pupil skills, and in providing a recognised qualification for students at both the schools and the college
 - the effectiveness of the use of video conferencing to support pupils with

severe hearing problems

- the organisational/logistical difficulties inherent in video conferencing
- the limitations of poor sound quality of the standard video-conferencing equipment
- accessibility and location issues which determine the curriculum usage
- the necessity for strong senior-management involvement to support new technology initiatives
- the necessity for continual pedagogical support for projects involving new technology.

Sponsors

42. The chief sponsor for this project is Burnley College, with additional funding supplied from the Single Regeneration Budget (SRB).

Costs and cost benefits

43. The project has received funding from the SRB programme over a three-year period. Other funding is provided by Burnley College. The funding provides the equipment for video conferencing in the schools (Olivetti PCCs and camera), the ISDN2 installation charges (but not the line-rental costs, which are met by the individual schools), and the setting-up and administration costs. The ISDN line-rental costs currently depend upon which scheme is adopted by the schools, but it is estimated on the basis of this evaluation that the overall costs (line rental and telephone-connection charge) should be about £500 per year for each school.
44. The benefits which have arisen from the video conferencing have been confined to the development of the pupils' IT skills and these, motivated by the acquisition of the Telematics Certificate, are particularly commendable. In terms of cross-curricular use, the benefits have been less apparent.
45. Other less obvious benefits have occurred in several ways. School staff have seen their own IT skills improve and this has been particularly so where INSET courses have been arranged. The project has received recognition at local and national level, and this has succeeded in raising the profile of Burnley College amongst the community, and recruitment from the schools involved in the project has increased by over 50% since the project started. The Telematics Certificate, which was developed as a method of monitoring usage and competency of the video-conferencing facilities, has received considerable recognition, so much so that a further 30 institutions will soon be franchised to operate it, using the materials developed.

Project B2.5: London Colleges Multimedia Initiative

Description of the project

46. The London Colleges Multimedia Initiative is a large and complex project with many partners based on a confederation of the Greater London Training and Enterprise Councils (TECs) and 22 colleges funded by the Further Education Funding Council (FEFC). The overall project is grouped into four regionally-organised consortia (Central, North, South and West London), formed on the area of influence of one of the sponsoring TECs. The consortia form a loose federation and each individual project within each consortium is autonomous.
47. The initiative began in August 1995, although planning for funding bids had taken place earlier in the year. Subject to continuing funding, which depends upon the attainment of targets, the project will continue for three years. The evaluation covers the initiative during the year February 1996 to February 1997.
48. Each of the 22 college projects is funded from the Government's competitiveness fund, a three-year initiative to encourage and assist FEFC-funded colleges to work together to contribute to improving the region's competitive advantage. Key areas identified as having priority were multimedia, telematics and the information superhighway; the devising, experimenting and exploiting of new ways of teaching and learning; and delivering learning materials telematically.
49. All the colleges have their own internal college networks, with sometimes several networks existing on the same site or across separate sites, and most colleges had connected their academic networks to the superhighway in order to give staff and students access to the Internet and to e-mail facilities.
50. A variety of models of connectivity to the superhighway were in place:
 - a private wide area network (WAN)
 - connection through the University of London Computing Centre (ULCC)
 - connection through to a local university via a BT Megastream connection (2Mbps)
 - connection via microwave link
 - connection through a local cable supplier
 - connection via an ISDN line.
51. The focus of activity has been to increase the competitiveness of business within the region, to improve access to high-quality vocational training, to harness new technologies to improve the flexibility of training provision, and to respond better to the needs of employers and individuals for continuous skills development and lifelong learning. This has involved the production of teaching and learning

materials based upon the new technologies, and the provision of access and flexibility in response to the needs of the local communities, particularly local industry and commerce.

Aims and outcomes

52. The intended outcomes of the initiative are that learners will be able to undertake their studies in more flexible and accessible ways, and utilise to the full their skills of handling and communicating information acquired through their studies. In line with the Government's objective, the initiative will contribute to the goal of ensuring learners are adequately prepared for initiation into or return to working life able to understand and use new technologies.
53. Learners will also have improved access to support, through the flexibility of broadband connectivity, to enable them to have direct and immediate interactive communication to their tutors and other teaching services, together with the facility for on-line assessment and management of learner responses.
54. The specific outcomes sought include:
 - the establishment of an information superhighway as a catalyst for lifelong learning and skills development for the individual, in order to enhance the economic performance of businesses in London
 - the development of broader use of technology for information interchange, and promotion of the use and benefits of the Internet to colleges, schools, businesses and other agencies such as careers service partnerships, employment services and TECs
 - support for the National Education and Training Targets through the development of work-based learning systems allowing development through the NVQ Level 3 qualification in priority skills areas
 - support for the development of new learning methods, both for colleges and for employers, by using technology to provide open access to vocational skills training
 - the promotion of vocational training and qualifications across organisations within the region, encouraging increased investment in future skills development
 - the maintenance of current levels of vocational education and training in construction and engineering-based industries
 - economic growth through vocational skills development in identified priority areas in both large organisations and small and medium-sized enterprises (SMEs)
 - highly cost-effective vocational-training provision within the workplace

and within the colleges

- increased access to flexible vocational-training provision in the workplace, for home-based students and in areas of special need.

55. Such a wide range of outcomes will ensure that vocational education and training will contribute significantly to improving competitive advantage in London by their ability to:

- widen access to provision, including particular specialisms within any college
- enrich curriculum content by improved access to resources
- foster more versatile approaches to the development of core skills in both academic and vocational courses
- promote collaborative ventures with the local community, including employers and schools, and between UK colleges and their counterparts in other countries
- gain access to sources of information on vocational needs to improve the responsiveness of colleges to changing vocational requirements, both in the UK and in Europe
- provide information, advice and guidance to prospective students, especially adults wishing to re-enter education.

56. To a large extent, the main themes of the objectives have been realised in the form of:

- the development of courses targeted at local commerce and industry, specifically addressing training needs in the new technologies
- improved access to courses and learning materials through open learning and the use of the Internet
- using technology for the development of courses for people with severe disabilities and for unemployed people
- production of multimedia learning materials
- in-house development of CD-ROM based learning materials
- staff development linked to the use of technology.

57. All the colleges which were visited organised programmes of staff development which were available to all staff employed by the college. These courses were of three types.

- Introductory awareness training for staff. These courses were generally short, and provided sufficient knowledge and skills to enable self-learning to proceed.
- Specialist training for staff. Staff taking these courses were encouraged to participate in a variety of ways. Sometimes remission time was given, sometimes overtime was paid. In one college, staff were loaned a high-specification multimedia PC to use at home.
- Organisation of conferences for staff from schools and colleges within or outside the project.

Sponsors

58. Funding for this project has been obtained from the FEFC, the European Social Fund, the SRB and the respective colleges.

Costs and cost benefits

59. The 22 colleges were grouped into four regional consortia in which they could collaborate on the devising of projects to fulfil the broad aims of the London Colleges Multimedia Initiative. Collaboration is the mechanism which enables the colleges to bid for finance through the Government's competitiveness funding programme. Guidance from the Government Office for London indicated that the bids must be collaborative, that funding must be spent in a collaborative way and not shared out between colleges, that employer involvement was essential and that matched funding was the basis for the allocation of any finance. Bids are made annually to and allocated by the London Regional Group which comprises representatives from business, the FEFC, the Government Office for London and the DfEE. Thus, the funding of the specific individual initiatives in this project were often part of an overall scheme within a consortium.
60. As detailed above, the benefits which accrued to the colleges and the local communities were significant, but the multiplicity of projects and the extent of cross-fertilisation means that it is difficult to attribute benefits to specific project costs.

Project B2.6: Carlisle Schools Video-Conferencing Project

Description of the project

61. This project is one of the two Cumbria Broadband Pilot projects. It started in September 1995 and involved three 11-18 schools in Carlisle: Newman School, North Cumbria Technology College (NCTC) and William Howard School. Initially, the project was designed to provide curriculum enhancement to A-Level communication studies and the GNVQ manufacturing course, using video conferencing over ISDN links.

62. Each school is equipped with identical hardware, namely Olivetti 486 PCCs, with BT VC8000 boards. In addition, NCTC also 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. Connectivity is by ISDN2 lines.

Aims and outcomes

63. The overall aims and objectives 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.
64. The teaching and learning outcomes include the use of video conferencing for:
- the support of language projects between NCTC and a school in Milwaukee, USA
 - support and advice for control technology projects at NCTC from a technology equipment supplier
 - inter-school liaison on a geography project and a design and technology project.
65. Links with local industry using video conferencing for support of GNVQ courses have not been successful.
66. Major findings would indicate the curriculum value of using video conferencing, but also stress the inherent logistical and technical difficulties, including timetable matching, small-group usage, sound quality and incompatibility of different equipment.

Sponsors

67. For this project, sponsorship funding was obtained from BT, Cumbria Local Education Authority (LEA) IT Services and the Greater Carlisle Post-16 Co-operative.

Costs and cost benefits

68. The overall costs of the project were provided by sponsorship.
69. The benefits have been largely the development of skills by pupils and staff at the schools, enhancement of the curriculum in terms of the applications of the technology, and an understanding and appreciation of the use of video conferencing in schools.

Project B2.7: Furness Highway Project

Description of the project

70. The Furness Highway Project is in two strands and commenced in January 1995, linking two colleges, two special schools and all six secondary schools in the Furness region of Cumbria, using modems for e-mail and Internet access. 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.
71. Video conferencing is available in only three of the secondary schools, using Pentium PCs equipped with VC8000 boards and Olivetti software. Connectivity for the Internet and e-mail is achieved through 14.4 Kbps modem units attached to a variety of hardware configurations, usually 486 PCs but also including an Apple Macintosh computer at one of the special schools. All schools are connected to BT CampusWorld for their e-mail and Internet facilities.
72. The major focus of activities has been related to the use of e-mail, fax, the Internet and video conferencing within the secondary-school curriculum.

Aims and outcomes

73. 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.
74. Project outcomes indicate:
 - the breadth of useful Internet applications for the school curriculum
 - the value of superhighway technology for use with pupils with special needs
 - the importance of a 'whole-school' approach when developing IT-related initiatives
 - the unsuitability of slow-speed access to the Internet
 - the logistical difficulties, including room bookings, timetable changes, timetable matching and selection of other schools, in the use of video conferencing.

75. Of particular importance has been the use of e-mail with pupils with special needs who, through the use of this facility, have developed links with many other schools around the world. E-mail is a particularly effective form of communication for pupils with learning difficulties, in that it is not an immediate technology. Pupils with disabilities can take their time in composing a letter and, with a word processor, their mistakes are easily rectified before they need to send their communication.

Sponsors

76. This project was sponsored by the LEA, BT and the Technical and Vocational Education Initiative (TVEI) 14-19 project.

Costs and cost benefits

77. 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 supplied funding to each institution in the project to help defray telephone charges.
78. The major benefits have been in curriculum applications, and the increased understanding and awareness of the use and limitations of the technology. On an individual basis, many pupils and staff developed their IT skills, and there were several examples of interesting and worthwhile projects which had been initiated through the use of a range of IT applications.

Project B2.8: Hertfordshire 'Students as Writers' Project

Description of the project

79. The four schools in Hertfordshire involved in this project are two primaries, Chaulden School and Northgate Junior Mixed and Infants School, and two secondary comprehensives, John F. Kennedy High School and St Albans Girls School.
80. Each school has been provided with ISDN2 lines and an Internet connection to CampusWorld. The primary schools each have one 486 PC with Internet connection, but the secondary schools use their existing networked PC computers linked via routers to the ISDN lines. The Internet service provider is BT Internet.
81. The focus of the project is on the use of the Internet within the curriculum of the schools, with particular emphasis on the production of learning materials for dissemination on the WWW through BT CampusWorld.

Aims and outcomes

82. Although the aims of the project vary slightly from school to school, the four schools are expected to:
- publish children's work on the Web

- develop curriculum materials which will be available to all schools.

Additionally, as the schools are members of the user-support group, they will also: investigate the WWW, discover interesting sites and send information to the Hertfordshire Education Services Curriculum Adviser, who will create a catalogue of Internet resources from the schools' findings develop helpful strategies to prevent children from having access to unsuitable material on Web sites.

83. This is a recent project which in effect only began in September 1996 and suffered from initial technical problems. Consequently, many planned initiatives have been delayed.
84. Current outcomes include applications in the use of the Internet within the curriculum, including A-Level science, modern languages and music, the development of teaching materials for primary schools using Internet resources, and the applicability and useability of the Internet with primary pupils.
85. An interesting feature of the evaluation has been the use of parents to act as IT assistants in one of the primary schools to overcome the problems of supervision and access.
86. Staff development has occurred through courses organised by Hertfordshire Education Services on an ad-hoc basis as and when new software is installed at a school; for example, HTML-support training was given to all schools during February 1997. Some schools have also been involved in developing their own programme of staff development targeted on specific curriculum areas.

Sponsor

87. The sponsor for this project is BT.

Costs and cost benefits

88. The ISDN line installation and running costs for the project have been met by BT.
89. It is estimated, on information supplied by two of the schools, that the running costs (that is telephone-connection charges and ISDN line rental) for the project per quarter amount to between £600 and £1,000 per school.
90. The major benefits which have occurred have been in the development of IT-related skills by the staff and pupils at the schools, in the pupil motivation and in the curriculum enhancement which has resulted from the project. It is too early in the project's time-scale to indicate accurately the results of any curriculum benefits to the schools (and nationally) through the development of teaching materials for CampusWorld.

Project B2.9: Link Centre at Queens' School, Bushey, Hertfordshire

Description of the project

91. The focus of this evaluation is the operation, organisation and effectiveness of the Link Centre at Queens' School, Bushey.
92. Queens' School is an 11-18 grant-maintained (GM) mixed comprehensive school of approximately 1,300 pupils and 96 staff (some of whom are part-time), situated on the outskirts of Bushey on two sites separated by the B462 Aldenham Road.
93. The Link Centre is one of several such centres which are currently being developed in UK schools and is an example of a school-commerce partnership. It has been in full operation since September 1994. The purpose of the Link Centre is to provide a separately owned and managed multimedia IT resource for the school, with access to a comprehensive CD-ROM library. The hardware and software are available to the school during school hours, but outside these times (after school, and during weekends and holidays) the centre is available for use by Link Training to provide IT-related courses for the local community.
94. The computing facilities, including hardware and software, furniture and fittings, were provided free of charge by Link Training.
95. The hardware held at the Link Centre comprises 17 Pentium multimedia IBM PCs (one PC is used as a server for the Novell network). All are equipped with personal earphones and connected to a local area network (LAN), with full Internet connectivity via ISDN lines using the Planet Online Internet service. Technical back-up is arranged independently from that used by the school.
96. The chief focus of activity is in the integration of the Link Centre facilities into the curriculum, particularly the use of CD-ROM software across the curriculum.

Aims and outcomes

97. In creating the Link Centre at Queens' School, Link Training specified the following eleven objectives which the centre was expected to achieve:
 - to develop a commercially sustainable formula for the provision, support and management of new technology in secondary schools
 - to provide regular, booked access to the centre for staff and pupils at the school
 - to identify and develop multimedia interactive applications across all the subject areas of the National Curriculum
 - to induct all school teaching staff into the use of the centre and the technology employed

- to sift the available multimedia content and support teaching staff in identifying suitable multimedia resources in their own subject area
 - to assist in overcoming the technology barriers and creating the climate to enable teaching staff to incorporate multimedia resources into their lesson plans
 - to support teaching staff in the delivery of full classroom lessons using multimedia resources and new technology
 - to support the effective delivery of the National Curriculum, GCSEs, GNVQs and NVQs using multimedia resources and new technologies in the school environment
 - to deliver cost-effective, high-quality IT skills training to the local community and businesses
 - to understand and manage pragmatically all the key interest groups associated with the school, including teachers, governors, pupils, parents and, where appropriate, the LEA and the TEC
 - to develop the procedures and support infrastructure to ensure a fully-managed, seamless technology package for the school customer.
98. The evaluation has established that the overwhelming majority of these aims have been met, and the use of the centre has been integrated into the activities of the school, with the facilities used by most of the curriculum areas. Effective liaison between the Centre Manager and the school has ensured that the IT resources complement the existing school resources, and provide a supported environment for the development of IT by staff and pupils at the school.
99. As an operational model, this has clearly benefited the school and the local community. However, its viability as a commercial enterprise is less clear, since the accrued income from out-of-hours courses must be used to defray the set-up and running costs of the facility. Consequently, it is important that the initial market research, in terms of school location and suitability, is carefully assessed.

Sponsor

100. The sponsor for this project is Link Training.

Costs and cost benefits

101. Schools involved with such projects are expected to provide a Link Centre room with nearby toilet facilities; parking; access when the main school is closed; heating; lighting; caretaking and 'reasonable' security. Link Training provides the decoration, furniture, fittings, hardware, software, networking and centre staff, which comprises (in this case) a Centre Manager and part-time assistant(s). The school has made no capital contribution to the set-up costs. In future, any school

wishing to enter into a partnership with Link Training will be expected to share a common vision by contributing possibly £15,000-£20,000 a year to support the Link Centre. Additionally, the school would have to pay around £6 per hour per class for Internet access. Link Training has indicated that it will need contracts which will deliver in the region of £50,000-£55,000 per year from each centre, including the school contribution, for that centre to be a suitably profitable venture. Other funding could be generated, for example by a local TEC buying into services provided by Link Training.

102. For Queens' School, the benefits have been marked, particularly in terms of the increased usage of IT within the school. During the 1996 spring term, the Link Centre room was booked for about 83% of maximum, with some weeks up to 96%. The crucial factors which have determined the success of the project in terms of the curriculum applications are:

- the effectiveness of the liaison between the Centre Manager and the school staff
- the guaranteed availability of support during the use of the Link Centre
- the availability of a large software base to ensure wide coverage of the curriculum
- appropriate hardware to enable a variety of IT applications to be used.

103. In a wider context, the facilities have helped to raise the profile of the school, as well as developing the IT skills of the local community, business and commerce.

Cross-Project Observations and Recommendations

104. The Group B projects involved a wide variety of applications of technology, in a large number of schools and colleges. This breadth ensured a diversity of valuable experience within this group. Many of the projects evaluated were pilot projects and thus, by their very nature, were experimental, being designed as forerunners to future activities. The learning that took place at all levels was clearly in evidence.

105. All the projects were as a minimum soundly conceived. Some were very imaginative. Any problems which arose were at the level of implementation and management. Institutions were particularly interested in using the new technologies to enhance the learning experiences of their students, and some senior managements of institutions hoped, eventually, to achieve economies in the delivery of courses and training.

Teaching and learning

106. The projects have had a strong impact on the teaching and learning, resulting from

thoughtful and carefully-planned applications of the technology, and a wealth of classroom and workshop activities have been observed during the course of the evaluation. The following examples are indicative of the range of activities taking place:

- Monkseaton School has shown how video conferencing can be systematically integrated into the curriculum and effectively used to develop language skills.
- Kingsway College has used the Internet as a means of providing courses and assistance for students with severe disabilities.
- Burnley College has introduced a Telematics Certificate to monitor and encourage the use of broadband technology, and has experienced a significant increase in course applications, as well as being able to franchise its courses to other FE institutions.
- The extensive use of CD-ROMs has been a feature of the work of the London FE colleges, as well as at the Link Centre at Queens' School.
- In the GEMISIS 2000 Schools project, CD-ROMs are held on a central server at Salford University and distributed over the broadband cable. This has been a successful operation and both schools involved have been quick to use OILS materials with their pupils as a result.
- Many schools and colleges have designed their own WWW pages and this has become an accepted activity linking different curriculum areas. In some cases, school pupils themselves have been involved in all stages of the development, acquiring a wide range of technical skills in the process.

107. When using video conferencing, schools and colleges must first resolve organisational difficulties as it involves careful planning to synchronise timetables and curricular topics between institutions. These difficulties can be successfully overcome but do need careful consideration. Access to a video-conferencing directory would be useful.

108. Video conferencing with the equipment used in the projects is essentially an activity for individuals or small groups of pupils, and difficulties can be encountered when larger class groups are involved. The teaching and learning styles are effectively determined by the technology available, and this has resulted in small-group usage, where pupils are withdrawn from a class. Consequently, the activity has to be organised on a rota basis to ensure that all pupils are involved. This form of lesson organisation has not prevented interesting applications from occurring, for example design and build projects using video conferencing between North Cumbria Technology College and a technology equipment manufacturer; collaboration between two Cumbria schools on a technology project; and collaboration between schools for a geography activity in the Carlisle Schools Video-Conferencing project.

109. It is clear that video conferencing is an activity which has quite significant potential in many curriculum areas, as well as for assessment purposes, for example assessment of the NVQ tourism course at Burnley College. We have seen from the projects which are currently under way that it can help to develop many different skills amongst pupils. However, it is not an activity which can be undertaken without careful planning and co-operation.

Use of the superhighways for pupils with special needs

110. There have been several instances in the Group B projects where the requirements of pupils with special needs have been of particular importance. This included adults with severe disabilities being provided with a PC and working from home, accessing learning materials provided on the Internet by a college, and communicating with each other and their tutors via e-mail. In one special school, pupils used e-mail to communicate with many other schools all over the world. At Burnley College, video conferencing has been used by a deaf student to communicate with deaf students at other colleges. At both schools involved in the GEMISIS 2000 Schools project, OILS materials delivered from a central server housed at Salford University were beginning to be used for pupils with special needs. These four examples of usage give an indication of the benefits that the use of superhighways technology can bring to support the learning of pupils who have special educational needs. The term 'special educational needs' includes learners with a wide variety of requirements, and the very nature of communications technology can assist in meeting these individual needs by giving greater access to human and material resources.

Projects with community links

111. Several of the Group B projects have specifically targeted the local communities for the development of IT skills. This was the case for many of the FE colleges and for some of the schools. This aspect was a well-developed and successful element with a wide range of commendable initiatives. For example, the Link Centre offered courses in IT to the local community and industry through an IT centre established at a school.

Links with industry and commerce to develop and deliver courseware

112. FE institutions were at the forefront in developing courseware for local industrial and commercial organisations. This is an expensive undertaking for individual institutions, but in the London Colleges there has been extensive software development, primarily CD-ROM based, specifically targeted at industry and SMEs. This should not be undertaken without significant thought being given to the dissemination and maintenance of the software once the trialling and evaluation is complete. However, the colleges have also shown a commitment to the comprehensive staff-development programme required for such courseware production and usage. One example of the industrial partner providing the learning materials has been the Virtual Workplace project with the collaboration

of the Royal Mail. Such partnerships helped to strengthen the links between industry, commerce and training, and add direct vocational relevance.

Equipment location, access and availability

113. This is an issue which is more appropriate to the school-based projects than to those in FE, since FE institutions usually have networked access to CD-ROM libraries and also to the Internet. Schools generally had between one and three items of superhighways equipment. This forced particular organisational frameworks on the teaching as, to provide appropriate access, pupils would be withdrawn from class, and would work at the machines either individually or in groups of two or three. Alternatively, pupils would be allowed access during their free periods or lunch-times.

Connectivity issues

114. While some of the projects in Group B have been affected by connectivity problems, this was not a major issue for others. In a few cases, excellent connectivity has been achieved and novel forms of connectivity, for example microwave links, have been established.
115. The projects which used video-conferencing equipment could video conference fully only with others who had identical equipment, since there was no universal adherence to the video-conferencing standards. All equipment was compatible with the H320 standard and, consequently, speech and visual images were transmitted, but the difficulties arose with the other standards, such as T120, whereby, unless both sets of equipment adhered to this standard, other facilities such as text-talk, whiteboarding and shared applications were not available.

Project management, representation and responsibilities

116. Superhighways projects often place novel requirements on the senior management of schools and colleges in that they involve co-ordinating the work of many different organisations. In the most successful projects, the project management group had representation from all major contributors, including sponsors, higher-education representatives and the institutions involved. The responsibilities that came with this were fully accepted and this model of management allowed a clear structure for establishing aims, setting goals and monitoring progress. The responsibility did not end with providing resources and taking decisions, but was followed through with carefully thought-out implementation plans with clear allocation of tasks within established time-frames. Significantly, there was also close involvement by the school or college management in the project's development. The crucial requirement was that senior management was, and was seen to be, involved. At least a minimal appreciation of the technical and curriculum issues was also important, and provided a significant boost to the sense of confidence in an undertaking. It is also an important part of management that appropriate dissemination structures are available so that developments occur within an appropriate framework which will allow for their evaluation and

possible replication. Not all projects were able to attain these high ideals but all had, or developed, effective management structures.

Sponsorship and funding issues

117. All projects have relied upon sponsorship funding from many sources. This was sometimes quite substantial. Normally, funding was in terms of financial assistance for the purchase of equipment and software, or to help defray the costs of training and management or even the ISDN telephone charges. However, in three projects the sponsorship has not provided direct finance, but rather equipment, software and connectivity. All contributions, financial and in kind, have been gratefully received, as has the collaboration with commercial partners. The uncertainty over continued sponsorship has had an impact on some projects, precluding the development of longer-term strategies. Often, what were also required were funds to buy time for those implementing the project to have the opportunity to explore and develop different models of usage.

Staff development models

118. The overall emphasis on staff development has been variable. Generally, the FE colleges all set up programmes to develop the experience and expertise of their staff in IT. The picture from schools was less clear. Although in all projects there was some measure of staff development, the content of the courses was in several cases disappointing in that the emphasis was placed on a mastery of the technical aspects of the hardware, rather than on examining the curriculum applications. The most effective staff development programmes encompassed four elements: familiarity with the hardware, general use of the software, examination of the potential curricular uses of the new technology, and practical support during the use of these curriculum applications with pupils. The actual timing of the staff development was also important. Staff development is crucial to the success of projects and, when schemes are conceived, appropriate time should be budgeted for and allocated to this aspect of a project programme. The careful scheduling, provision and monitoring of suitable staff development with a curriculum focus must be regarded as a key management issue. Ongoing curricular support should also be available to maintain and develop progress.

Administration

119. All projects in Group B had a strong curriculum focus in their aims. While some instances of the use of electronic communications were noted in the administration of the projects, the use of the superhighway for general educational administration was not a feature of any of the projects evaluated. There is, however, clear potential for such usage in terms of asynchronous information exchange and access to shared resources as well as synchronous video conferencing and application sharing.

Cost benefits

120. Benefits which have occurred have been largely in terms of curriculum enhancement, including improvement of access for disabled students and the local community; improvement in attitudes and enthusiasm; development of technical skills; and improved performance levels. It is difficult to quantify in strictly financial terms such individual benefits, let alone the vast developments which have occurred in terms of IT skills amongst the staff, students and pupils who have been involved. All of the projects, to a greater or lesser degree, have shown measurable benefits, but whether or not these justify the costs incurred is essentially a matter of individual opinion. What is notable, though, is that some teaching staff are clearly so convinced of the benefits to learning that they are prepared to commit much additional energy and time to the development of the use of the technology.

Future developments

121. Two of the projects in Group B have now reached the final stage of development. Others have been extended or are in the process of developing into new projects, often depending extensively on the experiences gained during the course of the evaluation. Several projects are now beginning to develop with most interesting proposals for the future and it is important that this work continues to be closely monitored so that the results may be more widely disseminated.