


Education Departments' Superhighways Initiative

Group A: Curriculum Projects in England and Wales

Final Report

University of Leicester School of Education

Maurice Galton, Chris Comber, Linda Hargreaves, Tony Lawson, Ken Fogelman

University College of Wales, Aberystwyth - School of Education

Richard Thorpe, Dilwyn Roberts-Young

External Consultants

Tony Eldridge, Mike Rumble

The evaluation

1. This evaluation concerns seven curriculum-focused projects that were based mainly in the primary and secondary sectors in England and Wales. Two further projects in the group were located in Scotland, and were the subject of a separate report produced by the Scottish Council for Research in Education (SCRE). The projects were extremely diverse in scale, ranging from a single infants school with two machines to a group of around 30 secondary schools and sixth-form colleges exploring a range of technology. Projects also varied greatly in their organisational and technological structure, and their aims and objectives. What united the group was a classroom focus, with teachers and pupils exploring the potential of a range of ICT technologies to enhance teaching and learning.

7. THE POWYS ACCESS FOR SCHOOLS PROJECT (PACCS)

7.1 The evaluation was conducted jointly by staff from the Schools of Education at the University of Wales, Aberystwyth and Leicester University. Following an initial round of visits to the participating schools and meetings with representatives from the partner organisations, three site visits to each school were conducted. Additional visits were made to observe training sessions and particular events. Further meetings were also held with representatives of the Local Authority and with the information providers involved in the project.

Description of project

7.2 The PACCS project involved one secondary, one special and three primary schools across a wide area of Powys. Two of the schools, the secondary and its primary feeder, are in a medium-sized town in the north of the county, the special school is located in the north-east, and the two remaining schools in the east, close to the England/Wales border.

7.3 The project, which was initiated and co-ordinated by staff of the Local Authority IT Education Support service, aimed to take advantage of a county-wide broadband Wide-Area Network (WAN), the Rural Wales Network (RWN), to access the Internet and to provide communication between the schools. The project's focus was upon the potential uses by teachers and learners of on-line access to and creation of locally-relevant resources, including geographical, archival, archaeological and fine-art materials.

7.4 The project's aim of creating information providers and receivers allowed for the opportunity to develop resources relevant to the *Curriculum Cymreig*, that 'pupils should be given opportunities, where appropriate, to develop and apply their knowledge and understanding of the cultural, economic, environmental, historical and linguistic characteristics of Wales', which is a common requirement for all National Curriculum subjects in Wales.

Sponsors and other parties involved

7.5 The LEA paid for the installation of the networking infrastructure and on-line subscription costs. Funds were also earmarked for initial training, awareness raising and on-going support for the project. The project co-ordinator was the Powys Education Authority's IT Advisory Officer.

7.6 The local information providers were:

- the Powys Archives Service (PAS)
- the Clwyd-Powys Archaeological Trust (CPAT)
- the 'Artists in Wales' project under the guidance of the Powys Education Authority's Art and Technical Advisor.

Limited funding was made available to PAS for the initial creation of Website materials. No commercial partner funding or support was secured, although there was, in effect, some 'invisible' support through schools' use of the County Council WAN.

The schools

7.7 Powys County Council covers a sparsely-populated rural area. The Project initially involved three primary schools, two secondary schools and one residential special

school, with the intention of bringing in other schools at a later stage. Schools involved in the project were chosen on the understanding that they gave Information Technology a high profile.

7.8 The larger of the secondary schools, with over 500 pupils, which received pupils from two of the primary schools in the project, pulled out a very early stage in the trial. The remaining secondary school, with just 270 pupils, taught through the medium of Welsh and English.

7.9 The primary schools varied in size from 71 pupils to 285 pupils on roll. Two of the schools were English-medium schools and the other was bilingual. All three schools catered for pupils in both Key Stages 1 and 2.

7.10 The residential special school catered for pupils who had some degree of learning difficulties, and in addition some pupils had social, emotional and behavioural difficulties, sensory defects, physical handicaps or epilepsy. The school covered a wide catchment area and included pupils from as far as the Ceredigion and the Pembrokeshire Education Authorities. It had 50 pupils with special educational needs and behavioural difficulties, with an age range from Key Stage 2 to Key Stage 4.

Background and experience of staff/institution

7.11 The secondary school IT co-ordinator felt that 80% of the members of staff were confident in their use of Information Technology (IT). Two of the primary schools had experience of working on IT projects, with 50% of members of staff deemed to be confident in their use of IT. The special school felt that only 35% of members of staff were confident in their use of IT. However, they had the advantage of an 'in-house expert'.

Technical issues

7.12 Existing IT provision varied across the group of schools, generally a mix of old and new technology, with a range of standard peripherals. The secondary school had a total of 23 machines, a mixture of 486s, 386s and 286s, the last 'recycled' from the Local Authority architects, on two Local Area Networks (LANs). A further machine was situated in a separate room. This was mainly for the use of teachers, but pupils were occasionally allowed to use it for project work. In addition, the school had recently purchased a Pentium multimedia PC, with a 21st Century System for video conferencing, running VTEL conferencing software. The neighbouring primary was atypical of many primaries in that it had a network of 15 PCs, again a mixture of 486s and 286s, as well as a number of stand-alone BBCs. The larger primary school had a similar mix of 15 networked RM machines, including three RM multimedia PCs, and a further eight BBCs. The smallest school had four stand-alone machines, two BBCs and two RM 386s. The special school had nine networked PCs in a dedicated suite, running Windows 95, plus a multimedia PC in each classroom.

7.13 Throughout the period of the evaluation, the schools suffered from intermittent connectivity, and a lack of compatibility between various components of the network, problems which had a significant impact on the progress of the project. The County Council IT Centre had installed a high-capacity 2Mbps spine through the length of the county with side spurs in certain strategic places. At the start of the project, this WAN had some 60 file servers, now increased to around 100. For the project, this provided Novix access to the Internet, which enabled schools to manage their LAN from a dedicated school PC, at no cost. Against this wider communication capability, the LEA Schools IT Support Unit had recommended RM equipment and sought this as the consistent standard. Internal school RM LANs had

Net LanManager with OS/2 in the file server and Microsoft LanManager and Microsoft Windows 3.11 on the client PCs.

7.14 Of the five schools that participated in the project, only three could be linked to the RWN via BT ISDN2 and thence to the Internet Service Provider (ISP) used by the County Council. The smallest primary school and the special school, because of their location, had dial-up access to the Internet via the BT Campus World service.

7.15 The RWN experienced problems during the first 12 months of the project, being overstretched at times by the heavy demand. For example, users included some 15 major towns, with their colleges, schools, business and civic centres and telecottage nodes. In the local government reorganisation, it was reconfigured to a 'figure of eight' to enhance capability. While this would have long-term benefits for users, the process coincided with the start of the PACCS project, thus disrupting connectivity for some time.

7.16 This problem was exacerbated by a protocol conflict between RM Net LanManager and Novix which affected the reliability and stability of the system. As the project co-ordinator put it, 'It works, but it creaks'. RM has recently introduced enhanced network software, RM Connect, that enables both manageability and connectivity.

Aims and objectives

7.17 The stated aims of the project were:

- to gather information about harnessing Web resources for the classroom
- to promote co-operation between information providers
- to allow schools increasing access to on-line information
- to investigate the potential for turning public resources into educational resources.

7.18 These aims were to be achieved by:

- encouraging local public sector bodies to become 'quality information providers'
- providing schools with reliable Internet access to these and wider resources
- enabling pupils to become information providers as well as recipients.

7.19 The aims were particularly relevant given the lack of Welsh-medium resources on the Internet and the desire to improve the availability of such materials. Enabling pupils to create as well as access educational resources suitable for the Internet was regarded as a key objective of the project. An overarching objective was, in the words of the initiator of the project, 'to create a sense of community' in the participating schools.

Evaluation

Project initiation

7.20 Schools within the Powys Education Authority were invited to put forward proposals for projects under GEST funding, of which approximately £17k was made available for specific telecommunications projects. As stated earlier (see

paragraph 7.8), the larger of the two secondary schools originally selected pulled out of the project at an early stage. Of the 17 schools that made a bid, five participated in the project. Schools were selected by the authority's GEST Working Party, comprising members of the local education authority and a selection of headteachers, using the following criteria:

- the quality of the bid
- technical considerations
- IT competence of the staff
- geographical clustering.

7.21 The original proposal envisaged dial-up access over normal telephone lines, but the opportunity to link schools to the RWN, a 2Mbps communications spine which ran through the length of the county, was regarded as 'too good to miss'. For geographical reasons, two of the schools, the small rural school and the special school, did not have access to the RWN. As a consequence, the schools used dial-up access into a commercial ISP service. The project co-ordinator felt that this would provide an opportunity to test the amount of usage between schools which had access to the Internet via a permanent connection that did not charge by the minute, and those who had to dial up and pay telephone charges, even though the charges were actually paid by the LEA.

7.22 The initial stage of the project involved the installation and setting up of facilities within the schools and establishing connectivity to the RWN. This became an extremely protracted phase, to the point where, at the end of the specified period of the trial, it could be argued that schools were only just beginning to emerge from the first stage.

7.23 The project has been faced with a host of technical problems, which have been only recently successfully addressed in most schools. The major problem, which was not immediately identified, was a protocol conflict between the external RWN and internal school networks. Local factors, for example old or inadequate equipment or networks (see paragraph 7.43), also contributed to the problems that schools experienced. The resolution of these was further affected by the loss of several key members of the Authority's IT Centre staff as a result of budgetary cuts. Certain features of the LEA's organisational structure also made effective communication between the County technical and advisory services at times problematic.

7.24 In the primary schools, the initiation of the project proper, therefore, can be said to have begun only during the Autumn term of 1996 or early Spring term of 1997. In March 1997, the headteacher of one of the primary schools reported that they were 'just getting going' and hoped to be 'up and running' when they returned for the Summer term, a full 18 months after the start of the project. The special school with dial-up connectivity was able to make some progress, although continuing difficulties were encountered by the rural primary school with the same arrangement. The secondary school in the project, though not free of technical problems, initiated a number of projects at an earlier stage.

7.25 As autonomous organisations, the information providers, PAS, CPAT and the Artists project, were not affected by the technical and organisational problems which beset the schools, and were able to begin creating suitable Website materials. Some of this work is continuing and further materials are being planned or developed. However, these developments have also been constrained by limited budgets.

Initial training

7.26 The initial training for the schools, provided by the Advisory Service, consisted of morning or twilight sessions for the school IT co-ordinators. Participants were given an overview of the educational possibilities of the Internet, and introduced to basic processes such as bookmarking, and printing information from Web pages. This initial training was combined with the introduction of the Welsh Office Multimedia and Portables Initiative (WOMPI). No training in the educational use of the World Wide Web (WWW) was provided, so that exploration was limited to individuals within schools if and when the technology was functional.

7.27 Beyond this initial session, there was little or no follow-up training, in part due to the cut-backs in IT advisory staff. As a consequence, schools failed to get the initial level of support that they felt necessary to get the project operative. When the co-ordinator and staff from the Powys IT Centre did visit schools, they frequently had to abandon plans to provide further teacher training because of the need to address urgent technical problems. Beyond this, there was no further external training offered during this initial phase. While the IT co-ordinator at the secondary school organised a successful INSET session on the WWW in January 1996, to develop the skills of the members of staff; in the primary schools, there was little in the way of co-ordinated training so that learning about the WWW was mainly left to the individual explorations of interested staff, supplemented in one case with visits to a local cyber-cafe, originally set up as a community teleworking initiative.

Management strategies

External

7.28 There were two organisations within the Local Authority which had a role in supporting the project. These were the IT Advisory Service, responsible for curriculum support and development, and the IT Centre, which provided technical support. The two organisations did not act in unison, so that there was no stable point of contact or back-up on which schools could rely, contributing to confusion and uncertainty. For example, on some occasions support and advice was duplicated, on others missed altogether.

7.29 No effective external management strategy developed because, following a huge cut in funds for technical support to Powys schools, the Education Authority's IT Advisory Officer was left without adequate numbers of staff. Additionally, a failure to develop a clear management structure made it difficult, especially given the geographical distances involved, for teachers or co-ordinators to meet and work together to drive the project forward. Little attempt appeared to have been made to address this fundamental need and, with no formal steering group, co-ordination, such as existed, was left to ad-hoc and infrequent meetings between the headteachers of the participating schools.

Internal

7.30 Responsibility for the project within schools was undertaken by members of staff who were confident and competent users of IT. Two of the schools had been involved in previous IT initiatives sponsored by the Micro Electronics Unit (MEU) Cymru. Another school had been commended by the Office of Her Majesty's Chief Inspector of Schools in Wales (OHMCI) for its use of IT. In the secondary school, the IT co-ordinator took responsibility for the project, with support from a senior colleague, and in the special school, the task fell initially to a teacher's assistant (see paragraph 7.33). In all three primary schools the headteachers took on the role, although in two of these, for different reasons, the headteachers were away from the school for lengthy periods during the evaluation period.

7.31 In one case, because of illness, the headteacher was obliged to be away for much of the project just at the time when the technical problems were finally resolved. Main responsibility for the project was devolved to an IT-competent member of staff, who shared the task with another teacher. Neither, however, had any previous knowledge of communications technology. Because of the difficulties in maintaining communication with the absent headteacher, who had taken the lead in the project, there was some uncertainty about the aims and objectives of the project for the teachers in question, and this hampered progress in the school.

7.32 In a second primary school, the headteacher was seconded to the Local Authority for a term. While the IT co-ordinator, who took on the main responsibility for the project in his absence, was quite comfortable with educational aspects of the project, most of the difficulties were technical. She made personal efforts to gain greater experience of and knowledge about the WWW, including background reading and, later in the project, attending an INSET event at County Hall on Website authoring. However, the combination of the absent headteacher and the technical problems meant that the progress of the project in the school was considerably hindered.

7.33 At the special school, although the headteacher was a highly competent IT user, the obligations of school management took priority. Responsibility for both the managerial and educational aspects of IT throughout the school, including developing Information and Communications Technologies (ICT), fell to a teaching assistant who happened to be an expert in IT. This person was an enthusiast for the project and made considerable progress, before budgetary constraints prevented the school from extending his contract. His departure effectively halted progression of the project for several months. His replacement, appointed in the Spring term of 1997, was charged with, among other things, revitalising the project. So far, however, little further progress has been made as the member of staff in question is still finding his way.

Implementation at project and institutional levels

Creating cross-institutional relationships and support

7.34 The schools are situated in a sparsely-populated rural area, where communities can be quite remote. The special school in particular was isolated both geographically and, because of its status, academically. Telecommunications, therefore, offered the opportunity to combat isolation. Attempts were made to use e-mail to conduct regular correspondence with the Authority's central offices, but messages sent to some departments remained unanswered. The school felt that, for this approach to succeed, the local authority had first to promote a change in the administrative culture.

7.35 Other than through informal communications between headteachers, there appeared to be little attempt at co-ordination between the various partners in the project. As a result, many teachers, when interviewed, had never heard of PACCS, and did not even realise that they were part of a project. Those who knew they were part of 'something' had no accurate understanding of the Project's aims nor did they know the identity of their other partners. Much the same was true of the information providers, who understood that they were producing Internet materials on behalf of Powys Education Authority, but had little or no knowledge of the Powys Access for Schools initiative.

7.36 One argument advanced for the lack of face-to-face meetings was that, given the uncertain state of the technology, it was not at the time a productive use of the limited funds available. This decision, however, contributed to the general feelings of isolation amongst the school co-ordinators. All those interviewed felt that they

would have gained from having an overview of the project and the opportunity to discuss concerns over delays because of various technical problems.

7.37 A suitable forum for such meetings could have been INSET events which had relevance for the project, but these were rarely available. In the Spring term of 1997, there was a training day on Web page authorship and Hypertext Markup language (HTML), based at the IT Advisory Centre at County Hall. However, only two primary schools in the project were invited to attend. The three teachers, including two headteachers, who attended this training said the day had been rewarding and that there had been opportunities to share experiences about the project. Although this event was relatively late on in the project, it was a missed opportunity to bring together representatives from the five schools, and was indicative of the lack of co-ordination which dogged the project. When teachers in the three other schools were visited shortly afterwards by the evaluation team, they expressed great disappointment and frustration at not having received an invitation to attend the INSET day.

7.38 Some of the schools developed links outside the PACCS group. The special school had already made e-mail exchanges with other special schools within Wales and beyond, but these contacts had not been formalised. The secondary school has developed e-mail links with a Maori school in New Zealand that has a similar bilingual and geographical background. It was also a member of a consortium of local and European secondary schools, with representatives from the Republic of Ireland, Germany, Denmark and Belgium, again with similar linguistic experiences, and it viewed e-mail as an important tool for developing this relationship. So far, however, these initial contacts have not been followed up, largely because of the delays in getting the technology working effectively.

7.39 Schools in the project were able to access sites of artists working in Wales through the Internet, which gave information about a number of artists and examples of their work. Some schools expressed interest in making contact with artists in the immediate location. Some were also looking to becoming information providers, one of the key aims of the project. One school had been working with the MEU Cymru project, which involved collecting information on local history and local folk tales and traditions. The headteacher saw the Internet as an ideal means of disseminating these materials through the school's Web site.

7.40 The fact that schools were developing such activities independently was a positive sign, but many would have benefited by collaboration between the group of schools. However, as noted above, a combination of limited resources, a depleted advisory service and continuing technical problems militated against this strategy.

Further training and support

7.41 Little project-specific follow-up training was made available to the schools. A one-off session for WWW authoring was organised towards the end of the trial, although this was attended by only two of the schools (see paragraph 7.37).

Maintaining equipment

7.42 Maintenance and technical support in the schools was the responsibility of the Powys IT in Education team, and less frequently the County IT engineers. However, budgetary cuts severely restricted the numbers of IT staff, and consequently the amount of help that was available.

Implementation at classroom level

7.43 The secondary school was the only institution to have made any real progress with ICT. However, Internet access was 'terribly slow' and, while a number of

departments, including music, art, science, maths, IT/technology, Welsh and English, had explored WWW resources, few had pursued it since both teachers and pupils found it frustrating to use. The greatest use was in design and technology, but even here, the speed of the system proved to be off-putting for all but the most dedicated. Ironically, the only school to have reasonably reliable connectivity had equipment which was not of a sufficiently high standard to allow for regular use. In addition, the school server was in need of upgrading and crashed frequently.

7.44 An interesting and important development, though strictly outside the remit of the PACCS project, was the purchase by the school of a multimedia Pentium machine, enhanced to enable video conferencing. While the school was not well-off financially, this was justified by the fact that it would help combat the disadvantages of being a relatively isolated rural school (see paragraphs 7.51-52).

7.45 In the primary schools, the story was one of general lack of activity for both technical and organisational reasons. In two schools, the long-term absence of the headteacher had a considerable impact on the progress of the initiative within the schools. In the smallest school, with around 70 pupils on roll, the absence of the teaching head had a 'knock-on effect' since the remaining staff were required to cover his classes. This meant, therefore, that other issues took priority over the PACCS project, particularly given continued technical problems, despite numerous visits from the project co-ordinator and technicians from Powys County Council. The school initially accessed the Net via BT Campus World on the advice of the project co-ordinator. According to the IT co-ordinator this 'never worked'. The school eventually gave up this route and gained access via direct dial up to the Powys Homepage, which was operational at the time of the final evaluation visit in March 1997.

7.46 A second primary school, geographically close to the one described above, was much larger, but had made no more progress. Again, a string of technical failures of hardware, software, LAN and ISDN connectivity to the RWN, had seriously disrupted the project. The headteacher described the frustration of having solved one problem, only for another to arise. The ICT was, as at the other school, a 486 PC, situated in a noisy and busy alcove next to a corridor, which the school admitted was far from ideal. Ironically, the school had a strong commitment to IT generally, with ambitious plans to build ICT into the curriculum, and to develop community-networked facilities in the near future.

7.47 Like other IT co-ordinators interviewed, there was concern at the lack of co-ordination in the project generally, and between schools in particular. There was a perceived need for teachers to meet together to set common goals and targets, and to help and support one another and share experiences, even if there were technical difficulties, or indeed because of these. Ironically, the local secondary school, which pulled out of the PACCS project at an early stage, was reported to have 'wonderful' ICT facilities which were rarely used.

Pupils with special educational needs and disaffected learners

7.48 Teachers had gained insufficient experience in the use of the technology to reach any firm conclusions as to its specific potential for pupils with special needs. The special school had begun to explore the use of the Internet, in concert with other IT applications, which had the effect of enthusing and motivating pupils. There were examples of English work where pupils had collaborated with children from other schools within Wales and from other parts of the United Kingdom**.**

7.49 The special school had also contacted other schools in the UK with a view to developing collaborative links, and was hoping in particular to establish links with other special schools. Some pupils had been involved in responding to Campus

World on-line surveys. Teachers reported that taking part in such projects, particularly seeing the school's name on the database, had proved a great motivator for follow-up activities, as the pupils were keen to read and interpret the data provided by other schools. Such exchanges were also important in placing the school among numerous other schools across the UK. The school recently appointed a new IT co-ordinator, and has now developed its own Website, the only school in the project to do so, a testament to what can be achieved with narrowband facilities. The eventual aim is to include examples of pupils' work.

Benefits and disadvantages for small and rural schools

7.50 Clearly, ICT has enormous potential to extend communication and reduce isolation in a large, sparsely-populated county such as Powys. The three primary schools and the special school all saw this as a tool for combating isolation. Although their first priority was to establish links within the authority, they were also mindful of the opportunities afforded to pupils through linking with schools worldwide. For a variety of reasons, little inter-school communication has taken place. A plan for the secondary school and its neighbouring primary to improve continuity between Key Stages 2 and 3 through the use of e-mail has also not yet been taken forward.

7.51 As explained above (see paragraph 7.44), the secondary school had invested in video-conferencing equipment which gave pupils access to remote-learning resources. In particular, the facility allowed pupils, via remote tutoring from the Gwynedd Distance Learning Centre, based at Llangefni, to study accountancy, sociology and IT at A Level, subjects which were not offered at the school. The alternative was for the pupils to move to sixth-form colleges elsewhere, which would also mean a loss of revenue for the school.

7.52 The system worked to the benefit of not only pupils and the school, but also of the community, since some courses, for example accountancy, were open to adult learners. The school had identified a technical solution to a particular curriculum and financial need, and this development clearly demonstrated the feasibility of communications technology in rural situations. A further use was for three local secondary headteachers to conference with colleagues in Cardiff. This was a successful exercise, saving considerably on time and travel costs, involving headteachers of other secondary schools in Wales using the Welsh language as a medium of study. These activities, coupled with the fact that the school planned to expand the number of courses on offer, and to a greater number of pupils, demonstrated that, as far as the headteacher was concerned, it was a very worthwhile investment.

The information providers

7.53 One of the major visions of the project was to enable remote access to locally-created and locally-relevant materials. Although this aspect of the project was not fully explored during the trial, these materials represent a potentially invaluable resource for rural schools. The local and national nature of the materials being developed by CPAT, Artists in Wales, and PAS had particular implications for teaching and learning of the National Curriculum in Wales which requires pupils to be given opportunities, where appropriate, to develop and apply their knowledge and understanding of the cultural, economic, environmental, historical and linguistic characteristics of their country. The development of relevant materials in Welsh as well as English was thus fundamental to the project, and it was for this reason that these providers were invited to develop Web-compatible resources.

7.54 The Archives Service was geographically distant from many schools in this large county, and in addition the building which housed the materials was not designed or particularly suitable for visiting researchers. The same was true for the

Archaeological Trust, and as a consequence many of the resources were difficult to access. Therefore, the creation of interactive, educationally-relevant materials accessible via the Internet was potentially a very important development for schools. The fact that they had little external financial support, and in the case of CPAT none at all, to progress with these initiatives was a considerable disappointment, and both had reached a point where it was difficult to move forward. In the case of CPAT, the sites were never fully developed during the lifetime of the project, and did not appear on the Website. Furthermore, the lack of communication between the various partners which characterised the project meant that those services which were available were not drawn to their attention, while the agencies themselves were unaware of the PACCS project, or their role within it.

7.55 The Powys County archive material had previously been accessible only by visiting the Archive offices. In a rural area, this was a difficult enterprise for schools, and so creating resources for the Internet was an obvious solution. The service had funding for six months to develop the materials and in that time produced an impressive array of documents and graphics, deliberately designed to be attractive and accessible for schools. The material focused on two areas within Powys, one to the north of the county the other to the south, and included documents, photographs and prints. Hypertext links between these and other Websites allowed pupils to explore historical themes. One example was the trial at the local assizes of a local man. Copies of original assize documents were created, which showed that the presiding magistrate was a local landowner from a family which is still well-known in the area. Pupils were thus able to experience history in a real and meaningful context. Plans to continue the project further, and to tie materials specifically into National Curriculum Programmes of Study, were delayed because of lack of financial support, although the PAS was hopeful of attracting extra funding.

7.56 The Artists in Wales project created materials, including examples of local artists' work and biographical information. The site, which had options to search by geographic area, artist's name or by language, also offered the possibility of communicating with the artists by e-mail. The database of artists provided a good selection and cross-section of artists working in Wales, including ceramic artists, illustrators, multimedia artists, and wood turners. In the case of both the PAS and Artists' initiatives, the materials were accessible via the Powys County Council Website (http://www.powys.gov.uk).

7.57 The Clwyd-Powys Archaeological Trust was working on a similar initiative, although the plans were less well-developed. Although the organisation itself was represented on the Powys site, the educational materials were not made available during the period of the evaluation. No funding had been made available, so that resources had been found from within the Trust's existing budget. These were not great, however, and so CPAT was looking for ways of financing the initiative. Based initially on existing educational materials, such as leaflets, photographs and so on, the Trust was developing interactive materials which would allow users to 'tour' archaeological sites in the two counties, and to communicate directly with the Trust via e-mail. Again, the materials were being developed to fit in with National Curriculum requirements.

Usage times

7.58 Despite some isolated exploration at the secondary school, across the project there was insufficient usage of the facilities to draw any meaningful comparisons between schools. For example, after a lengthy discussion about the potential of e-mail and the Internet to enhance the curriculum, one IT co-ordinator revealed that she had had 'about 10 minutes' active exploration of the WWW throughout the project. This experience was not untypical. Another school reported that the pupils had experienced no more than half an hour on the Internet in the space of 12 months.

7.59 Although it was anticipated that the two schools with dial-up connectivity would act as 'controls', one school was never fully operational for both technical and organisational reasons, while the second was stalled for much of the project because of lack of experienced staff. It is to the school's credit that, upon the appointment of a new IT co-ordinator, they began to make progress, including the development of school Web pages. In the smallest school, unresolved problems in accessing the Internet via Campus World led them to effectively abandon the project for several months.

Meeting the aims

7.60 The project did succeed in its aim to encourage the creation of educational resources by local providers, most of which are available on the World Wide Web. However, this achievement was more than offset by the fact that the technical problems encountered by the schools rendered the resources more or less inaccessible. Moreover, the existence of the materials, or their part in the project, was never made explicit to either schools or providers. The notion that pupils could themselves become providers, as well as consumers, was never addressed.

7.61 A variety of problems dogged the project from its inception, and many of these were not anticipated. Budgetary cuts as a result of local government re-organisation, limited financial support, the reconfiguration of the RWN and the incompatibility of LAN and WAN were all major difficulties largely outside the influence of the project co-ordinator or project participants. These difficulties were exaggerated by the fact that very little assistance was available to the co-ordinator, in terms of personnel, funding or support from senior management within the Authority.

7.62 Given these difficulties, the management of the project was often reactive rather than proactive. For example, while it may have seemed a reasonable strategy to wait for technical problems to be resolved before organising training or co-ordination meetings, this 'holding back' meant that the project simply failed to get started. This was compounded by a major failure of communication which left schools and IPs lacking any sense of common goal or purpose. Indeed, in many ways it was difficult to detect any sense of a project as such, and few of the participants were aware of the involvement of the others. Although there was a certain irony about the fact that technical failure prevented e-mail communication between the schools, which might have helped schools to discuss ways of driving the project forward, more traditional technologies could have been brought into play so that such issues could be addressed. In the event, schools rarely contacted one another, were not actively encouraged to do so, and opportunities to bring schools together were missed.

7.63 Where and when the technology was functional, tentative explorations of the technology were being made, but these were isolated activities, and the 'sense of community' among the schools was never created. The opportunity to share experiences, or to exert any collective influence, for example in making a case for the provision of funding or resources, was therefore lost.

Future developments

7.64 Despite these drawbacks, headteachers remain keen to exploit what they all agree is a potentially powerful tool, and one which will have particular relevance in a Welsh context, and all involved have definite ideas they wish to develop. One of the original ideas of the project, to encourage pupils to create their own Internet resources, also remains an objective. It remains to be seen what progress will be made in the immediate future now that the primary schools are finally coming on line, and with the promise of reliable access.

7.65 It is hoped that the lessons learned so far, as well as those from other EDSI projects, will enable the schools to make rapid progress in the near future. It is encouraging that schools retain their enthusiasm for exploring the potential of ICT, for which they have identified a twofold potential, firstly as a means of incorporating new material into the curriculum, thereby enhancing pupils' learning experiences, and secondly as an administrative tool. It will be important, therefore, for the education authority to foster an administrative climate which encourages the frequent use of electronic communication.

7.66 It is also encouraging that the various information providers view the projects as a long-term initiative, although these will require sufficient and reliable sources of funding if they are to make further progress. Consideration is currently being given to making existing archived and archaeological materials available on CD-ROM. Such an option would provide schools which were not on line with resources which would be otherwise unavailable to them. This is a relatively inexpensive option, and one which is capable of generating revenue. Whether this will come to be seen as a separate resource or as complementary to Internet resources has yet to be seen. It is also envisaged that the art database will remain in its current form, and will be constantly updated.

Cost and cost effectiveness

7.67 In many ways, the experience of PACCS echoes that of the Birmingham Project (see Report A2.4), in that it failed to make substantial progress and represents potential rather than realised benefits for the schools. Despite the eagerness of the schools to use ICT now that many of the technical difficulties have been resolved, it is unclear yet whether the initiative will be relaunched in its original form.

7.68 All participants in the project expressed concern about funding. At the moment, the schools are receiving free Internet facilities and it is too soon to judge whether the level of their commitment would remain as high if the project became self-financing. Given its local nature and therefore its restricted commercial relevance, sponsorship would not appear to be a viable option. The education authority was committed to the project's continuation but found difficulty in providing support in the face of other financial priorities.

7.69 A number of interesting developments have taken place within the Powys Education Authority since the launching of the Powys Project. Though not directly related to PACCS, they provide an indication of how other schools within the authority are approaching the potential of the Information Superhighway.

7.70 The number of schools in the county coming on line has been steadily increasing, and from the Summer term of 1997 most will be able to access the communication facilities offered by the Internet. One school is about to develop an 'Information Technology Partnership Centre', to be opened before the end of the academic year 1996-1997. This highly ambitious development will provide facilities for whole-class tuition within the school and for cluster primary schools. Out of school hours, the community, local businesses, training agencies and secondary school pupils will be able to access the facilities. The centre will have an impressive collection of hardware, and will include video-conferencing facilities. The local Lions Club have offered to make a strong funding commitment to the project, supported by technical, organisational and some financial support from the Local Authority.

Conclusion

7.71 There is an urgent need to address the concern of schools that they lacked a sense of belonging to a project, by establishing a steering group. This group would arrange meetings of representatives, inform schools of any likely developments and be a

forum for sharing ideas through newsletters and by use of the telecommunication facilities.

7.72 A further purpose of the group would be to develop relationships between the schools and the information providers, thereby ensuring that the materials developed will be appropriate for use by the schools. There was a lack of dependable technical support for the project schools throughout the project, and strengthening this element needs to be addressed. Given the difficulties created by cuts in funding and services, one way forward might be for the steering group to explore ways of raising revenue so that in the future a member of staff could be made available to dedicate her/himself to co-ordinating and developing the project.