Education Departments' Superhighways Initiative

Group S: Curriculum Projects in Scotland

Final Report

Scottish Council for Research in Education

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THE EVALUATION

1. This report describes the findings of an evaluation carried out by the Scottish Council for Research in Education (SCRE) of two Scottish projects included in the four UK Education Departments' Superhighways Initiative (EDSI). The two projects were *Modern communications for teaching and learning in Argyll and Bute* and *Superhighways Teams Across Rural Schools (STARS)*. The evaluation was managed by the Scottish Council for Educational Technology (SCET) for the Scottish Office Education and Industry Department (SOEID), and ran from January 1996 to March 1997.

2. We wish to acknowledge the help and co-operation of a number of people: in particular, the project co-ordinators and all the teachers in Argyll and Bute and in the STARS project who spent a considerable amount of time answering our questions and explaining their uses of electronic communications. We would also like to thank our advisory committee for sharing their expertise and ideas with us.

3. We are grateful to Bob Munro of Strathclyde University, consultant to the project, who provided technical expertise and also undertook some of the fieldwork. We also thank our secretary, Kay Young, for her support and expertise.

The Projects

1.   This report describes the findings of an evaluation carried out by the Scottish Council for Research in Education (SCRE) of two Scottish projects included in the four UK Education Departments' Superhighways Initiative (EDSI). The two projects were Modern Communications for Teaching and Learning in Argyll and Bute and Superhighways Teams Across Rural Schools (STARS). The evaluation was managed by the Scottish Council for Educational Technology (SCET) for the Scottish Office Education and Industry Department (SOEID), and ran from January 1996 to March 1997.

Project S2.1: Modern Communications for Teaching and Learning in Argyll and Bute

Description of the project

2.   The evaluation was of ongoing work in Argyll and Bute Council to develop an electronic communications network for educational purposes. The network had been in existence for some four years before the evaluation began, and staff in schools and in the Education Development and Support Unit (EDSU) were actively engaged in explorations of the most appropriate ways to make use of the network to enhance the curriculum, to extend opportunities for teaching and learning, and to support the management of schools and co-operatives (cluster groups of primary schools within a defined geographical area). The evaluation is based on the work of two co-operatives, and focuses on a variety of school-based initiatives making use of telephone, fax, a closed-conference network (Argyll Online) and video communications, which were under way during the evaluation period.

Aims and outcomes

3.   The aims of the project were to:

- develop an effective communications policy and strategy within an educational context

- enhance the curriculum

- support staff development in the use of electronic communications technology

- promote interactive teaching and learning

- enhance the personal and social development of pupils and teachers.

4.   These are all long-term aims which the Authority did not expect to achieve fully during the evaluation period. However, the evaluators noted progress in all of the aims over this time. Significant outcomes identified in the course of the evaluation are listed under the main headings below, and described in more detail in the report (see Report S2.1).

Development of an effective communications policy and strategy

5.   Evaluation showed that there was:

- strong support for this initiative at senior management level

- centralised control of the development of the network

- embedding of the network in the co-operative structure

- a commitment to training for all staff in the Authority

- careful planning, implementation, monitoring and evaluation of innovation

- scope and support for autonomous development within schools and co-operatives.

Curriculum enhancement

6.   Outcomes included:

- integration of the use of electronic communications in core subject areas

- specific projects to explore the potential of electronic communications, for example in teaching modern languages in primary schools, art teaching, and 'bridging' projects designed to support transition of primary school pupils to secondary school

- extensive use of the network by pupils, independently of teachers, when judged appropriate for the task in hand.

Staff development in the use of electronic communications technology

7.   Evaluation showed that there was:

- a policy decision that all teachers and all pupils be competent in the use of the various forms of electronic communications available, to prevent the dominating effect of 'experts' and 'technophobes'

- INSET in basic technical skills provided for all teachers by EDSU

- training materials developed by EDSU for staff and pupil use, on the basis of needs identified by teachers, for example easy-to-use training cards

- recognition that training in the use of the technology for teachers and pupils is most successful when delivered in the context of the curriculum.

Interactive teaching and learning

8.   Outcomes here included:

- development of a range of curricular activities which are delivered electronically and which support collaboration of pupils and teachers across schools, usually within a co-operative

- a focus on identifying appropriate uses of electronic communications to support the day-to-day work of the class

- development of distance learning approaches for use by specialist teachers.

Enhanced personal and social development

9.   Opportunities to make contact outside the school community are particularly important in isolated rural areas because:

- pupils who may have few or no peers in their own school gain from the chance to collaborate with others in other schools

- there is an extended audience for shared work, for discussion and development of ideas, which is so important for pupils in small schools

- teachers, particularly those in one-teacher schools, need opportunities to share experiences, practice and ideas

- using the network enhances opportunities for teachers' professional development in a variety of other contexts as well as those connected to electronic communications.

Costs and cost benefits

10.   The use of electronic communications in Argyll and Bute schools has extended and enhanced the curriculum by enabling teachers to share their expertise in developing core curricular materials. It has encouraged BT and Strathclyde University Faculty of Education to work with the Authority to produce commercial materials. It has also developed distance learning approaches and enabled teachers and pupils to collaborate with peers, collect and share information and to experience learning environments other than the school.

11.   For school management, the introduction of video conferencing within co-operatives has not only saved travel costs and time for headteachers, but also encouraged them to set tight agendas and deal with routine matters through fax or e-mail, thereby reducing the number of physical meetings.

Project S2.2: Superhighways Teams Across Rural Schools (STARS)

Description of the project

12.   This project, based at Northern College of Education, in Aberdeen and Dundee, was designed to create a network of schools in isolated rural areas across the north and north west of Scotland, with the aim of enhancing provision for able pupils. Eighteen small primary schools, with four teachers or fewer, and two secondary schools took part. The project ran between January and December 1996.

13.   The project made use of electronic communications technology which schools already possessed, and Northern College's existing closed-conference system, using FirstClass™ software. Materials for pupil use were developed by the project co-ordinators at Northern College and delivered to schools over the network. All tasks aimed to promote problem-solving and critical and creative thinking skills. Some activities were designed as stand-alone tasks and others required pupils to collaborate across schools before finalising responses and returning these to the project co-ordinators for comment. Pupils communicated via the conference system using e-mail, group conferencing or on-line chat. Towards the end of the project, tasks which required pupils to access information from the Internet were designed for a subset of schools interested in developing skills in this area.

Aims and outcomes

14.   The aim of the project was to enhance pupils' learning and the professional development of teachers using existing electronic communications technology. The evaluators were asked to focus on:

- the extent to which appropriate learning benefits can be provided via an electronic communications network to meet the special needs of isolated able pupils

- the extent to which different communications technologies can be integrated to deliver relevant and effective training and professional development opportunities

- the comparative performance of different service and carrier technologies.

15.   Significant outcomes in these areas are listed under the main headings below, and addressed in more detail in the body of the report (see Report S2.2).

Appropriate learning benefits for isolated able pupils

16.   There was a wide range of benefits for able pupils, including:

- taking greater responsibility for their own learning

- increased confidence and enthusiasm

- opportunity to share ideas with high-ability pupils in other schools

- new awareness that peers from other schools could out-perform them

- greater attentiveness to the needs of others in the school and willingness to help them.

Additionally, there were sometimes unexpected gains for other pupils, including: increased pupil awareness of problem-solving and creative and critical thinking skills and significant development of these skills, applied not only to STARS activities but to other work within the school.

Delivery of training and professional development for teachers via electronic means

17.   This included:

- development of a range of technical skills in the use of the conference system and of the Internet, both as a result of hands-on experience and of specific training and support

- opportunities to explore ideas about able pupils and strategies to support them

- opportunities to experience and discuss the effects of a concentrated and overt focus on problem-solving and creative and critical thinking skills.

Performance of different services and carrier technologies

18.   Findings here included:

- FirstClass™ proving reliable and user friendly, although the cost of working on line was a disincentive to extensive use

- difficulties arising from incompatibilities in transferring documents produced using different software packages being resolved by adopting Rich Text Format (RTF) as the standard format for attachments, although this limited the nature of work which could be shared among schools

- uneven access in project schools to telephone and ISDN lines also having an adverse effect on the project's development

- Apple Remote Access software being found not to be an appropriate form of access to the Internet for project schools.

Costs and cost benefits

19.   Teachers were convinced of the gains which they and their pupils had made, not only in relation to understanding and applying problem-solving and creative and critical thinking approaches, but also in IT skills. Professional development is feasible through electronic communications and, although it cannot replace face-

to-face meetings, it may be a cost-effective approach in areas where it is difficult for teachers to meet at a central location.

Cross-Project Observations and Recommendations

Professional development

20.   Effective professional development is crucial to the introduction of information and communications technology (ICT) and should cover both the technical skills required to use the technologies and an understanding of their educational potential. Both projects demonstrate the effectiveness of training that is delivered in the context of the curriculum, allowing teachers to see the educational rationale for, and benefits of, using ICT. In Argyll and Bute, this was reinforced by management structures that facilitated the identification of training needs by staff themselves. The STARS project showed that technical training and support can be delivered electronically, but that this is much enhanced when teachers have the opportunity to discuss new educational ideas and develop approaches collaboratively.

Small schools in remote rural areas

21.   The potential benefits to be gained from electronic communications technologies by small schools in remote rural areas are considerable. It has, traditionally, been difficult for such schools to have access to the range of sources of information and educational opportunities which are commonly available to schools in urban areas. In small schools, pupils and teachers have few or no peers with whom to interact, and opportunities for developing and sharing new ideas, discussing, practising and arguing can be limited. Electronic communications offer a variety of solutions to these problems and schools in the two projects have been inventive in developing the potential of the technologies to which they had access.

Teaching and learning

22.   To become effective tools for teaching and learning, electronic communications need to be integrated into the daily work of the class. Work in Argyll and Bute has focused on developing materials and approaches which support the integration of electronic communications technologies into the 5-14 curriculum, and on encouraging teachers and pupils to identify the most appropriate uses of the various electronic methods available for particular tasks. The STARS project has demonstrated that particular learning approaches using problem solving, and critical and creative thinking, which are encouraged in 5-14 and which teachers are keen to introduce and develop with their pupils, can be promoted effectively via electronic communications.

23.   Both projects have also highlighted the fact that technical training and development for teachers and pupils are most effective when delivered in the context of the curriculum.

Use of the fax

24.   The fax machine has proved to have unexpected potential for schools. It is widely used by pupils and teachers in Argyll and Bute classrooms to make contact with other schools to request information, to enable pupils to collaborate across schools on activities such as surveys or story writing, and to make arrangements to make contact using other forms of electronic communication, for example video communication.

School management

25.   Aspects of school and co-operative management, particularly in rural areas, can be achieved more efficiently through electronic communications. In Argyll and Bute, video conferencing has proved valuable not only in reducing travel time for managers who previously met face-to-face on a regular basis, but has also led to other efficiency gains. For example, awareness of 'on-air' costs has encouraged managers to deal with routine issues by fax or e-mail before video meetings take place, thus reducing the overall length of time spent in meetings.

Network structures

26.   The establishment of a human network is a key prerequisite for an electronic network. The co-operative structure introduced in Argyll and Bute at approximately the same time as the electronic network has been a significant factor in the success of the development of the Authority's electronic communications strategy. It created a motive for communication and a natural focus for the introduction of a range of innovations, several of which have focused on the development of a common approach to 5-14. At the same time, the co-operative structure has benefited considerably from the ease of communications and the scope for collaboration which electronic communications have provided. The two networks, the human and the electronic, are now closely interlinked.

Access and equity

27.   The 'market forces' approach to developing an infrastructure for electronic communications in the UK has not led to an equitable distribution of resources for schools. Neither project had access to broadband technology. While both have achieved much using narrowband (ordinary telephone lines), and, to a limited extent, intermediate technology (ISDN lines), and have demonstrated the fact that small schools in isolated rural areas can benefit from electronic communications, possibly to a greater extent than larger schools in urban areas, the absence of broadband technology in rural Scotland, and of the opportunities which could be made available via broadband, is a limiting factor and will continue to be so.

28.   Furthermore, funding to support the introduction and development of electronic communications in small schools needs to be reviewed. While Argyll and Bute has been highly successful in securing commercial sponsorship to support the development of its network and, as a single authority, has been able to control the

cost of using the network for individual schools, some schools in the STARS project were handicapped by insufficient access to computers, telephone points and telephone lines and by the cost of calls. What would, for a larger school, constitute relatively insignificant additional expense, can represent a large proportion of the budget of a school with only a few hundred pounds a year to spend after allocated costs are met.

Partnerships between industry and educational institutions

29.   Both projects demonstrated that industry can benefit from partnerships with educational institutions. In Argyll and Bute, partnership with BT has produced a number of developments which are of benefit to industry, for example the development of video-conferencing protocols, but other curricular work and training materials and approaches developed independently by both projects have wider applications. It would be to the advantage of commercial organisations to seek to develop closer links with schools and other educational institutions engaged in developing applications of electronic communications technology for educational purposes.

Costs and cost effectiveness

30.   Individual schools will find it difficult or impossible to take responsibility for the full costs of involvement in electronic communications networks. Small schools in particular are likely to be disadvantaged if support from education authorities, commercial sponsors or other agencies is not available.

31.   The two projects involved in the evaluation adopted very different approaches to funding. In Argyll and Bute, the Authority instigated the project, and decisions about levels of resourcing were taken centrally. The Authority was also responsible for seeking commercial sponsorship to support the development of the network and for drawing up a model of financial support in which some costs were eventually devolved to schools when the educational value of the technology had been demonstrated.

32.   In the STARS project, the aim was to make use of schools' existing resources. From the evaluation, it is clear that such models, while undoubtedly attractive, require careful auditing of the resources available to participants at the outset - including time for training, co-ordination and support, and provision for some upgrading - in order for the newly-formed network to function effectively.

33.   It should be noted that clear evidence of cost effectiveness is unlikely to be immediately available in the case of projects initiating and developing experimental work with new technologies. Those setting up such projects would benefit from establishing 'benchmark' costs in areas where savings are eventually anticipated, as these are difficult to retrieve retrospectively.