

Analyzing European projects in secondary education

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Summary

This report summarizes an analysis completed in 1991 of telecommunications use in secondary schools in Europe. Over 60 projects were examined and surveys and interviews with project leaders and other educators involved in telecommunications use with secondary school students were conducted and analyzed. A literature and project-report review, conducted on a world-wide basis, provided a framework for looking at the European activity. In this paper we summarize the results of the study with respect to major trends in the instructional use of telecommunications in European secondary schools. We also summarize recommendations pertinent not only for Europe but also more broadly, for teacher support and, more generally, for telecommunications activities in secondary schools.

1. Introduction

There is considerable interest, and some controversy, about the amount of support to give to telecommunications activities within the context of overall policy with respect to computer use in secondary schools in The Netherlands. On one hand, many different projects involving telecommunications use in Dutch secondary schools are in progress or recently completed (Veen, Bakker & Baak, 1991), projects which are paralleled by extensive activity in other European countries (Commission of the European Communities, 1990) and of course, in North America, Australia, and many other countries and regions. However, policy makers are under considerable pressure to support and stimulate many different aspects of information technology in schools, and in The Netherlands, as well as in a number of other countries or regions are (quite reasonably) asking, 'What are the results so far of telecommunications projects in secondary schools?', 'To what extent should we support these projects in the future?'

In this context and to help policy makers and other educational planners address these questions, two studies were commissioned in 1990 in The Netherlands. One, sponsored by the National Curriculum Institute, asked for a world-wide summary of strategies for the support of effective use of telecommunications in secondary

schools (see Collis, 1992a,b, for summaries of this study. Also, see a summary of this research in Collis & de Vries, 1991). The other study was commissioned to focus specifically on Dutch and other European experiences with telecommunications use for instructional purposes in secondary schools (Collis & de Vries, 1991). The purposes of the second study were to make and analyze an inventory of European experiences with these types of telecommunications projects, and from this to suggest recommendations for policy and further activity in The Netherlands.

The purpose of this paper is to summarize the results of this inventory and analysis. As part of this analysis, similarities and differences among Dutch and other European-based telecommunications projects and projects outside Europe will also be discussed.

2. Methodology

The survey

One source of the experiences summarized in this section was a survey developed for this research. An instrument was developed, consisting of six parts: demographic information, specifics of the respondent's experience with telecommunications use, (personal and for instructional purposes), opinions about the value of telecommunications use in education, appraisal of problems and strategies for coping with the problems, and opinions about the relative priority telecommunications support should be given in the school. Dutch- and English-language versions of the questionnaire were prepared.

The instrument was pilot-tested, amended, and then sent to 191 persons from 14 European countries. All of these persons were well informed about and/or directly active with telecommunications projects in European secondary schools, with 80% of them project leaders of such projects. The English version of the survey was sent to 54 such persons in European countries outside The Netherlands. The mailing list for the Dutch-language version of the survey was sent to project leaders of national telecommunications projects and to persons known to be active in policy initiatives or support services (such as developers of curriculum materials) for telecommunications applications in Dutch secondary schools.

Thus our sample was not representative of teachers in general, but rather, of European educators already well informed about at least some aspects of the use of telecommunications in secondary schools in order to obtain the most experienced

comment we could about what was happening with telecommunications in European secondary schools. Table 1 summarizes the respondents by country.

Country	Number Sent	Received
Netherlands	137	65
Denmark	15	6
Spain	8	7
Belgium	8	4
UK	7	6
Sweden	6	1
Germany	2	1
Finland	1	1
Israel	1	1
Italy	1	1
Austria	2	0
France	1	0
Portugal	1	0
Greece	1	0

Table 1: Survey Respondents, by Country

Of the respondents, 47 were from secondary schools, 20 from universities, 20 from Ministries of Education, and the remainder from a variety of other types of institutions. Approximately two-thirds of the respondents classified themselves as regular users of electronic messaging, with approximately one-third indicating themselves to be regular users of electronic bulletin boards and also about the same proportion claiming to be regular users of in-line information services. Of the classroom teachers in the sample, 27 had used electronic mail (CMC) as an instructional project with their students, 9 had made use of computer bulletin boards with their students, and 8 had been involved in projects in which their students made use of on-line information sources.

Of the projects in which the respondents were involved, there was no real pattern with respect to who initiated or sponsored the project, but apparently all the projects operated on special funding from outside the normal school budgets. With respect to the subject areas in which the telecommunications activities in which the respondents were involved were embedded, the majority of the activities were related to language practice (mother tongue or second language), or geography, or related to computer (information technology) literacy.

No real conclusion could be made about the time investment the respondents had relative to telecommunications activities, as many of these activities occurred in the framework of large-scale, on-going projects with multiple activities. Trying to isolate how much time the respondents spent on some aspect of telecommunications in secondary education use thus was not possible.

Other sources of information for the analysis

Other sources of input for the inventories and the conclusions throughout the report included:

- a review of literature and project reports, mostly of secondary school telecommunications projects with international aspects, based on a collection of over 400 documents and studies.
- printed information about more than 60 European (not based in The Netherlands) projects and more than 15 Netherlands-based educational telecommunications projects. (See Appendix A for a partial list). Our basic criteria were that we tried to consider only telecommunications activities being used for instructional purposes during the normal school day by students in European secondary schools. We categorized these projects generally as (a) services available for cost to subscribers, (b) networks organized for on-going access by schools or educators, (c) 'umbrella' projects with structured activities, and (d) specific-focus, limited-time projects.
- Notes and materials from a Dutch (1991) and three international conferences (1989, 1990, and 1990) focused specifically in telecommunications projects in schools.
- Interviews, summaries and reflections prepared expressly for the study by persons with extensive involvement in telecommunications projects in Dutch secondary schools, and a case study relating to the experiences of a secondary school teacher attempting to explore the applications of telecommunications within his teaching.

3. Results

Perceived benefits of telecommunications activities

When asked to comment about the overall benefits of telecommunications in secondary schools, the respondents did not see telecommunications as necessarily leading to greater productivity in the school, at least in terms of some of the traditional understandings of this word--reducing costs and increasing administrative communication. More than half of the respondents, for example, felt that telecommunications use would have little to do with cost savings in education, and that telecommunications would only provide a 'moderate' contribution relative to

aiding educational administrators. However, the majority (82 out of 93), felt electronic messaging to have useful or very interesting educational possibilities; 62 felt the same about electronic bulletin board applications; and 72 about on-line information sources. The majority of respondents felt that telecommunications can make a valuable contribution in the secondary school relative to facilitating the exchange of ideas among teachers, giving students opportunities to interact with students from other cultures, bringing new possibilities to the classroom, and giving students awareness of an important use of information technology in society.

Problems personally encountered

In terms of the problems faced by the respondents during their own experiences with telecommunications projects in secondary schools, the most serious problems involved finding financial and personal support within the school for the telecommunications activities and finding a manner to demonstrate the educational pay-off of their activities. Finding time for the students to do the telecommunications activities was seen as a problem by two-thirds of the respondents. Obtaining for themselves the technical skills necessary for using telecommunications hardware and software, for getting on desired networks, and for handling predictable problems that occur on-line were cited as problems by more than half the respondents, as was obtaining information about relevant educational applications of telecommunications. In contrast, respondents indicated that their students had little difficulty obtaining the skills necessary to use telecommunications.

Overall problems

In terms of general problems facing the spread of telecommunications use in secondary schools, more than 50% of the respondents indicated the following to be serious constraints:

- availability of equipment;
- access of students to the equipment;
- access of teachers to equipment for preparation;
- time available for student use of telecommunications;
- time available to teachers to develop uses of telecommunications;
- integration of telecommunications into lessons for instructional effectiveness;
- costs.

In contrast, less than half of the respondents felt the following to be serious general problems:

- using telecommunications software;
- using electronic messaging;
- finding appropriate partners with whom students can telecommunicate.

In many cases, the respondents felt that the problems that are serious now could be reduced in their impact in the future if more means were available for the support of telecommunications activities. However, finding adequate time for student use or teacher preparation, finding good ideas for instructional integration, and dealing with costs were seen as problems likely to continue to be serious.

Teacher support

The respondents were asked to consider various possibilities for the better support of teachers wishing to make use of telecommunications in the secondary school. Respondents felt all of the nine suggested alternatives were important. There was particular agreement on the value of organizing in-service that focuses on instructional strategies for telecommunications use and, closely behind this, on providing in-service that helps teachers improve their technical familiarity with different applications of telecommunications. Providing on-going support was seen as important, as was ensuring that schools acquire adequate equipment, and finding opportunities for student participation in international projects involving telecommunications. More than two-thirds of the respondents indicated these strategies were of first priority.

The suggestion to which the most mixed reaction came related to the sponsoring of teachers' conferences or meetings relative to the topic of telecommunications use in schools, as more than half of the respondents saw this strategy as of lesser or little priority compared to the first-priority items. There was also difference of opinion relative to the value of establishing a teacher in the school to be a 'telecommunications reference person'; of establishing regional or national 'help centres'; and of developing specialized on-line resources for students. For each of these ideas, about half of the respondents felt the strategy was important but the other half felt the idea was of less or little priority.

Policy

Finally, respondents were asked to what extent they thought government policy should support telecommunications use in secondary schools. The majority of the respondents (72%) felt that 'telecommunications use in secondary schools is important enough for the ministry to invest in at the national level'.

As this sample was biased from the start toward those who already were active in telecommunications projects in secondary schools, these survey results should not be overinterpreted. However, they do conform to the more general international experience (Collis, 1992a,b) that, even with the current difficulties and limitations involved in using telecommunications in the secondary school setting, those educators who do get involved in telecommunications projects believe the projects to be significant and to deserve national-level support.

4. Telecommunications use in European secondary schools

There is no tabular way to show how we came to our identification of 'trends' emerging from our wealth of qualitative and attitudinal data. Based on our own close analysis of our different sources of information, we feel confident that we can say that the following overall observations emerged from our analysis of the European activity with telecommunications use in secondary school:

Enthusiasm

Among those involved in it, there is strong enthusiasm for telecommunications-related educational activity, particularly for CMC (computer-mediated communication); however, despite this participant enthusiasm there is little evidence of telecommunications use spreading beyond the project boundaries.

International motivation

Almost all the projects are internationally oriented, and have as a major motivation the development of better social understanding and communication skills among students in different cultures. Second-language practice, and anticipation of a post-1992 'common Europe' motivate many of the projects.

Communications oriented

Almost all European projects are computer-mediated-communication (CMC) activities rather than projects involving access of on-line data bases (exceptions occur, particularly in The Netherlands and the UK) or exchange of scientific data among students.

Importance of good instructional preparation

Most project leaders strongly emphasize the need for good instructional preparation prior to and concurrent with the telecommunications activities.

Isolation of projects from one another

The many different projects and activities do not have ways, either technically or through other methods of information exchange, of communicating with each other. Being active in one network or project does not bring a greater chance of getting involved in another network or project. Each one has its own organization and technical requirements. It is difficult to get information about projects that are available if one is outside the 'mailing list' of the project or service. There is certainly nothing like a systematic synthesis of experiences occurring among the projects (or even within many of them) that can be available to those considering involvement in projects in the future.

Dependence on key persons and project resources

With the exception of a few of the large projects and services, most of the projects seemed based on or at least strongly fuelled by the efforts and vision of one or two key persons. If this person is not able to continue, or when project funding stops, the telecommunications activity also stops. Finding money for international activities, such as bringing participating teachers together for face-to-face planning, is a continual challenge to the projects.

Measurement of effectiveness

The objective measurement of the educational effectiveness of activities involving telecommunications use is apparently very difficult to carry out, as it is not being done in any systematic way in the great majority of the situations. 'Doing the activity,' and showing signs of 'greater awareness' or 'increased motivation' are the most frequently cited 'results'. Student enthusiasm is perhaps the most measurable outcome.

'First-Order obstacles'

Certain problems reappear in most projects and can be predicted as 'first-order' obstacles. Unless they are solved, no telecommunications use develops. These are:

- Unavailable or unusable equipment (modem, telephone connection, telecommunications software);
- Unknown or difficult or too-costly network connections;
- Inability of students to have access to the telecommunications equipment for instructional purposes even if the equipment is available in the school;
- Inability of teachers to have access to the telecommunications equipment for familiarization and instructional preparation;
- Not enough time during regular class periods and within the curriculum for telecommunications activities;
- Not enough time for the teacher for personal skill development relative to telecommunications use and lesson preparation;
- Limited technical familiarity of teachers with telecommunications;
- Limited perceived relevance with respect to curriculum;
- Limited awareness by teachers of strategies for instructional management of telecommunications use;
- Time and financial costs;
- Not enough on-site support and technical help;
- Not enough evidence of educational value.

'Second-Order obstacles'

Once 'first-order' obstacles are dealt with, less-tangible 'second-order' problems also critically affect the process of telecommunications use. The same clusters of

second-order problems appear in study after study and involve pedagogical and organizational issues (see also Collis, 1992a, b). The second-order obstacles are often more subtle difficulties than the first-order problems, and also may be more difficult in the long run to resolve. The outcome of computer-mediated communication, for example, depends heavily on the organizational and pedagogical insight of the teachers involved. Effective use of an on-line information source requires the searcher to have well-developed inquiry skills prior to any computer use and also that the teacher has prepared the students to ask good questions of complex information in a concise way and in the syntax of the management program that organizes access to the on-line information. The complexities of asking good questions or communicating well and purposefully go far beyond the difficulties of handling telecommunications.

Teacher support

Many different strategies are being used to better support teachers attempting, despite all the above problems, to use telecommunications as an instructional tool. Promising strategies include:

- providing teachers with models and lesson ideas in which telecommunications use is integrated;
- improving teacher in-service and on-going support with respect to telecommunications use;
- improving the design of the software used for the telecommunications activities;
- developing simulation software and other preparatory activities that can give teachers and students hands-on familiarization with the 'look and feel' of telecommunications use before actually attempting the use.

5. Reflections on European Activity

In general, the activity in Europe with respect to telecommunications in secondary education is similar in characteristics to other international experiences in the area. We can, however, observe some interesting differences.

Instrumentation

It is our impression that there is more attention being given to improvements in the telecommunications software, its user interface and functional characteristics, in The Netherlands, than is the case in the rest of Europe and internationally. The 'Telelijn' and 'Telesim' packages being provided to teachers throughout The Netherlands through the Dutch PTT are an example. (Telesim is a simulation program that allows off-line practice with the environment available on-line through the use of Telelijn.) The Dutch PTT is currently sponsoring research in the

effectiveness of these software packages and supporting their improvement. The Dutch PTT has supported regional infusion and support projects (the PTT-NIVO Project); supports an on-line service for teachers (SLOLijn), based at the National Curriculum Institute; and has investigated different strategies for on-line information provision and access including through videotext. While not unique to The Netherlands, there is a sense of more strategic focus on instrumentation in many of the Dutch projects than may be the case in other countries.

Strategies for teacher motivation

Europeans have much less of a pattern of teachers attending teachers' conferences and regional meetings than is the case in some other countries, for example the USA, Canada, and Australia, so there was difference of opinion between the European study and the more international study on the value of these sorts of activities as implementation support for teachers. As a generalization, European teachers are less inclined toward the use of 'motivational strategies' such as newsletters, games, and student competitions, than may be the case in North America, thus we can perceive a difference in the overall tone and style of the educational activities in the telecommunications use when Europe is compared with North America.

Access to on-line information sources

Despite the Dutch examples earlier cited, it is our impression that there is less access to on-line collections of information in Europe than is the case in North America and, in contrast, more emphasis on non-mother-tongue language practice. The richness of the cultural and language diversity in Europe, within a shared 'Europe after 1992' framework, make European secondary schools an excellent base for multilingual CMC activities at the secondary school level. However, the language and cultural 'richness' of Europe also makes it more difficult to build a large enough critical mass of information to stimulate shared use of on-line information sources outside the national level--or unless students are able to work in a second language. Language skill and understanding, however, are at a much more demanding level when attempting to access an on-line information source than when communicating via electronic mail with other students. When added to the complexities of formulating appropriate questions when accessing a on-line information source (see Collis, 1992a, b) it is of major importance in Europe to investigate strategies for multi-lingual, multi-cultural on-line information services affordable to education.

Similarities with non-European experience

However, despite these contrasts, in many other aspects the experiences in Europe with the use of telecommunications in secondary school are similar to those found

elsewhere--teachers need on-going support, time, instructional guidance, and support materials if they are to make use of telecommunications in the context of the secondary school curriculum. And, of course, first-order problems of access to equipment, telephone lines, and networks must be handled for the teacher before anything else can occur. Second-order obstacles will be as challenging in Europe as anywhere else.

6. Recommendations for policy

Based on the analysis, we also developed detailed projections of the sorts of support, teacher training, research, and infrastructure that might be most effective for stimulating effective use of telecommunications, at least in the Dutch secondary education system and the implications for national policy relative to these projections. The major recommendations we think can be as applicable in settings outside the Netherlands as they are relative to the Dutch situation. We conclude this chapter with these major recommendations for policy-level support of telecommunications use in secondary schools.

- 1 Establish a strategy for the continual consolidation, evaluation, and dissemination of experiences from the many projects and activities going on in the schools in the region or country. Better communication among projects needs to occur.
- 2 Collect and disseminate models of good instructional practice involving telecommunications use in actual school settings. Videotapes of classroom management strategies and ideas for relevant evaluation of student gains from telecommunications activities are particularly needed. Making these resources available to teacher training institutes is particularly important.
- 3 Stimulate and support a limited number of research activities particularly relating to the identification of effective on-line information services. Finding and streamlining a methodology for action and policy research regarding the educational (and cost) effectiveness of telecommunications applications is also a priority.
- 4 Improve access to telecommunications networks and services in and for schools. This ranges from designing and providing more educationally-specialized telecommunications software to facilitating subsidized rates for school use of real-world information services, and includes recommendations for providing teachers with modems at home for lesson preparation.

Appendix A

A partial listing of the European projects involving instructional use of telecommunications in the secondary school investigated in this study

Apple Global Educational Network (European sites)
AT&T Learning Network (European sites)
British Library Project
Campus 2000 Education Network
Computer Pals Network (European sites)
Computerjournaal
DATEM Project
Denmark-to-France E-Mail Project
ECCLES
E-Mail Project Netherlands-France
European Awareness Project
European Schools Project
European Studies Project, Scheme I
European Studies Project, Scheme II
Extended Classroom Project
GEONLINE (Geography On-Line)
GISET (Geographical Information System for Educational Applications)
Global Educational Telecommunications Network (European sites)
International Educational Telecommunications Project (European sites)
Kalmar Project
PLUTO International Network Project
Proefschool Nieuwe Media (Experimental School for New Media)
The PTT-NIVO Project
RAPPI (European sites)
Schoollink (European sites)
Telematica projects as part of the Dutch 'Technology-Enriched Schools' (proefscholen) project
TENS
Videotex in Education Study

Contact addresses for these and other projects are available from the authors.

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