Paper (W2-06)
Telecommunications Projects in European Secondary Schools

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Abstract
This report summarizes a recently completed study 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. An extensive 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.

Introduction
There is considerable interest, and some controversy, about the place of telecommunications in official 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), paralleled by extensive activity in many 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, "Where should the priorities be?", "What are the results so far of telecommunications projects in secondary school?", "To what extent should we support these projects in the future?" In this context and to help policy makers and planners address these questions, two studies were commissioned in 1990 in The Netherlands. One, sponsored by the National Curriculum Center, 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 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 between European-based telecommunications projects and North American projects will also be discussed. A brief summary of the general recommendations, applicable outside the Netherlands, will also be given.

Methodology for the Inventory of Experiences
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. A selection of the some of the items from the 14-page questionnaire is given in Appendix A. 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 or 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 persons (all outside The Netherlands). The names were obtained through previous contacts of the researchers, participant lists of European-community sponsored seminars on telecommunications in secondary schools (Commission of the European Communities, 1990), and through making an increasing radius of enquiries, including persons...
who had been involved in the First International Symposium on Telecommunications in Education (sponsored by ISTE and held in Israel in 1989).

The mailing list for the Dutch-language version of the survey was sent to project leaders of national telecommunications projects (known personally to the researchers or through participation in a national congress on educational telecommunications use, held in January 1991.) Also, in the Netherlands, the survey was sent to persons known to be active in policy initiatives or support services (such as developers of curriculum materials) for telecommunications applications in secondary schools. Thus our sample was not representative but highly informed; we wanted to get the most experienced comment we could get about what was happening with telecommunications in European secondary schools. Table 1 summarizes the respondents; in Appendix A (Part I) further information can be found about the types of institutions in which the respondents' work and their job definitions.

| Table 1 Survey 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       |

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

1. 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, all dating from the 1988 or more recently.
2. The personal experiences and contacts of the authors.
3. Formal interviews with 10 persons in The Netherlands with experience as school project leaders in telecommunications use in general secondary education.
4. Printed information about more than 60 European (not based in The Netherlands) projects and more than 15 Netherlands-based projects. It is difficult to give specific numbers, as many projects have subprojects, which also issue independent reports, and also because it is sometimes problematical to know if an on-going service, such as a bulletin board available to students in a number of countries, should be included as a "project" or not. 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 made particular use of information from 32 networks or projects active in Europe (see a list in Appendix B for a sample of these) and to a lesser degree, from 31 other European projects. We categorized these 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.
6. Written summaries and reflections prepared expressly for the study by two persons with extensive involvement in telecommunications projects in Dutch secondary schools.
7. A case study prepared expressly for the study relating to the experiences of secondary school teachers attempting to explore the applications of telecommunication within their teaching.

All of these sources are more fully described and summarized in the (English-language) project report (Collis & de Vries, 1991, 270 pp.). Highlights of the summaries will now be given here.

Summary of Results
European Experiences with Telecommunications in Secondary Education

Responses to the survey. Portions of the survey responses to fixed-alternative questions appear in Appendix A. Many of these asked for open-ended responses, all of which have been analyzed and synthesized. Highlights of these responses are that:

1. Most of the respondents (75%) are: users of electronic mail, 63% are users of bulletin boards with educational purposes, and 70% make use of on-line information services. So, as we expected, ours was a knowledgeable sample. (See Item 1 in Appendix A).
2. 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. (See Appendix A, Item 7). However, the majority (82 out of 93), felt e-mail e-mail to have useful or very interesting educational possibilities; 62 felt the same about bulletin board
3. We asked the respondents to comment on the experiences they had personally had as classroom teachers implementing telecommunications activities with their own students. The number of respondents in this category was smaller than the total number of respondents (44 out of 93); Items 2 and 3 in Appendix A summarize some of their experiences. Of these classroom teachers, 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 on-information projects. There was no real pattern with respect to who sponsored the different projects; but it did matter that 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 were embedded, the majority of the activities were language-related, or geography, or related to computer (information technology) literacy. No real conclusion could be made about the time involved with telecommunications activities, as so many of the activities occurred in the framework of large-scale, on-going projects with multiple activities. Trying to isolate how much time the teachers spent on preparing for telecommunications use was not possible.

4. Item 3 in Appendix A summarizes the problems faced by the respondents from their experience with telecommunications projects in secondary schools. We can see that, for this group, the most serious problems involved finding financial and personal support within the school and finding a manner to demonstrate the educational payoff of their activities.

5. Item 5 in Appendix A summarizes the responses to the request that respondents comment on the general problems facing the spread of telecommunications use in secondary schools. Problems related to costs, to finding adequate time for teachers and students to make use of the telecommunications medium, and of finding appropriate lesson integration strategies are seen as being of a serious nature by many of the respondents (59%, 51%, 69%, 61%, respectively). Frequently, however, the respondents felt, however, 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.

6. The respondents were asked to consider various possibilities for the support of teachers wishing to make use of telecommunications. Item 6 of Appendix A shows the responses. Respondents felt all the suggested alternatives were important. There was particular agreement on the value of organizing inservice that focuses on instructional strategies for telecommunications use and, closely behind this, inservice that helps teachers improve their technical familiarity. Providing on-going support was seen as important, as was ensuring that schools acquire adequate equipment.

The suggestion to which the most mixed reaction came related to the sponsoring of teachers’ conferences or meetings relative to the topic. There was also difference of opinion relative to the value of establishing a teacher in the school to be a “telecommunications reference person”, or of establishing regional or national “help centers”. In each case, about half of the respondents felt the strategy was important but the other half varied in its opinion.

7. 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 is important enough 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 confirm the North American experience (Collis, 1992a,b) that, even knowing the current difficulties and limitations, those educators who get involved in telecommunications project believe the projects to be significant and to deserve national-level support.

Summary and overall impressions. There is no tabular way to show how we identified “trends” as emerging from our wealth of qualitative and attitudinal data. Based on our own close analysis of all 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:

1. Among those involved in it, there is strong enthusiasm for telecommunications-related educational activity, particularly for CMC; however, there is little evidence of telecommunications use spreading beyond the project boundaries.
2. 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.
3. 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.
4. Most project leaders strongly emphasize the need for good instructional preparation prior to and concurrent with the telecommunications activities.
5. 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 any greater chance of getting involved in another network or project. Each one has its own organization and technical require-
ments. 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.

6. With the exception of a few of the large projects and services, most of the projects seemed based on or at least strongly fueled 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.

7. Measurement and validation of educational effectiveness 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”.

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

9. 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.

These trends correspond closely to the findings of the more-internationally based literature study (Collis, 1992a, b). The “first-order” and “second-order” obstacles common at both the European and more international level are particularly interesting, and thus will next be described in more detail.

First-level problems. We identified the following list of “first-level” problems that consistently and seriously trouble school telecommunications projects:

1. Unavailable or unusable equipment (modem, telephone connection, telecommunications software).
2. Unknown or difficult or too-costly network connections.
3. Inability of students to have access to the equipment for instructional purposes even if the equipment is available in the school.
4. Inability of teachers to have access to the equipment for familiarization and instructional preparation.
5. Not enough time during regular class periods and within the curriculum for telecommunications activities.
6. Not enough time for the teacher for skill development and lesson preparation.
7. Limited technical familiarity of teachers with telecommunications.
8. Limited relevance with respect to curriculum.

10. Time and financial costs.
11. Not enough on-site support and technical help.
12. Not enough evidence of educational value.

Second-level problems. Even after these “first-level” problems are addressed, there are more subtle difficulties. 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 have well-developed inquiry skills prior to any computer use. (A more detailed discussion of these “subtle” second-order problems associated with CMC use and with on-line inquiry appears in Collis, 1992a, b.)

Teacher support for dealing with the problems. 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 where telecommunications is integrated; improving teacher inservice and on-going support with respect to telecommunications use; improving the design of the software used for the telecommunications activities; and 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. It is our impression that there is more attention being given to improvements in the telecommunications software, its user interface and functional characteristics, in Europe and particularly The Netherlands, than is the case in North America.

Europeans have much less of a pattern of teachers’ conferences and regional meetings than do North American and Australian teachers, 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. However, in most other aspects, teacher support recommendations were fundamentally the same in Europe as 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.

Reflections on European Activity with Telecommunications in Secondary Education

In general, the activity in Europe with respect to telecommunications in secondary education is similar in characteristics to other international experiences. There are some differences in orientation. In particular in Europe, there is less access of on-line collections of information than is the case in North America and 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 CMC activities at the secondary school level. However, the language and cultural “richness” of Europe also limits the possibilities of 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 an on-line information source (see Collis, 1992a, b) it is probably unrealistic to expect much large-scale, European-level use of informational databases in secondary schools in the near future.

Recommendations

Based on the study, we elaborated two “scenarios” for telecommunications use in secondary schools—one focused on CMC (“The Global Community”) and the other on utilization of on-line information sources (“The Information Society”). We recognize, of course, that a optimally profitable scenario will involve both focuses. We then developed detailed projections of the sorts of support, teacher training, policy, and guidance that each scenario could most benefit from over a five-year period. From these scenarios and projections we made recommendations that can be clustered under the following headings:

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.
3. Stimulate and support a limited number of locally appropriate projects and research activities. Finding and streamlining a methodology for action and policy research regarding the educational (and cost) effectiveness of telecommunications applications is a priority.

4. Improve access to telecommunications networks and services in and for schools. This ranges from designing and providing more specialized telecommunications software to subsidized rates for school use of real-world information services, and includes recommendations for providing teachers with modems at home for lesson preparation. Dutch idea of providing schools with specialized telecommunications software (“Telelijn”) and also simulation software (“Telesim”) to provide off-line tutorial practice with the software and including student and teacher print resources is a good example of this recommendation.

References


Appendix A
PRINT Survey: Research in the Applications of Telecommunications in European Secondary Education
(Partial Version, with Results)
Survey mailed, 1 February 1991; Results collated April 1991

In the context of providing recommendations for the application of telecommunications in Dutch secondary schools, we request your cooperation in filling in this survey. For the purposes of this survey when we use the word “telecommunications” we are limiting ourselves to computer-based telecommunications (“the process of connecting two or more computers together by telephone or cables so that the computers can exchange information in digital form”) that are feasible for use by students and teachers in present-day Dutch general secondary schools.

Part I: Personal information
Your complete mailing address: (94 respondents; names and addresses available); not all responses total 94 because of occasional missing or multiple responses)

Respondents are from:
Secondary School 47
Higher Education 20
Ministry/Government 20
Other 6

Your work title or job description:
Respondents can be categorized as:
Teacher/Faculty 41
School Administrator 12
Researcher 3
Ministry 29
Other 8

Part II: Overview of your experience with telecommunications
1. Below we list three typical types of telecommunications applications that secondary school students may encounter. Please put check marks in the cells below that BEST describe your experiences with respect to these three categories.

<table>
<thead>
<tr>
<th>E-Mail</th>
<th>Bulletin Boards</th>
<th>On-Line Information Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no personal experience</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Some personal experience</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Regular user</td>
<td>66</td>
<td>38</td>
</tr>
</tbody>
</table>

2. (For classroom teachers using telecommunications with their own students) In terms of your experience involving students in secondary schools using telecommunications:

Were the students using:
Electronic mail? 27
Electronic Bulletin Boards? 9
On-line information sources? 8

Was the activity part of a special project of some sort?
= All but one respondent said “yes”

Did the project receive external funding or support?
= All respondents said “yes”

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Did the activity occur:
In the context of a special course on information technology? 2

In a traditional subject area:
Geography? 12
Language (Mother tongue)? 4
Language (second language)? 13
Other? (Please describe) 16
(generally special projects that did not try to be part of a specific subject area—i.e., a general "getting acquainted' orientation)

3. (Again, for classroom teachers who had used telecommunications with their students) What were the difficulties you had in organizing the activity (check as many of the following as apply; give a double-check to that were particularly frustrating):

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Serious</th>
<th>Some</th>
<th>Little or None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finding out about appropriate opportunities to use telecommunications</td>
<td>1</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Getting support in the school to do the activity</td>
<td>13</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Getting access to functioning equipment for yourself (for preparation)</td>
<td>4</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Obtaining the technical skills necessary:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• how to use the software and hardware,</td>
<td>1</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>• how to get on the desired system,</td>
<td>2</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>• how to handle predictable problems while using the system</td>
<td>3</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Arranging access to functioning equipment for the students</td>
<td>3</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Helping students to have appropriate technical skills to do the activity:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• how to use the software and hardware,</td>
<td>1</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>• how to get on the desired system,</td>
<td>2</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>• how to handle predictable problems while using the system</td>
<td>1</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Finding time to plan for the activity</td>
<td>3</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Finding time for the students to do the activity</td>
<td>3</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Finding a way to evaluate the educational value of the activity</td>
<td>8</td>
<td>12</td>
<td>7</td>
</tr>
</tbody>
</table>

National Educational Computing Conference 1992
5. (For all respondents) What do you feel are the major problems that limit the educational use of telecommunications in secondary schools?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Serious problem not likely to be reduced</th>
<th>Serious problem, but could be reduced with more resources</th>
<th>Not a major problem</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of equipment</td>
<td>4</td>
<td>63</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>Access of students to equipment</td>
<td>6</td>
<td>54</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td>Access of teachers to equipment for preparation</td>
<td>3</td>
<td>54</td>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td>Time available for students</td>
<td>14</td>
<td>33</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Time available for teachers</td>
<td>16</td>
<td>48</td>
<td>22</td>
<td>5</td>
</tr>
<tr>
<td>Technical skill needed to use e-mail</td>
<td>9</td>
<td>38</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>Use of the software</td>
<td>6</td>
<td>30</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Integration into lessons for educational purposes</td>
<td>14</td>
<td>43</td>
<td>28</td>
<td>5</td>
</tr>
<tr>
<td>Finding appropriate partners with whom the students can communicate</td>
<td>8</td>
<td>20</td>
<td>53</td>
<td>10</td>
</tr>
<tr>
<td>Costs: Acquisition</td>
<td>10</td>
<td>56</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Usage</td>
<td>18</td>
<td>41</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>Personnel</td>
<td>15</td>
<td>41</td>
<td>26</td>
<td>6</td>
</tr>
</tbody>
</table>

6. (For all respondents) How valuable do you think each of the following would be for secondary school teachers who would like their students to use telecommunications for an educational activity?

<table>
<thead>
<tr>
<th>Activity</th>
<th>First priority</th>
<th>Second priority, if important funding allows</th>
<th>Not so important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing schools with a modem and appropriate software</td>
<td>66</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>Organizing courses for teachers on how to use telecommunications from a technical perspective</td>
<td>64</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

National Educational Computing Conference 1992
Organizing courses for teachers on how to develop instructional strategies for the use of telecommunications

Developing specialized software to make telecommunications use easier

Developing specialized resources (i.e., bulletin boards and on-line information sources for students)

Stimulating student participation in international projects involving telecommunications

Setting up a “resource centre” for teachers

Providing a way for teachers to get technical help when they need it

Sponsoring meetings, conferences, etc., for teachers

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Very</th>
<th>Moderately</th>
<th>Little</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing costs</td>
<td>27</td>
<td>15</td>
<td>43</td>
</tr>
<tr>
<td>Aiding administration</td>
<td>20</td>
<td>42</td>
<td>25</td>
</tr>
<tr>
<td>Facilitating exchange of ideas among teachers</td>
<td>44</td>
<td>39</td>
<td>9</td>
</tr>
<tr>
<td>Giving students opportunities to interact with students from other cultures</td>
<td>53</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>Bringing new possibilities to the classroom</td>
<td>55</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>Giving students awareness of information technology</td>
<td>55</td>
<td>29</td>
<td>7</td>
</tr>
</tbody>
</table>

(Excerpts from Survey responses. Open-ended questions also included and responses categorized and analyzed).
Appendix B
Names of Selected European Projects Involving Instructional Use of Telecommunications in the Secondary School and 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)
- Computer Journal
- 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)
- PTT-NIVO Project
- RAPPI (European sites)
- Schoollink (European sites)
- Telematica (projects as part of the Dutch "Technology-Enriched Schools" project)
- TENS
- Vidcotex in education

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