CISO Project

Recommendations for an On-line Service
for Dutch Education
CISO project

Recommendations for an On-Line Service to Support the Dutch Educational Community

Final Report of the CISO Project
December 1993

by

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Preface

This report is one of the three documents comprising the CISO Project Final Report. The second of these is a document parallel to this one but in Dutch (Het eindverslag: CISO-project), written by the same authors. The third is the Supporting Documents Volume, containing approximately 275 pages of document, some in Dutch, some in English. All three volumes were presented to the Project Sponsors, PTT Telecom and PRESTO, the Dutch stimulation project sponsored by the Ministry of Education and Science for new technologies in middle-level vocational education, on 1 December 1993. The Supporting Documents Volume contains materials written by or otherwise contributed to by each of the members of the Project Team.

December 1993.

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Summary

Defining a CISO-Service

Throughout the world, telecommunications technologies are bringing new possibilities to communication and information-related activities in the school. For these possibilities to be realized, many component factors must be considered. One of these relates to the technical issues involved: schools must have a way to connect to an on-line environment. But once the connection possibilities are organized, the issue of what it is that the school connects to becomes of importance. A service has to be established that organizes the on-line information and communication options that will be offered to its subscribers and that generally supports the users of the service. We call such an organization a ‘CISO-Service’, where CISO-Stands for the Dutch words for ‘an (on-line) communication and information system for education’. A CISO-Service is thus involved with the maintenance and presentation of various component on-line (sub)services, presenting them in an integrated fashion to its subscribers. It involves therefore both technical and human organization. CISO-type services can vary widely in scope and range, both of who they serve and of what they offer. They also vary considerably in how they are organized, what they offer to their educational users, and how they offer it.

Purpose of the CISO Project

The purpose of the CISO Project was to make recommendations for a CISO-Service for the overall Dutch educational system (up to higher education). The Project was sponsored by PTT Telecom and PRESTO. PRESTO is a project group under the framework of the Ministry of Education and Science whose focus is particularly on the application of new technologies to vocational education in The Netherlands. The Project team included researchers from groups associated with the Universities of Twente, Utrecht, and Leiden, and also teachers from four different middle-level vocational schools. From mid 1992 until the end of 1993, the team investigated a broad range of issues and considerations relative to an optimal CISO-type service for Dutch education. Their analyses resulted in a series of written reports and in a set of recommendations and guidelines for such a service, which are elaborated in the final reports of the Project (December 1993), one in English and one in Dutch. The English-language version was prepared because of the widespread international interest in the general question of the Project: Characteristics and guidelines for an on-line service for education that will maximize the chance that telecommunications applications can reach their potential in the educational context.
The Project involved four parallel lines of work for which a summary follows.

**Research Focus 1: Investigating CISO-Type Services Outside the Netherlands**

The first of these lines of analyses related to making a year-long study of existing CISO-type services outside of The Netherlands. Through surveys, study visits, document analysis, interviews, and other such activities, major activities in Europe and world-wide were summarized and their main trends and characteristics extracted. Chapter 2 of the Final Report of the CISO Project gives the results of this investigation.

Main conclusions of the summary include:
- centrally supported CISO-type Services are well established in many countries, with both educational and technical staff;
- typically the central service coordinates school and teacher access to appropriate on-line information sources, stimulates and moderates on-line discussions and conferences, supports various types of on-line communication services, provides file transfer capabilities, and organizes access to distributed resources available through internetworked access to other on-line systems; and
- becomes a focal point for professional support and growth relative to telecommunications applications in education in its region or country.

Many particular recommendations for a Dutch CISO-Service were extracted from this analysis, particularly from the national CISO-type services already functioning in other European countries.

**Research Focus 2: Investigating the Dutch Context for Telecommunications in Education**

The second of the year-long lines of inquiry in the CISO Project related to an analysis of the particular Dutch context relative to an optimal CISO-type service for education. Previous and current experiences with on-line activities in support of education in The Netherlands were studied and opinions and ideas relative to the characteristics of such a CISO-type service were gathered from a large number of persons and groups. Also, factors particular to the Dutch educational system at the current time, in particular the move toward the self-responsible school, were also studied, and seven judged to be most significant to the implementation of a CISO-Service were elaborated. Chapter 3 of the Final Report summarizes the analysis of the Dutch context.

**Research Focus 3: Studying School and Teacher Experiences Especially Organized for the CISO Project**

The third of the lines of inquiry in the CISO Project involved the participation of eight teachers, from four middle-vocational schools, in an extensive examination of their experiences and ideas about the educational use of telecommunications. The experiences of the teachers, beginning with their reactions to initial inservice activities and extending through their reflective opinions about the
overall implications of telecommunications for education, provided an important range of insights for a CISO-Service in The Netherlands. Chapter 4 of the Final Report summarizes this stream of investigation in the CISO Project, and refers in turn to more than 20 reports in the Supporting Documents Volume of the CISO Final Report elaborating these school- and teacher-based experiences in more detail. Among the many considerations that emerged were:

- the particular benefits of a focus on telecommunications use for professional support of the teacher and school; and
- the problems and needs that teachers will have, both in the school and at home, in obtaining adequate access to on-line use for their own instructional preparation and professional activities.

Research Focus 4: Synthesizing and Clarifying

The last of the parallel streams of the CISO Project was that of the on-going process of consideration, analysis, and synthesis that took place with respect to the sharpening of awareness of the factors and characteristics that would be most productive to consider in terms of recommendations for a CISO-Service for Dutch education. For a CISO-type service to be successful, many different, interacting variables and considerations needed to be taken into account, prioritized, and seen in a strategic framework relative to short-term phasing in of such a Service, and long-term development of the Service. Using a methodology based on ‘responsive multi-participant illumination’, the Project Team worked continually throughout the year in an iterative search for an effective set of recommendations for a CISO-Service for Dutch education. Chapter 5 of the Final Report elaborates this synthesis, and contains:

- suggestions for priority focuses for telecommunications-related services for Dutch education, with an emphasis on supporting school and teacher professionalism;
- specific recommendations relating to a CISO-Service and its strategic evolution, including issues relating to responsibility, financing, and types of (sub)services and activities to be supported; and finally,
- with a reflection on two possible scenarios for telecommunications application in education in The Netherlands, one based on the presence of an effectively run integrated, national-level CISO-Service, and the other based on the state of affairs likely to evolve if the current, non-coordinated and non-integrated approach to educational telecommunications use that is now the case in The Netherlands simply continues.

Highlights of Recommendations

At the risk of oversimplifying a complex, interrelated set of recommendations, considerations, and strategies, the following could be said to be major conclusions from the CISO Project:

- A centralized service, coordinating and providing leadership for educational applications of telecommunications, is already established in many countries and brings with it important benefits of more professional and efficient on-line and support services, and the likelihood of a broader range of resources and experiences, in a more time- and cost-saving way than is the
case with no integrated service. We thus recommend such a focal-point CISO-Service for Dutch education.

- Although students benefit from well-managed on-line activities, a major value for a CISO-Service in The Netherlands at this time is in support of the professionalism of the school and teacher. Thus CISO-Services and strategies should be initially focused on school and teacher needs and characteristics, rather than primarily on student use.

- Many on-line services for education are already operating in The Netherlands, but in an uncoordinated and not-internet-worked way, predominately on highly limited budgets and relying on the voluntary commitment of particular individuals. Any centralized CISO-Service should be organized as a service that offers, through a common front-end, access to a distributed network of already existing local and specialized on-line services, but also networks of international interest, and particularly to the Internet system. Thus an integrated CISO-Service, as we envisage it in this study, is not a competitor to existing services but a way to enhance and strengthen them through benefits coming from scale, interconnectedness, and professional organization.

- An effective CISO-Service should be run as a professional support operation for the educational sector, requiring stable funding. Costs to schools and teachers must be kept as low as possible.

- Teachers and the school administration will need particular help in finding ways to access the on-line service, from both school and home, in order to realize its capacity for supporting professional growth.

- A phasing-in strategy for the CISO-Service should involve identifying a particular communication or information need that is currently a source of frustration among teachers and school leaders, and then finding a way whereby the on-line service can address that need and making this way accessible to teachers and schools as easily and broadly as possible. This ‘trigger event’ strategy can help build a momentum of use of the CISO-Service.

- Accessibility is a critical barrier to telecommunications use in education. Reducing accessibility problems should underlie all phasing-in activities of the CISO-Service.
1 The Dutch CISO Project

In the first section of this report we describe the needs underlying the investigation of an on-line communication and information service for support of the educational sector in The Netherlands and how this investigation was carried out by the ‘CISO Project’. The goals, strategic and theoretical frameworks, research questions and methodologies, and general organization of the Project are described.

1.1 Needs for Better Communication and Information Access in Education

1.1.1 Student needs
Better and more efficient communication and information access are becoming critical characteristics not only of education but of productive society more generally. Interconnectiveness among people and information will form the framework of much of the activity in which today’s students will be engaged when they enter the work world, and thus the educational system has an obligation to better orient students to literate and capable functioning in internetworked communication and information environments. In addition, such environments can offer students access to experiences beyond the resources of the ordinary school, experiences that can not only compensate for inequitable access to resources in the local environment but also enrich and extend the possibilities for learning beyond what even the most well-equipped school could offer.¹

1.1.2 Needs related to educational professionalization
But better and more efficient communication and information access are not only of value to students. Increasingly, schools and those who work within them or in support of them, are being called upon to assume more professional self-responsibility. In particular, increasing the professionalism of the teacher and of the school administration is being more and more recognized as an important co-requisite of effective schools and learning. For example, in a recent international study², quality improvement in schools was seen as critically related to the information and professional networking available to teachers and school leaders (Chapman & Mählck, 1993).

Information for quality improvement is however not a ‘trickle down’ dissemination process, but instead is fundamentally related to human networking and a sense of participation in the information-flow process.³ Although the networking approach to improved teacher and administrator effectiveness can proceed without a telecommunications infrastructure, on-line communication and information access increase by orders of magnitude the opportuni-

¹ There are literally hundreds of references available to support and expand upon these statements. The proceedings of the Tele-teaching ’93 Conference, held in Trondheim, Norway in August 1993 (Davies & Samways, 1993) is an extensive source of experiences, predominately European. Other summary references include Collis, 1993, in an overview prepared for the Council of Europe; and Roberts, 1991, in a report prepared for the United States Congress Office of Technology Assessment. A collection of over 200 reports and articles relating to the educational value of telecommunications for the school sector was accumulated during the CISO Project.

² Conducted by the UNESCO-sponsored IIEP (the International Institute for Educational Planning) and the IEES (Improving the Efficiency of Educational Systems), sponsored by the United States Agency for International Development.

³ See, for example, Buda, 1993.
4) The recent survey of teachers using telecommunications carried out in the United States by Honey and Henriquez (1993) indicates that these teachers feel the opportunities offered to them for on-going professional development through on-line communication and information are having a significant impact on their work and level of professionalism. Similar experiences are being documented in many countries, including Japan (Sage, 1993); New Zealand (Steward, 1993); and Russia (Berenfeld, 1993); and throughout Western Europe (see the report prepared for the conference on the Use of Databases and Telecommunications in Education, June 1993, Copenhagen, under contract of the Task Force Human Resources, Education, Training and Youth of the Commission of the European Communities).

1.2 Telecommunications in the Context of Communication and Information Needs in Education: The Need for a Coordinating Service

1.2.1 The need for facilitation

Rapid advances in telecommunications technologies and services becoming available via those technologies are escalating the opportunities not only for students but also teachers and school administrators relative to communication and information.

But there is a large gap between possibilities and usabilities. Much more than a technical infrastructure is needed for educational enrichment and professionalization to occur. Some sort of a service, or agency, or other method of facilitation must occur so that:

- Valuable and appropriately organized information is available and access to it as well as contribution to it are made as efficient as possible.
- Human contacts, for expertise-sharing and cooperative learning and working, are supported in ways appropriate to the needs and characteristics of those involved, be they young students or senior administrators.
- Opportunities for communication and information handling are affordable, accessible, and take into account the situations of the users.
- A focal point for coordination, stimulation, technical and professional growth, and overall leadership can be identified
- Economies and other benefits of scale can occur.

1.2.2 Defining a CISO-Service

Thus a human organization must occur that in some way facilitates, stimulates, and supports effective use of on-line communication and information possibilities in order for them to reach their educational potential. This organization will have many different aspects: technical and electronic, service and support, brokerage and quality maintenance, financial and procedural. Because this type of organization is relatively new, terminology describing it has not yet standardized. We will describe it here as a ‘CISO-Service’, where ‘CIS’ stands for (on-line) communication and information systems, and ‘O’ stands for the Dutch word for education”.

We use the phrases ‘CISO-Service’ and ‘CISO-type services’ throughout this report, to indicate both an on-line system and its associated human-managed organizational system, which together offer an integrated range of communication and information services to the user.

1.3 A CISO-Service for The Netherlands?

CISO-Services already exist in many variations. Such services may be cross-national or local, free to users or commercially available, especially made for education or adapted by educators to their own
purposes, and may be limited to scope to one type of user or theme or exist as umbrella agencies that coordinate large numbers of other CISO-Services. In various configurations and with different target audiences and characteristics, CISO-Services especially organized for education are in operation throughout Europe, North America, and many Pacific Rim countries, and also in The Netherlands (see Sections 8 and 9 of this report)⁶. However, the current CISO-type services in The Netherlands (ten of which have formed a loose (non-electronic) association among themselves called ‘PETTO’)⁷ have different backgrounds and focuses; are not internetworked in any realistic sense for the educator wishing ‘one-stop’ access to appropriate resources and human contacts locally, nationally, and internationally; and generally have limited, uncertain or short-term financing and manpower.

Among those wondering if a more integrated approach to a CISO-Service, anticipating increasingly demanding future use by the educational community throughout The Netherlands and supported centrally through both policy and stable funding, should be promoted, and if so what its characteristics should be, are PTT Telecom (telephone and telecommunications utility) and ‘PRESTO’. PRESTO has been formed by the Ministry of Education and Science to stimulate and coordinate the use of new technologies in lower- and middle-level vocational education in The Netherlands. Vocational education is a large, complex, and important sector of both secondary and post-secondary education in the Dutch educational system. A critical characteristic of the vocational educational sector is its close relation to the work areas for which its students are preparing. Telecommunications-related experiences are therefore, for both student and staff-related reasons, of particular interest in this sector. PTT Telecom and PRESTO thus together decided to sponsor an investigation leading to integrated and broadscale recommendations for an efficient, productive, CISO-Service for The Netherlands, a service that would lead to the better use of telecommunications possibilities for both students and educational professionals. Making these recommendations is the task of the ‘CISO Project’.

It was not the role of the CISO Project to evaluate or comment upon the existing on-line services already in operation in The Netherlands, but instead to focus more generally and strategically on characteristics of an effective national-level CISO-Service and how it may be realized. Thus the Project will not make recommendations relating to the current or future operation of any particular existing service or project.
1.4 The CISO Project

1.4.1 General goal and outcomes of the Project
The general goal of the CISO Project was to:
‘contribute to the long-term development of the use of telecommunications for communication and information support in Dutch education.’
This contribution is to occur through the particular means of a set of recommendations ‘for an educationally oriented on-line communication and information system and its associated organizational service.’ The recommendations are to pay particular attention to the educational value of such a system/service, its costs, and factors influencing its implementation and acceptance into widespread use.

1.4.2 Strategic and theoretical frameworks for the Project
We took as the strategic organizer for the Project the idea of a supply and demand dynamic; that the task of the CISO-Service would be, at its core, to make what is supplied through the Service valuable enough, accessible enough, affordable enough, attractive enough, and on target with the needs and wishes of teachers and other educational decision makers, so that demand for the Service will grow. The eventual practical test of the Service will be in terms of reaction of the demand side: Is the Service used? Is it perceived to serve a valuable function, and is it perceived to provide its services well? Is it used by students? by teachers? by administrators?
By others with an interest in the educational system?

But a CISO-type Service available electronically is an innovation for most educators. Thus we took as the theoretical framework for the study the considerable work that has already occurred relating to the diffusion of an innovation in education. In particular, we used the ‘CBAM’ Model (Concerns-Based Adoption Model; Hall, Louckes, & Rutherford, 1977) which has been extensively validated with respect to computer use in education, including in The Netherlands (see for example, Doornekamp & Carlear, 1993).
This Model says that teachers (and administrators) go through a predictable sequence of seven ‘stages of concern’ about an innovation, which can be expressed as:

**Concerns-Based Adoption Model**

1. Little or no concern or interest
2. Concerns about the general characteristics of the innovation and what is required to use it
3. Concerns about one’s personal skill in starting to use the innovation
4. Concerns about the organization and management of the use of the innovation in some aspect of routine practice
5. Concerns about the impact of the innovation on students
6. Concerns related to interacting with peers in the application of the innovation, and
7. Concerns related to the development of a leadership role in the use of the innovation and in consideration of its implications for educational change
The application of the CBAM Model relative to the development of the demand side of a CISO-Service (teachers and other educational professionals) suggests that strategies for the phasing in of such a service need to anticipate the above sequence through the types of experiences and support offered. According to the Model, expecting teachers to move from Level 2 to Level 5 without passing adequately through Levels 3 and 4 is likely to be unproductive. This suggestion was examined as a component aspect of the CISO Project study and underlies the study's recommendations relative to strategy for phasing in of a CISO-Service.

1.4.3 Research questions for the CISO Project
To address the task of making recommendations for a CISO-Service for Dutch education, 20 clusters of research questions, grouped in five categories, were identified for the CISO study. These questions related to:

Issues Relating to Educational Relevance:
- educational relevance of CISO use for students;
- lesson integration possibilities of CISO-mediated communication and information;
- professional benefits of CISO use for teachers and administrators and the school as a whole.

Teacher-Related Issues (in addition to teacher professionalism):
- factors associated with a teacher's access to telecommunications, including time, location, and costs;
- effective teacher inservice for CISO use;
- effective on-going support for teachers with respect to CISO use.

School-Related Issues:
- relationship of telecommunications use to other computer-related activities in the school;
- costs;
- school policy regarding support of teacher's use (including at home) of telecommunications services for lesson preparation and for more general professional activities, including on-line inservice.

Strategic Issues:
- overall financial framework for the CISO-Service;
- identification of groups responsible for the support, management, and delivery of CISO-Services;
- profiling choices and operating targets for the CISO-Service, including usage expectations and indices of successful development;
- strategies for stimulating use of the CISO-Service.

Issues Related to the CISO-Service itself:
- general technical infrastructure and related technical issues, including internetworking possibilities (both with local and regional CISO-Services and also with the INTERNET system);
- types of functions and services to be supported by the CISO-Service and their costs to the users;
issues related to the information available through the CISO-Service; its selection, maintenance, filtering, indexing, and forms of retrievability;

- issues related to the effective management of on-line discussions among teachers and/or administrators;
- user-interface issues and other issues related to the software through which the user accesses CISO environments;
- help and support options and strategies for users;
- issues related to the operation and organization of the CISO-Service itself, as a business or service agency. 

It was not expected that every issue would end up being substantially addressed by the Project. All, however, needed to be considered.

1.4.4 General methodology for the study

A ‘multi-perspective illumination’ approach (Parlett & Dearden, 1977; Melton & Zimmer, 1987) was chosen for the study. This approach focuses on an issue (in our case, the CISO-Service) as a whole in its natural context and attempts to ‘illuminate’ it from a variety of perspectives. The approach bases its validity on having a large sample of input, from interviews, group discussions, naturalistic observations, structured and open questionnaires, checklists and logbooks, analyses of pertinent documents, analyses of external experiences, (in our case) analyses of actual on-line behaviours of teachers, and ‘any other resource which could help illuminate the situation’ (Melton & Zimmer, 1987, p. 112).

Interviews, project experiences, discussions and other sources of opinion should take place in a responsive fashion, that means, where the researchers respond to and are shaped by the emphases that emerge during the research (Stake, 1976). Not only do the researchers continually rethink their own emphases from the insights that emerge during the Project, but they also should evolve toward a more responsive sense of the needs of those to whom the Project results will be relevant (see, for example, Schermherhorn & Williams, 1979). Thus the research-question clusters originally defined for the Project (Section 1.4.3) evolved during the Project, with some getting more emphasis or redefinition, and other less specific attention.

A multi-perspective illumination approach should reveal the multiple realities of a complex project, such as is certainly the case with a national-level CISO-Service and its use. The strength of the approach however is also its risk: the accumulation of much observation, opinion, experience, and perception brings with it an inevitable subjectivity of the researchers in their synthesis of the accumulation and their extraction of recommendations from it. On-going triangulation ‘of input as well as of interpretations and insights’ is thus critical to the acceptability of a multi-perspective illumination approach (Russek & Weinberg, 1991).
1.4.5 CISO Project overall procedure

In order to bring as many perspectives as possible into consideration, the study consisted of four parallel streams of activity.

The first involved an investigation of experiences with CISO-type services outside of The Netherlands. This investigation was conducted through document analysis, interviews, discussions, study visits, attendance at conferences, and multi-national surveys over the one-year period of the study.

The second stream of activity related to an analysis of the particular context for a CISO-Service in The Netherlands, including an investigation of previous and current telecommunications experiences, through document review, interviews, group discussions, surveys, and other forms of information collection, again over the one-year period of the study. Policy-related issues and economic realities in the Dutch educational system, particularly those relating to the support of information technology in education, were also considered.

The third stream of activity related to a detailed investigation of the use of existing on-line services by eight teachers at four vocational secondary schools in The Netherlands. The teachers were supported both at school and at home in their use of telecommunications services. These teachers were given carefully designed in-service and on-going support relative to on-line use and its curricular relevance; and were involved in a variety of data-gathering and opinion-gathering activities, including interviews, group discussions, logbook entries, written reflections, and on-going communication with the research team throughout the year-long period of the Project. In addition, the teachers’ on-line activities were captured electronically and analyzed. Furthermore, other key persons in the teachers’ schools, including the school directors and computer coordinators, were interviewed at least twice, and the schools as a whole were studied relative to their experience with innovation, with computer use, and with telecommunications.

The fourth parallel stream of activity related to the evolution of thinking of the research team itself, as it worked together throughout the Project period to continuously respond to and readjust and reconsider the meanings of the streams of input coming from the above three streams of activities.

1.4.6 Project participants

The Project partners were:
- PTT Telecom and PRESTO, as project initiators and members of the Steering Committee of the Project.
- The Parliamentary Documentation Centre and the Stichting SIM (Foundation for Information Management) of the University of Leiden, responsible for the overall management of the project; for the general contacts among the Project Team, the Steering Committee, and the schools and other groups involved in the
study; for the provision of the hardware, software, and on-line services to the project; and the maintenance of human and on-line help for project participants.

- The Faculty of Educational Science and Technology of the University of Twente, responsible for the research aspects of the project.

- The IVLOS-DIWIT Institute of Education of the University of Utrecht, responsible for teacher liaison, teacher inservice and support, and development of lesson materials for the teachers.

- Four schools for middle-level vocational education in The Netherlands and eight teachers from those schools.

1.4.7 Timeline for the study

The Project began its official year of operation in December of 1992. However, substantial activity for the Project began six months earlier, and considerable insight and experience was already accumulated by the formal date of Project start (with nine institutions involved, and within these institutions different departments, the formal aspects of the Project moved more slowly than the human aspects).

1.5 Overview of the Report

The four streams of activity in the CISO Project are described and analyzed in the following four sections of this report. Section 2 synthesizes the investigations about CISO-type services in operation outside of The Netherlands. Section 3 summarizes the Dutch context, including previous and current experiences (outside of the CISO Project) with telecommunications in education and current realities constraining policy and support for a CISO-Service. Section 4 gives an overview of the extensive activities involving the four schools and eight teachers participating in the CISO Project and summarizes the experiences and opinions and input from the schools and teachers. Section 5 presents the researchers’ overall synthesis of the streams of Project investigations, and based on the strategic and theoretical frameworks of the study, presents its recommendations.
2 Experiences Outside The Netherlands with Broadscale CISO-Type Services

The first of the research streams for the CISO Project related to the analysis of existing practice outside of The Netherlands with on-line communication and information systems in support of education. In this section we summarize our methodology for this analysis, give major features of selected European and outside-Europe national-level CISO-type services, and indicate our conclusions relative to a Dutch CISO-Service.

2.1 Method

2.1.1 Procedures

The task of gathering and comparing information about existing CISO-Services outside of The Netherlands was carried out through:

- A collection and synthesis of information about such environments and their organization in 20 European countries, as well as a number of other countries and regions from throughout the world including various US states, Canadian provinces, Australian states, New Zealand, Japan, Hong Kong, Mexico and Chile.
- Study visits to the Nordic countries and to Switzerland to interview key persons associated with CISO-type services\(^\text{11}\).
- Surveys distributed on-line and through the post to international users of the British Campus 2000 CISO-type service\(^\text{12}\).
- Informal interviews and discussions with more than 25 users and managers of CISO-type services operating outside The Netherlands.

11) An (English-language) report of the Scandinavian Study Visit is included in section E4 of the Supporting Documents Volume of the CISO Project Final Report.

12) An English-language summary of the results of these surveys, by B. Collis and E. Lammertama, is also included in section E3 of the Supporting Documents Volume of the CISO Project Final Report.

2.1.2 Categorization difficulties

A major difficulty in attempting such a synthesis is differentiating among on-line activities, on-line projects, local bulletin-board systems, and wider-area CISO-type services. Networks are described in ways that sometime relate to their technical infrastructures, other times to the human communities being served by the technical infrastructure, other times to the actual on-line environments themselves, and still other times to the human organization that manages an on-line system. Compounding the difficulty of selection of on-line services relevant for synthesis in the CISO Project is that fact that in many countries the distinctions between special on-line projects, on-going on-line projects, and on-going network services are difficult to determine; as are the distinctions among networks within institutions, networks connecting institutions, networks for special purposes, and networks for regional and national educational applications. Internetworking compounds the difficulties.
2.1.3 Delimitations for the CISO Project
In order to streamline the range of experiences with telecommunications environments and services to those most directly relevant for the CISO Project, we used the following selection criteria: (a) on-going CISO-Services rather than special projects, or activities taking place within the frameworks of on-going CISO-Services; (b) CISO-Services relating to an entire country or jurisdictional region within a country (i.e., a canton in Switzerland); and (c) services focused on the school sector, as opposed to higher education and training sectors. In the following sections, examples from Europe and outside Europe meeting these criteria are described.13

2.2 European CISO-Services
The following list gives an overview of selected CISO-type services in Western European countries. Each point listed is chosen as having relevance for a Dutch CISO-Service.

2.2.1 Belgium (French Speaking)
- Provision of every secondary school with a microcomputer equipped with a 9,600 bps modem, connected to a central IT Network for Education, supported by the Ministry of Education.
- Provision of e-mail services.
- Centrally maintained on-line data bases, broadly available, such as:
  • for audio-visual resources;
  • for support of students choosing careers or study areas (the CHOIX databank);
  • for access to ECHO, the databank of the Commission of the European Communities for educational information;
  • economic data banks (TELELINK and HOMEBANKING) offered to 60 educational establishments and sponsored by the Banque Bruxelles Lambert;
  • DIDACTEL educational software databank, sponsored by Bruxelles Lambert Banque and Philips;
  • RéCoDA (database of documentation relative to studies associated with agricultural science education, containing 46,000 references).
- Support for participation of schools in international projects, via the British CAMPUS 2000 Network.
- New development of services for the DIDACNET Network, sponsored by Bruxelles-Lambert Bank and linking 60 educational institutions, for computer-mediated-communication in Belgium’s three official languages; and connection of the DIDACNET Network to the international ‘K-12 Net’ for international projects (Verloove, 1993).

2.2.2 Denmark
- The Schools Database Service, supported by the Ministry of Education and serving now more than 500 Danish schools. The objectives of the Service as described by Weidemann & Dulgaard, 1993, p.2, are:
‘to provide all educational institutions (from university to primary/lower-secondary schools) with access to a number of external databases and conference facilities at the lowest rate possible; to optimize accessibility to the databases/conference systems; to ensure user-friendly operation of the facilities; and to provide help and assistance in the considerable educational work required for integrating the use of databases and the conference system in teaching’.

These objectives are carried out through provision of access, at costs affordable to the schools, to a large number of on-line databases, and to a conferencing service.

- **LEARN**, a Danish electronic on-line service providing teachers, young students, members of the community, and clients from over 80 countries with the communication support needed to facilitate learning at a distance.

- The ‘Schools in Network’ Project, which stimulates and supports collaborative on-line curriculum-related projects, that have over a five-year period involved students from more than 60 Danish schools and 20 other countries.

- **TESS**, a distance-delivered inservice training project for teachers and an on-line communication project for disabled children.

- The support of locally focused smaller-scale CISO-Services, such as DIN-BASE, an electronic information and communication system developed by teachers and containing lesson experiences, results of student on-line projects, and support for projects among the children in the 180 schools connected with the DIN-Base.

- Leadership provided by the INFA Group at the Royal Danish School for Educational Studies for the LEARN and Schools in Network Project, as well as for interrelationships with other on-line projects and activities, such as development of a newsletter to highlight all the Danish experiences with telecommunications in education. (Antilla & Eriksen, 1993).

### 2.2.3 Germany

- Overall support of telecommunications by the BLK (Federal-State Commission for Educational Planning and Research) through support of regional (Bundesländer) initiatives. Projects get federal grants of about 150,000 DM annually and expenses for the telecommunications systems themselves (hard- and software, system operators, conference moderators, and the expenses of those maintaining the telecommunications services) are paid for by the federal Ministry. Costs of equipping and using the networks in schools and classrooms are paid for locally.

- Over 1,000 secondary schools are using BBS/videtexystems; SODIS, the national data base of educational software, is available throughout Germany.

- Support of German schools’ participation in various international network projects, such as those offered by Campus 2000, AT&T, the European Schools Projects, and PLUTO, is also facilitated under the central policy (Rommel, 1993).
2.2.4 Iceland
- Supported by the Ministry of Culture and Education, Iceland has the ICMENNT (the Iceland Educational Network), a CISO-Service, connecting 80% of all primary schools, 75% of secondary schools, and several higher education institutions. ICMENNT is also linked to the INTERNET system.
- A supervisor (with a teaching, not technical, background) from the Service visits every school that wishes to connect to the Network, personally setting up the equipment. The supervisor is available for help via telephone, almost ‘around the clock’. The Icelandic Teachers’ Federation supports the travelling costs of the ICMENNT staff to schools.
- Local conferencing is supported and moderated; conferencing is also used for support of distance-delivered teacher inservice and on-going support for teachers.
- A Gopher server is installed to filter access to databases and the libraries of institutions outside Iceland that are available through the INTERNET system; teachers can thus conveniently search through all these resources without any extra cost.
- Local databases are being provided, including documents from the Ministry of Culture and Education and information from the Educational District Office about audio-visual resources.
- Student participation in local projects and international projects is supported, including KIDLINK activities in which the ICMENNT takes a leadership role (Stefánsdóttir, 1993).

2.2.5 Ireland
- The National Information Technology in Education Centre (NITEC) Project provides an integrated range of information services, among them an electronic network service.
- The NITEC Network offers 24-hour a day service, and the NITEC Help Line live help from 9:15 to 17:00.
- By 1992, 219 secondary schools, 20 primary schools, 23 post-secondary institutions, and Department of Education inspectors were connected to the Network.
- Teachers have been most interested in the e-mail services and in using the network for reading notices and accessing data bases.
- Students are participating in various international on-line projects, through Campus 2000 and other services (McKenna, 1993).

2.2.6 Italy
- Italy has two major on-line services for education and supports a number of national projects involving telecommunications in education:
  - the SCUOLA-TEL is an information service available to the entire Italian public school system. It was established by the Ministry of Public Education and is run by the Library of Pedagogic Documentation in Florence. SCUOLA-TEL makes available:
    - ‘Scuola-Tel Documenti’, four on-line data bases relating to Italian educational publications, children’s literature, educational software, and books available at the National Library;
- 'Scuola-Tel Didattica', a conference service for teachers to exchange experiences;
- 'Scuola-Tel Giuridico', a database regulated by the Ministry;
- 'Uni-Tel', for students in their last year of high school, offering information about further education options.
- The AULAPERTA Service, offered by SIP, the Italian PTT, allowing access to the entire Italian videotex service, conferences for teachers, electronic mail, creation and use of forums, as a 'low cost service to schools'. For those subscribed, a hot-line and fax-news service are also offered.
- There is also support of schools' participation in international projects, such as those available through the KIDSLINK Network; and other regional and international projects such as 'Teleconsumascuola', 'Telematica Regione Toscana', and 'Sperimentazione Telematica', together involving 438 schools and financed with the support of local regions, banks, and the SIP (Grossi & Piana, 1993).

2.2.7 Luxembourg
- Support of the RESTENA Network and Network Service:
  • links all schools of secondary, technical and higher education, as well as all departments, services and institutes that depend on the Ministry of National Education. The link with primary schools is under development. All connected schools have been provided with modems and additional telephone lines;
  • offers electronic mail, conferencing support, file transfer, support of internal databases, and access to other telecommunications networks and external services;
  • particularly used for communication between school administrations and the Ministry of National Education, and communication among teachers and the existing information infrastructure (timetables and syllabuses, teaching aides, calendars of meetings, and of inservice seminars, etc).
- Support of WILYTEC, a separate CISO, available through the RESTENA Network, or independently, and particularly aimed at young children. Special services are available, and data bases chosen appropriate to the ages and interests of the children. WILYTEC is supported by the Ministry of National Education and the Ministry of Youth.
- Support of a Work Group, coordinated by the Service, for Pedagogical Innovation and Research to investigate the possibilities of distance learning through telecommunications for Luxembourg, and the subsequent development and delivery of certain inservice courses via RESTENA Service (Werné, 1993).

2.2.8 Norway
Norwegian education is extensively served by telecommunications infrastructures and services. A major example is the KUF Network, supported by the Ministry of Education, Research, and Church Affairs:
- Focused on individual teachers, rather than schools or students.
- Operation of the host system has been given to a commercial BBS firm, whose responsibilities are to keep the system
running, maintained and protected, to handle the tracking of user access and billing, to maintain a collection of files from the INTERNET and other sources, and to continue development of the technical infrastructure of the network.

- Service aspects of the Network are maintained by educators and conferences are moderated by teachers.
- Conference topics are discussions among teachers on themes such as applications of on-line information in social science teaching, planning for international exchanges, stimulating more females to computer use, and environmental issues. Many on-line conferences also grow to include face-to-face meetings or printed newsletters (Braatane, 1993).

2.2.9 Portugal

- Over 100 schools, as a result of the MINERVA Project, have a dedicated line connecting them to a national network service for education. The service supports electronic communication, widespread information dissemination, conferences, access to databases, and services for file transfer. In addition, different curriculum-related projects for students have been organized and carried out through the Network.
- The Ministry of Education is now developing the MINERVA Network into the RICOME Network, to connect all secondary schools to the central and regional educational administrations:
  - the first phase of RICOME involves supporting all schools in mail and conferencing and file exchange;
  - each regional administration is being equipped with a local area network, to connect all computers to each other and to the RICOME Network;
  - the goal is to bidirectionally convey information within, from, and to the ministry, so that regions and schools have up-to-date information and the same time the ministry has up-to-date management data from the regions and schools (De Figueiredo, 1993).

2.2.10 Spain

- In Catalonia, the creation of the XTEC Network (Catalan Educational Telematic Network) occurred in 1988, under sponsorship of the Catalan Ministry of Education:
  - services are provided according to two basic models, that of the collective construction of materials among students and teachers, and that of the structured gathering of data by students, where the formalization of materials so that they can be accumulated in a common data base for subsequent access becomes an emphasis;
  - the Service also stimulates and supports ‘reflective debates’, ‘literature debates’, ‘welcome activities’ (for newcomers to the Service), and various international projects;
  - a special emphasis is given to providing teacher-support activities, organized around subject areas, and to providing inservice teacher training via the Network, where four inservice courses are available for teacher subscription;
• continual work is going on in the development of better services; moving from the videotex format to an X.400 e-mail system and providing teachers with free access to the INTERNET system;
• the ministry supports the costs of equipment, the central network and those who provide its services, and also specific financial support to teachers who give extra time to the coordination of on-line activities.
Schools pay the telephone costs. (Castells i Prims, 1993; Vergés i Trias, Castells i Prims, & Ruiz i Tarragó, 1993).

− The Spanish Ministry of Education, through PNTIC (the Program of New Information and Communication Technology), supports all schools in its jurisdiction with telecommunications services, particularly through two major initiatives:
• the Mentor Project, providing flexible learning experiences to students, teachers, and other adults living in rural areas, through the equipping of small rural schools with extensive telecommunications and information technology resources, and providing support via telecommunications for adult self-training in 13 different courses. Clients use the school facilities after school hours;
• the Platea Plan, a national initiative to stimulate the use of telecommunications in schools, by providing specially designed software, and connecting 109 teacher centres spread over 27 provinces. Each Centre receives equipment from the central PNTIC Project and has support persons to set up a local bulletin board system using specially designed software. Thus each Centre is a node for local activities, as well as being connected to the central service at PNTIC.
The services offered from PNTIC to all the teacher centres, in addition to the software and technical support mentioned above, include:
  − access to data bases, such as of Spanish experiences with IT use in schools (more than 6,000 files of examples) and of resources available through PNTIC and National libraries;
  − E-mail and other communication services, currently being used by 2,000 persons belonging to all levels of education (including parents, inspectors, companies interested in education, and ministry officials);
  − teletutorials, for teacher inservice at a distance;
  − special information about events in the Spanish educational system, with the opportunity to submit questions about relevant subjects.
• each school can receive a modem from PNTIC and can receive direct help from an expert in its nearest Teacher Centre (San José, 1993).

2.2.11 Switzerland (Canton of Geneva)
The Centre Informatique Pédagogique (CIP), supported by the Department de L’Instruction Publique, serves the Canton of Geneva for its various needs related to information technology. These include teacher inservice, the organization and support of multi-sector working groups, the diffusion of information, the
organization of demonstrations and conferences and special-interest groups, and the support of an on-line videotex bulletin-board service.

- Every school in the Canton is connected to the CIP via a private network and leased lines and all administrative and procedural information is conveyed via the network to and from the schools. Centrally supplied print materials are minimized.
- The videotex service is used not only by schools and teachers but by members of the community, and contains a broad range of local-interest information.
- Included in the CISO-type options are also electronic mail services, data bases, and the specialized CISO, 'Kalimera', designed for use by 8-15 year old students, for collaborative activities, in any of the three official languages of the Canton. A printed newsletter sent to all schools on a regular basis highlights services and information available via the Videotex Server (Swann & Morel, 1993).

2.2.12 United Kingdom

In contrast to the other examples, educational telecommunications activity in the United Kingdom has less central support and organization. Various national projects have been conducted, and two on-line data bases, ECCTIS (relating to training and higher education courses available in the UK), and NERIS (relating to resources) were started with government funding. Such funding has since been withdrawn, with ECCTIS continuing on the basis of private funding but NERIS showing less clear support. The most widespread CISO-type Service in the UK is not supported by the Ministry but by British Telecom: This is the Campus 2000 system.

- Campus 2000 is a communication and information service specially designed and maintained for educational purposes. Some 32% of secondary schools in England and 70% in Scotland are subscribers, as are schools in over 30 countries. Subscribers pay a yearly fee, and some of the information services available through the Campus 2000 system require an additional access fee.
- E-mail services allowing international communications attract many of the users.
- Campus 2000 does not, however, connect to the INTERNET system, and this is contributing to the decision of many of its subscribers outside the UK to withdraw from its services now that INTERNET connections are more and more facilitated.\(^\text{14}\)

2.2.13 The Nordic School Network

The five Nordic countries, after a number of years of initiatives in telecommunications in education, have developed a plan for the further development of telecommunications services for Nordic Country schools. The plan is highly relevant for the Dutch CISO Project. The major components of the plan are:

- A Nordic School Network will be established, serving all five Nordic countries and linking their existing national CISO-type services.
- The Network will be accessed through a menu-driven interface
through which relevant educational institutions can give short full-text information about available funds, programmes, hints, schools contacts, etc. The service will also support e-mail communication, bulletin boards, conferences, file transfer, and a file library.

- The Nordic School Network technology shall be based on the already existing Nordic part of the Internet system, which links all Nordic higher education institutes. Accessing information over the system will be done using Gopher as a tool. Gopher is an Internet tool for administration of information which is stored in many different computers connected to the Internet system.

- Schools must pay running costs. The Nordic Council will support central costs and gateway costs to link existing network and CISO-type services.

- A strategy for inservice training has been carefully worked out. The inservice will include a special two-day session, in which all participating teachers will meet on a certain day, in different places, and have an introduction to on-line use, and then the second day will spend their time being connected with each other in their different locations.

- The phase-in period of the Network will be three years, and will involve 500 teachers from throughout the five Nordic countries. Teachers will be chosen because of their interest in modern language teaching and communication; pioneer telecommunications users already in the school will not be chosen as part of this first group of 500 teachers.

- Programming work is being done to solve problems with the special Nordic characters and the use of non-Nordic networks.

- The Network is to use existing technology. It is to be up and running in six months’ time from its budget approval in Fall, 1993.

- The focus of use is to be language training and environmental studies projects. Existing projects will be built upon.

- The strategic framework for the implementation strategy is the ‘3-A’ Model (advantage, accessibility, attractiveness; Collis & De Vries, 1991, 1993; see Section 5.2).

- Three teams have been established to run the phase-in of the Network: a team responsible for finding interesting information to put on the Network, a team responsible for technical issues relating to the Network, and a team of educational specialists responsible for putting the Network into use in instructional settings and evaluating what happens.
2.3 Other National or Regional CISO-Services

There are many other examples of CISO-type educational network support at the regional, national, and international level that could also be particularly informative to the Dutch CISO Project. Space limitations do not permit comment here on more than a selected few. The following examples highlight some features of particular value to the Dutch CISO Project:

2.3.1 New Zealand

The ‘Schools Sharing Information Network’ (SSINet) was started by the Massey University Educational Research and Development Centre and now connects 65 schools to the university Centre. Its focus is on staff development, staff training, and school development. Motivation for schools to participate in the Network comes from a change in the organization of education in New Zealand in 1989, after which schools are expected to be much more autonomous in their management and to take responsibility for their own staff and institutional development. However, tertiary institutions were neither funded nor staffed to be able to service the needs of schools on an individual basis (Stewart, 1993, p. 856). Thus the SSINet was begun, as a self-funding consortium.

A focus has emerged on the support and professional development of school principals, particularly those in smaller schools. This support occurs through various on-line discussions, short courses, mentoring arrangements between more-experienced principals and less-experienced principals, and maintenance of data bases and conferences around the topics of computing developments for school principals, curriculum changes, pupil and school discipline, educational news bulletins, news bulletins from the Principals’ Federation, training and school development, and shareware.

The major goal of the SSINet services is development of the concept of the school as a learning community with the principal as a major learner and researcher in this community (Stewart, 1993)

2.3.2 Japan

In Japan a growing number of teachers are active participants on various public telecommunications networks and are using this to shape their own informal, on-going professional education (Saga, 1993).

- There are over 20 national computer networks in Japan being used by more than 300,000 people as well as over 2,000 local networks. Among these are:
  - the AV-PUB, a national audiovisual educational materials information network, is supported by the Japan Audiovisual Education Association, that enrols over 250 institutions;
  - the PC-VAN network, with over 250,000 subscribers, has two special interest groups relating to education, the ‘Education and Software’ group and the ‘Computer-Assisted Instruction’ group. Each offers many on-line conferences, e-mail communication among interested parties, downloading of public domain software, and connection via INTERNET to
international teacher discussions and conferences. The Education and Software service is run by volunteer teachers, while the CAI service is supported by an association of software engineers.

- There are many other network services for education, stimulated by a variety of sources, including local education agencies, universities, professional societies, and curriculum-interest groups. The National Ministry of Education supports many such services run by local Boards of Education.

- The main outcome of this activity is seen as a revolutionary approach to teacher inservice in Japan; that parallel to traditional teacher inservice courses, teachers are more and more shaping their own on-going professional growth through voluntary participation in different on-line communities (Saga, 1993).

2.3.3 United States
Extensive CISO-type services are established in most (to date, 46) of the US states to provide educational networks and network support to teachers and students. (Kurshan, 1991). Space does not permit a discussion here; however, a major aspect of the various services is to support professional development experiences among teachers (Honey & Henriquez, 1993).

2.4 Implications for the Dutch CISO Project

The examples indicated here as well as the conclusions from the many other activities analyzed in this stream of the CISO Project suggest many implications for a Dutch CISO-Service. The following emerged from the synthesis:

2.4.1 With Respect to a National Service
- Given the extensive activity in so many countries and regions throughout the world, the value of central support of an on-line environment for education and of a service structure to make that environment relevant and accessible to the needs of teachers, schools, and students seems strongly supported.
- Effective and efficient internetworking is not a grass-roots proposition that can be left to the pioneer teacher.
- In most countries, central initiative and funding is necessary for the support of the network, its service structure, and some of the costs of local connection to the network. In general, this initiative is the responsibility of the Ministry of Education. There are many examples of contributory funding from businesses or professional institutions or other groups.

2.4.2 With Respect to the Educational Functions of the CISO-Service
- A definite trend is evolving: toward major use of the network and its services for teacher and school development, for information exchange among ministries and schools, and for opportunities for educational professionals to engage in discussions and exchange information with each other.
This trend toward professional development and support as a major use and benefit of telecommunications is emerging in many countries.

- Parallel to this trend toward professional development, interest is growing in formal and informal uses of telecommunications networks for more flexible and distributed provision of teacher inservice.
- Facilitating access to information among teachers, schools, and also students, remains a major function of on-line services. Mostly the information is of local or national origin, but other times international. Improvements in software interfaces and search procedures to facilitate the locating of relevant information and for attractive and effective presentation of information are important to efficient information handling.
- Facilitating well maintained, timely discussions among educators about topics of interest is a major use and perceived benefit of networks. Improvements in software for conferencing can stimulate more effective participation in and maintenance of on-line discussions.
- Student use of networks is generally through well-organized short-term projects, usually with reference to language practice or cultural-sensitivity development.
- Connection of local services to external networks, via the INTERNET system, is seen as a natural expectation and evolution. A seamless movement, from the perspective of the user, among different networks and services is important.

2.4.3 With Respect to the Organization of Network Use and Support

- Full-time staff, both technical and educational, are needed to maintain network services and to facilitate their use. Their skill and strategies will make a major difference relative to the subsequent use of and growth of network services in a country.
- Teachers and schools need help in initial use of a network, and in on-going use. Costs to the individual must be kept as low as possible, ideally with no cost to the individual.
- Off-line activities, such as seminars, newsletters, and demonstrations are needed to stimulate and support on-line activities. These are generally the responsibility of the CISO-type Service organization.
- An implementation strategy, involving integrated focuses on technical issues, content, and teacher inservice, is important. The Nordic Schools Project is an excellent example.
3 The Dutch Context for Telecommunications Use in Education

As is the case in many other countries, The Netherlands also has considerable experience with telecommunications in education. In this section, this experience is briefly examined with respect to its relevance to the goals of the CISO Project. In addition, salient aspects of the current educational, social and economic climate in The Netherlands affecting the recommendations of the CISO Project are identified.

3.1 Previous Experiences With and Current Use of Telecommunications for Educational Applications in The Netherlands

In The Netherlands, there are many reports and publications available about telecommunications-related activities in the school-related educational sector. A number of these relate to individual projects, while others to bulletin-board services and other types of on-going on-line provision.

3.1.1 Telecommunications projects

As a summary of these various projects, Veen and Vogelzang have recently prepared a review in which the focus was project-related telecommunications activity in The Netherlands over the period 1987-1993. In their summary they note that these educational telecommunications projects generally had the goal of exploring the prospects for telecommunications in education. Some of the projects were independently set up, some with ministry or PTT Telecom support, others via initiatives from individual educational establishments or business and industry. No national coordination has existed to systematically chart or build upon the experiences. Veen and Vogelzang’s general conclusions include:

- The projects tend to come to a close the moment the first phase, the initial phase of the process of innovation, has just been completed, or is not even nearing completion.
- The project results are slanted by the fact that, during the project, external support and extra facilities are made available to the pilot schools and teachers involved. The stimulus that this instills decreases the transferable value of the conclusions of the projects to 'standard' educational institutions (pp. 897-899).
- Promising aspects in using telecommunications in the projects appear to be: speed, topicality, information-processing, motivation, participation, a greater range of information, and organizational efficiency (p. 902).
- Common problems include: problems at the school-management level relating to policy, financial support, organizational and personnel support, and moral support; problems relating to the
organizational, technical, and pedagogic skills of the teachers; and the need for human networking to underlie telecommunications contacts (p. 903-905).

Figure 1


<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Period</th>
<th>Educational sector</th>
<th>Number of Schools/ Teachers Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albanus Project</td>
<td>e-mail on current issues via Greennet</td>
<td>1.3.90 -1.7.91</td>
<td>primary</td>
<td>3 schools</td>
</tr>
<tr>
<td>Apple Global</td>
<td>e-mail, BBS and use of databases</td>
<td>1.1.90 -1.5.91</td>
<td>lower vocational</td>
<td>1 school</td>
</tr>
<tr>
<td>Computer-journaal</td>
<td>multi-media awareness training of telecommunication</td>
<td>1.1.89 - present</td>
<td>secondary</td>
<td>n.a.</td>
</tr>
<tr>
<td>E-mail NL - F</td>
<td>e-mail in modern language teaching</td>
<td>1.9.99 -1.2.91</td>
<td>secondary</td>
<td>1 school</td>
</tr>
<tr>
<td>E.S.P.</td>
<td>e-mail in Interdisciplinary subject themes</td>
<td>1.1.88 -present</td>
<td>secondary</td>
<td>+ 100 teachers</td>
</tr>
<tr>
<td>GISET</td>
<td>on line data retrieval</td>
<td>1987 -1991</td>
<td>secondary</td>
<td>+ 200 teachers</td>
</tr>
<tr>
<td>Dutch PTT-NIVO</td>
<td>provision of hard-, software and telephone lines; schools were free to experiment</td>
<td>1.11.87 - 1.11.89</td>
<td>secondary</td>
<td>110 schools</td>
</tr>
<tr>
<td>School Information Service Center (SISC)</td>
<td>data retrieval and compilation of the database for students' own use</td>
<td>1.6.91 -1.9.92</td>
<td>primary secondary</td>
<td>35 teachers</td>
</tr>
<tr>
<td>Schoollink</td>
<td>e-mail, e-conferencing, BBS and data retrieval</td>
<td>1.10.89 -present</td>
<td>primary secondary</td>
<td>7 schools</td>
</tr>
<tr>
<td>Studietel</td>
<td>distance learning, e-mail and BBS</td>
<td>1.5.89 -1.5.90</td>
<td>higher vocational</td>
<td>3 schools</td>
</tr>
<tr>
<td>Tele CAI</td>
<td>distance learning and tele teaching</td>
<td>1.2.90 -present</td>
<td>higher vocational</td>
<td>1 school</td>
</tr>
<tr>
<td>TENS</td>
<td>e-mail</td>
<td>1.3.89 -1.7.89</td>
<td>secondary</td>
<td>12 schools</td>
</tr>
<tr>
<td>West-Netherlands modal school</td>
<td>data retrieval and e-mail</td>
<td>1.8.88 -1.8.92</td>
<td>secondary</td>
<td>1 school</td>
</tr>
</tbody>
</table>

These findings are similar to those of the Collis & De Vries (1991) study. The findings make it clear that the short-term project in itself, especially now that we have ample experience in ‘exploring’ telecommunications, is not likely to be translated into lasting value to the educational system. It takes considerable time and usually involves start-up difficulties before telecommunications use becomes functional and efficient. Rediscovering this every time a school or teacher wishes to use on-line services leads to an inevitable waste of start-up time, and even discouragement or scepticism among
potential users. On-going support and a facilitative context are necessary to overcome predictable common problems and extend the services and experiences available via telecommunications beyond the pioneer or project basis.

3.1.2 On-going activities and services
Some educational telecommunications activities and services in The Netherlands are more on-going. Some of these are associated with international network services of different sorts. The Dutch-based ‘European Schools Project’ (ESP) which started its development in 1987, now coordinates and leads ‘teletrips’ (defined as ‘structured ways of using computer mediated communication within education’, Sligte & Meijer, 1993) that involve schools throughout the world. The ESP Project, which has a strong international reputation, has received funding from the University of Amsterdam, but generally operates on volunteer efforts and solutions. Although ESP is highly sensitive to the need for human networking and communication support among the teachers whose classes participate in ESP activities, the service is generally aimed at facilitating the student projects that are structured and carried out.

The on-line services ‘Courseware Transferpunt’ and ‘ECCLES’ are examples of services of a different nature. Courseware Transferpunt is a service sponsored by PRESTO by which educational software appropriate to the lower and middle-level vocational educational sector in The Netherlands can be examined on-line. ECCLES is an on-line data base and bulletin-board system focused mainly on evaluations about educational software and its use in The Netherlands. ECCLES is maintained by Anderson Consulting-ECC, a group with direct roots in the former national educational computing centre in The Netherlands. Since 1992, ECCLES and Courseware Transferpunt have had a cooperation, as a result of which, among other things, users can access either service through the same software menu. Subscribers to ECCLES in 1992 include educational institutions throughout The Netherlands, libraries, schools, Ministry agencies, and support services and predominately use the service to seek out information and teacher-submitted experiences with software packages for different curriculum areas.

A bulletin-board aspect has also been started, whereby more open exchange of comments can occur and files can be downloaded (Groen, Renema, & van Roekel, 1992).

‘SLO-Lijn’ is a more broadly based bulletin-board system, run by the National Institute for Curriculum Development (whose abbreviation is ‘SLO’ in Dutch) with support of PTT Telecom. SLO-Lijn offers communication facilities, file transfer, and maintains various ‘interest areas’ which in themselves organize on-line discussions, additional file exchange, and other types of information flow. Over an average month in the school year, approximately 1,400 users (mostly teachers and other educators) access SLO-Lijn, for an average of between 20,000 and 25,000 minutes per month (thus an average log-in time of about 14 minutes). In spring of 1993 there were 15 interest areas being moderated (Lepeltak, 1993).
Thus there is considerable experience with telecommunications services directed at education in The Netherlands as well as with different types of specialized projects. But, as noted earlier, the existing services and projects are generally of short-term or uncertain funding; operate as somewhat peripheral activities with relatively few personnel within institutions predominately busy with other tasks; and are generally not internetworked, either with each other or to major networks, such as that of the SURF Organization, connecting universities in The Netherlands, or more generally to the INTERNET system.

There is no central, focal point of expertise and service to which the ‘supply’ and ‘demand’ sides can refer, or which has the mandate to take responsibility and leadership for integration, charting of experiences, efficiencies of scale, and more complex activities such as on-line inservice support. As we saw in Chapter 2, most countries in Western Europe (and most states in the United States and most provinces in Canada and Australia) have this sort of leadership and support focus.

3.1.3 Current opinions about telecommunications in education
In addition to considering on-going and past Dutch experiences with telecommunications in education, a number of specific measures were taken during the period of the CISO Project to capture opinions about issues relating to support of telecommunications in education in The Netherlands. These included a survey and group discussion at a national study day, and various interviews.

The National Study Day
In addition to numerous informal discussions with persons already active with telecommunications projects or services, a questionnaire was distributed to participants at a National Study Day sponsored by PTT Telecom (25 June 1993), to which approximately 50 persons active with telecommunications in education in The Netherlands, or involved with policy relevant to the application of telecommunications, were invited. The details of the questionnaire results and of the discussions which occurred are available in the Supporting Documents Volume of the CISO Project Final Report; in general they showed the participants to be particularly interested in the use of on-line possibilities for professional activities and interactions among teachers and school administrators. The on-line distribution of examination questions, for example, was seen as a useful way to perform a time-sensitive and high-volume task. Access to on-line collections of instructional support materials and lesson ideas was also stressed as valuable for teachers.

Interviews with policy makers
Also, individual interviews were held with a twelve persons involved with policy in areas tangential to a Dutch CISO-Service itself, but potentially interested in its range and possibilities. The persons included, among others, politicians, a media sociologist, technology policy specialists for various Ministries, a faculty member from the Dutch Open University, and persons
representing various educational support institutions. These interviews are also more fully summarized in section E2 of the Supporting Documents Volume Dutch of the CISO Project Final report.

A general summary of these various discussions includes the following:
- That it is clear that an efficient on-line communication and information system for education could have strategic broadscale value, but costs and quality organization of services are critical concerns. A CISO-Service must be handy, and eventually save time and money.
- Respondents also agreed that it is important that students should become familiar with the use of communication technologies, and that software to support on-line use must become more user friendly.
- Telecommunications can be used to stimulate renewal in the school and in instructional practice.
- The Ministry, the government, and schools can save money by making their information directly retrievable on-line from the CISO-Service.
- A foundation or cooperating group should be established, with contacts in the schools, and that schools feel gives them some ownership in the Network. This group should coordinate and stimulate use of the CISO-Service.
- Groups that support education should also be connected to the Network.
- The issue among these policy makers was not ‘Would we use a CISO-Service?’ but ‘How will we use it?’
- An integrated communication and information service, bringing together a number of existing networks and services, is preferable to starting one’s own, separate system.

3.2 Contextual Influences Relevant to Telecommunications Initiatives in The Netherlands

Not only is the Dutch experience with telecommunications in education relevant to the climate for an integrated and scale-efficient CISO-Service, but also more general conditions in The Netherlands affecting schools and educators must also be considered. Among many possibilities that could be considered, seven aspects seem likely to be of particular importance.

3.2.1 Sectorization
One of these is an on-going feature of the Dutch school system, the fact that the different sectors of education are organizationally and culturally quite separate from each other. Within vocational education there are many different types of schools organized in a number of subsectors. This kind of highly sectorized situation may make it hard for the type of integrated use and enterprise to develop that characterizes some of the broadly based CISO-type services such as those in Iceland, Ireland, Luxembourg, Spain, and Geneva. With the exception of Spain, these are small countries;
their CISO-Services can only work efficiently when not splintered into small, disconnected pieces. Maintaining a number of different CISO-Services for each of the small Dutch subsectors may loose the benefits of efficiency, of scale, of interconnectedness, and of opportunities for strategic innovation that characterize a number of the national services we identified earlier. It seems in general that different subnetworks can well function in their own spheres, but that most successful systems also have some central coordinating service that both stimulates more localized CISO-type services but at the same time provides powerful and strategic leadership and coordination (see for example, Denmark, Iceland, Luxembourg, and Spain, and in particular, in the Nordic Schools Project).

3.2.2 Who can take this lead in The Netherlands?
Within-school needs for efficient communication. A second factor to consider is one that may be a stimulus to a well-functioning Dutch CISO-Service. This factor is the fact that within a relatively short period in The Netherlands there have been a number of school fusions, sometimes involving buildings at a considerable distance from one another. Difficulties in communicating among these distant colleagues are the result in many of the newly consolidated schools. The appreciation that teachers have shown for electronic information and communication in countries such as Ireland and Norway could be also the experience in The Netherlands, if on-line access were not a burden to teachers and schools.

3.2.3 Curriculum reform
Another factor, one whose effect right now is difficult to predict, is the fact that in September 1993 a significant reorganization took place in Dutch lower secondary schools, in which a new, common curriculum has been introduced. Coping with new curriculum, new texts, and new groupings of students may make teachers feel less likely to consider new on-line environments, or conversely, it may make teachers particularly appreciate the chance for widespread contacts, sources of lesson materials, discussion groups, fast ways of getting information, and flexible and more frequent ways of getting professional support. Thus the time might be optimal in The Netherlands for the sorts of teacher-oriented CISO-type services established in Norway, Spain, Iceland, Luxembourg and Geneva: but only if the services are easily accessible and well managed. The Spanish Platea Project approach is an excellent example. This is not a time in The Netherlands for ‘grass roots’ reinvention of the wheel with respect to starting up telecommunications access. The self-chosen professional growth experiences available on-line that teachers in countries such as Iceland and Japan are making in increasing numbers could perhaps start to develop in The Netherlands.

3.2.4 The self-responsible school
Most critical, probably, is a major change in school governance that is now occurring in The Netherlands. A policy decision to give schools considerably more autonomy and responsibility for their own educational and professional choices, and to take the consequences of their decisions, is placing a burden on schools,
and on school leaders in particular. The models of CISO-type services described in New Zealand and Portugal could thus be particularly useful. The New Zealand example, with its emphasis on the professional support of the school director, is directly relevant to the current situation in The Netherlands.

3.2.5 Decentralized leadership
Along with the move toward the autonomous school, The Netherlands is seeing a shift in policy away from large-scale, central stimulation of information technology in education. After ten years of extensive and far-reaching projects, in which every school has had equal access to extensive projects involving hardware and software provision and teacher training, the Ministry has now effectively decentralized initiatives about information technology to the schools. If schools can work together to an extent sufficient to create a critical mass of activity to support a significant CISO-Service remains to be seen, but it is doubtful. A good CISO-Service organization is not a grass-roots operation. Thus the decentralization policy in The Netherlands can be a significant barrier for an effective and vibrant CISO-Service in The Netherlands: from where will its authority, financial support and leadership come in a decentralized, autonomous-school environment? Ironically, it is the autonomous school and its leaders that most need efficient access to relevant information and expertise. The model from Belgium of key support coming from the business and banking sectors perhaps should be carefully studied in Dutch context.

3.2.6 Costs
A major condition that will shape the success and strategy of any CISO-Service is costs. The Netherlands like most other countries is facing more and more financial pressures in education and in society. This presents an opportunity for a CISO-Service, if it focuses on ways that could lead to cost savings, such as for information dissemination as is occurring in Geneva, or to facilitate teachers’ access to types of inservice and support through their own computers rather than through traditional and expensive face-to-face inservice sessions, such as in happening in Spain, Iceland, Luxembourg, Denmark and Japan, each with a different sort of model. However, without efficient support, the high start-up costs in terms of time, effort, equipment outlay, and personnel time that have characterized the majority of telecommunications projects in The Netherlands will make it unlikely that an overall cost-savings position will occur, at least in the short-term.

3.2.7 Developments in the rest of The Netherlands and the world
Finally, the Dutch educational system does not exist in a vacuum, in The Netherlands or in the larger world. Major trends and initiatives are going on throughout Dutch society relative to ‘teleworking’ and ‘telelearning’. More and more higher vocational institutions and traditional universities are developing strategies for flexible access to their programs. Flexibility in time and in location can only occur through the use of well-management and stable telecommunications services, and these are increasingly
being developed. Campus-wide on-line information systems and world-wide interconnections through access to the INTERNET system are well established in Dutch universities and in many higher vocational education institutions through the centralized and efficient support offered by the SURF Organization, a CISO-type service for higher education well established in The Netherlands (and one which was started at least with a substantial subsidy). The Dutch Open University is an European leader in distance delivery of education, more and more facilitated by telecommunications. The EADTU (European Association for Distance Teaching Universities, now representing over 130 members) is based in The Netherlands and is an European leader in developing on-line support for educational delivery and associated services. The SATURN and JANUS Projects are both major European projects involving telecommunications in higher education and training that have their base offices in The Netherlands.

More generally, the newly-announced Fourth Framework programme of the Commission of the European Communities clearly places access to distant resources and learning at the heart of many of its educational initiatives. The new ‘White Book’ of the Commission for Economic Growth is also emphasizing the importance of a ‘community information environment’ for Europe, particularly with respect to vocational education and training, and particularly as mediated by telecommunications services.

Thus there is much established outside the Dutch educational system that relates to the sophisticated use of telecommunications in work and learning. But so far these ‘outer-world’ aspects, where The Netherlands has a strong international position, have not had much reflection in its educational system. Unlike in many countries, where strong initiatives are being made to help teachers have guided and affordable access to the INTERNET system, for example, little or no such help exists in The Netherlands. The teacher who wishes this must, as a true pioneer, find a way to associate him or herself with a university node. This is time-consuming, inefficient and a generally poor situation.

3.3 Conclusions for the Dutch CISO Project

Thus, there is good experience in The Netherlands with telecommunications in education and there is strong experience with telecommunications applications in higher education, in training, and in society more broadly. There is also clear experience that without a strong, on-going, efficiently run CISO-type service with time to develop its services and the support of its users during their predictable start-up problems, the benefits of telecommunications for the Dutch school sector may not be realized. The particular circumstances in The Netherlands at this point in time suggest both potential difficulties, and opportunities, for a professionally run, integrated CISO-Service.
4 Teacher and School Experiences During the CISO Project

An important component of the CISO Project was the contribution of the teachers and schools who participated in the Project's third stream of investigation. This stream was the focus of much of the practical activity of the Project. In the Supporting Documents Volume of the CISO Project Final Report more than half of the documents are syntheses of different aspects of the experiences relating to the teachers and their situations. In this chapter we can here only briefly outline the activities of the Project with respect to the teachers and schools, and then summarize the main trends and observations emerging from these activities.

4.1 Overview of Project Activities with the Teachers and Schools

4.1.1 Schools and school directors
Four middle-level vocational (secondary, students aged approximately 15-18) schools were invited to participate in the Project21. The schools were each fairly large, some consisting, because of recent fusions, of a number of different buildings at a distance from one another. The schools focused on training students for careers in tourism or in business and economics-related subjects22. Two of the schools had prior experience with special projects involving information technology. The research team visited all the schools for interviews with the school directors and with the school computer coordinators, as well as other persons in the schools who would be involved with the teachers as they participated in the CISO Project.

The school directors were generally interested in participating in the CISO Project because they expected that this participation would pay off for their schools, perhaps in stimulating new approaches to instruction, perhaps more specifically in getting the school started with telecommunications activities. Practical issues relating to delivery of the computers, procedures for handling the telephone charges, and variations in the types of computers and printers that a school wanted to accept from the Project also claimed considerable attention during these first in-school interviews.

21) The Dutch Volume and sections A1, A2 and B1 of the Supporting Documents Volume of the CISO Project Final Report give fairly extensive details about the schools, and also about each of the types of Project activities described briefly in Section 4.1.

22) In The Netherlands, students who are not preparing for university specialize early. Compared to Northern America, only a relatively small proportion of students prepare for university during their senior secondary school period.

23) A particular reason that the vocational sector was invited to participate in the CISO Project was the obvious relevance of applications of telecommunications to many of the careers for which their students were being prepared and also the need in the vocational sector to be as up-to-date as possible in terms of overall learning experience.

4.1.2 Teachers
The eight teachers invited to participate in the Project were generally asked by their school directors if they would like to participate; some had released time for the Project, others did not. The teachers, three women and five men, taught courses in office automation, office practice, general economics, commerce, commercial economics and statistics, business economics, tourism, business administration, marketing, various tourism specializations, computer applications, management, information in organizations, and geography23.
Two of the teachers already were using telecommunications in their
lessons; the others had no experience with telecommunications.
Five of the teachers had experience with using computers in
instruction; all of the teachers used computers as personal tools,
for word processing, test construction, student records, and
timetabling. The teachers responded to a questionnaire validated
previously among a large group of teachers in The Netherlands in
order to compare them to ‘typical’ Dutch teachers. Although the
teachers were different in a number of their teaching and
personality characteristics, they were generally self-confident and
preferred a directive teaching approach. They were not an atypical
group of Dutch teachers.

The teachers generally began the Project curious about the
application of telecommunications in their lessons and interested
in broadening their own experience and insight. A number of the
teachers expected the Project experience would pay off for their
schools by broadening and enriching the existing programs.
The teachers expressed their initial feelings about being in the
Project with phrases such as ‘curious’, ‘enthusiastic’, and ‘an
interesting challenge’. When asked what difficulties they thought
they might encounter when using telecommunications, two did not
indicate any expected difficulties, two were concerned about their
limited knowledge, two were concerned about insufficient
equipment and access to a telephone connection, two worried
about finding a workplace in their schools, one mentioned costs,
and one was concerned about a waiting time that might occur in
trying to get set up in his school.

4.1.3 Activities during the first few months of the Project
During the Project’s first months, activities focused on establishing
the Project in the schools; developing inservice training materials
for the teachers and sample lesson materials for them to use in
their classes; and for the Project team itself to extensively explore
various on-line environments in order to select those for use in the
teacher inservice and the training and lesson materials. Each
teacher had a computer and modem and printer to use at his or her
school, and another system for home. Telephone connections had
to be organized in the schools and at the teacher’s homes.
Extensive interaction had to take place over the types of computers
that schools wished to accept, and consideration variation existed
among the schools as to the chain of contacts and decision making
that were involved in the process of setting up the teacher with
telecommunications access in the school. Home set-up for the
teachers was even more complicated, because of internal variation
with respect to decision making and policy about home computer
use and out-of-school professional activities of teachers. Issues
relating to billing and telephone charges, which were to be paid by
the Project, but were often mixed up with the overall school
telephone bills, required considerable time and discussion.
4.1.4 Teacher inservice: Phase 1
Meanwhile, the first phase of the teacher inservice, a planned series of four half-day teacher inservice sessions, began, in an environment especially set up for the inservice sessions. Each two teachers shared a computer, all computers had direct on-line connections, and usually four or five members of the research team were available at each session for close interaction with the teachers. Teachers were given practice on-line activities to do between inservice sessions, and also were asked to reflect on issues such as relevance to their own students and curricula. Evaluation and reflection forms were filled in by the teachers and the inservice team after each of the inservice sessions. The Project Team also met after each inservice, to discuss, reflect, and revise their planning.

4.1.5 Teacher support: The Help Desk
An important component of the Project was the provision of ready support for the teachers, both through human contacts among the Project team, but also through the establishment of a Help Desk, which operated throughout the entire Project. The Help Desk was an electronic service which could be reached on-line, but the human maintaining the electronic service could also be reached by telephone. A major intended function of the Help Desk was to provide quick answers to technical problems. The teachers however made little use of the Help Desk provision; when they did it was generally in relation to problems with the data communications software they were using and in particular with its installation on school and home systems. The Help Desk also functioned as a information-exchange medium for the Project. All contacts with the Help Desk were captured and analyzed by the Project Team.

4.1.6 Teacher Support: Lesson Materials
During the first phase of inservice, work also began on an extensive set of lesson materials for the teachers to use with their students. These materials were developed by the Project Team, in consultation with the teachers, and included student materials as well as teacher-support materials. The development of these materials took considerable time. Teachers did not know enough about on-line possibilities to offer a range of attractive lesson suggestions, while Project Team members did not know enough about the curricula involved to proceed well without these suggestions.

4.1.7 Special software
The teachers were supplied with data communication software especially made for use in schools in The Netherlands under sponsorship of PTT Telecom24. This software, called 'Telelijn' has a number of special features, including a buffer area in which a trace of all on-line activity could be temporarily saved while the teacher was on-line and then saved on disk when the teacher logged off. This function was adapted by the Project so that all the on-line interactions of the teachers could be automatically saved and subsequently analyzed by the research team. In addition, teachers were also able to practice with a especially made simulation
program, developed to introduce users, while off-line, to what the use of the accompanying Telelijn program would be like when they went on-line.

4.1.8 On-line sources and environments
In addition to the Help Desk, the teachers had free access to a large number of on-line services, including various videotex data bases and the British Campus 2000 service. The research team familiarized themselves with these services and prepared guidebooks and manuals for the teachers, as well as guided tour-type familiarization activities for the teachers in the uses and possibilities of the various on-line environments. In addition, the research team studied more abstractly the types of features and user-interface characteristics that would be most appropriate for a full-scale CISO-Service, based partly on their observations of the teachers' experiences with the various on-line services during the Project, and also on analyses of other on-line services.

4.1.9 Second phase of the inservice: Teachers as reflective partners
After the first series of four structured, hands-on inservice sessions was completed, the contacts with the teachers changed in their style and content. The teachers and the Project team met monthly throughout the remainder of the Project, to discuss their experiences and opinions about telecommunications use. The teachers were asked to keep a logbook of their activities and ideas and these were collected by the researchers at each of the monthly meetings. The logbook entries were compared by the research team to the actual on-line traces of the teachers' activities in order for the team to stay closely informed about what the teachers were doing with telecommunications as well as what they were thinking.
In addition, teachers were asked to contribute essay-type reflections, not only on their experiences with telecommunications use but also their opinions on the value of telecommunications in education more broadly and also on the issues of specific relevance to the eventual recommendations to be made at the end of the CISO Project. All of this written material was shared among the researchers, and summarized in a number of ways. The group discussions each month were tape-recorded, for later analysis and summary.

It evolved quite quickly (and in accordance with the predictions of the CBAM Model) that the teachers did not initially too much want to attempt to use telecommunications with their students, although some did develop some extensive teaching materials ready for student lessons in after the summer break. They instead preferred to focus on their own skill and insight development. The Project Team responded to this. However, by the end of the Project the teachers were ready and enthusiastic about beginning to use telecommunications with their students in lesson situations. The teachers indicated they would be doing so, even thought the support of the Project, both human and financial, would no longer be available.
4.1.10 Final interviews
Finally, the teachers were interviewed personally, in their schools at the close of the school year, and again in a broader meeting, with their school directors and other interested persons in their schools, at the beginning of the new school year (September 1993). All these interviews were tape-recorded, transcribed, discussed among the researchers, and summarized. In their final meeting as a group with the Project Team, (on 14 October 1993), the majority of the teachers were able to describe their specific plans for going on with telecommunications use, both themselves and their students, after the Project was over.

4.1.11 Preparation for final analysis
In the spirit of multi-participant illumination, the researchers thus had a considerable amount of different sorts of data from this phase of the Project involving teachers and schools. In preparation for the final analysis for the Project, different teams of the researchers further synthesized and summarized various aspects of the data, observations, reflections, on-line traces, and all of the other sources of insight accumulated during the year of the Project. The majority of the documents in Supporting Documents Volume of the CISO Project Final Report are these different final summary reports. In the appendix included with this English Volume of the CISO Project Final Report, these supporting documents are briefly described.

4.2 Results and Summary of Impressions from the Teacher-and School-Component of the CISO Project

Only the most salient highlights of the many different summary reports will be presented here. To anticipate the overall analysis of insights and experiences obtained during the CISO Project which will be given in the following section (Section 5) of this Report, the research-question headings indicated in Section 1.4.3 will be used here as a way to summarize the many different results of the teacher-component of the CISO Project. However, not every cluster of questions evolved as having equal impact in the Project, so the ‘results’ are not presented on a question-by-question basis.

4.2.1 Issues Related to Educational Relevance
Three major conclusions emerged here:

*Varying Perspectives on the Nature of Educational Relevance for Students*
First, the teachers came to vary considerably on their perceptions of the educational relevance of on-line use for their students. Four of the teachers generally did not feel that they could identify useful on-line activities for their students. These teachers tended to look for materials on-line that fit closely into their typical lessons. They were also sensitive to the pressures of preparing the students for final examinations (centrally prepared in The Netherlands) and felt that students would not be helped in their examination performance by on-line activities. They were
sceptical about further investigations relative to instructional applications. They were appreciative, however, of efficiencies available through being able to access sample examination questions on-line and for the use of on-line connections for rapid and efficient delivery of time-sensitive examination papers.

In contrast, two of the teachers did not look for on-line lesson-specific materials but instead felt very enthusiastic about the value of on-line use for their students because they felt the skill-oriented, experience of working on-line, of developing search skills and practical on-line literacy, to be what was critical. These teachers were process oriented, relative to what they saw as most important for their students.

The remaining two teachers were both lesson-oriented and process-oriented. They identified many lesson ideas for telecommunications use for their students and were also enthusiastic about the educational relevance of a process orientation.

In any case, the opinion clearly developed among the teachers that telecommunications could contribute to the professionalization of the educational programme itself, making it more pedagogically flexible, more practice- and future oriented for the students, and providing greater efficiencies in various aspects of student activities, such as examinations and finding information.

**School and Teacher Professionalism**

Second, and perhaps this is the major finding emerging from the school experiences, there developed a strong feeling among the teachers during the year of the Project that telecommunications had a major value relative to serving the teacher and school, not so much because of its use for developing lessons for students but by providing a communication and information channel among teachers and among schools and their teachers, and by generally supporting teacher and school professionalism. This feeling emerged over time among the majority of the teachers, one after another and expressed in different ways.

As with their opinions about educational value for their students, the teachers differed among themselves on what they saw most important with respect to telecommunications support of teacher and school professionalism. Three of the teachers were particularly impressed by the opportunities opening up to them for broader reflective communications and even for making a real contribution to their professional communities through their maturing use of on-line possibilities. Two of the teachers in contrast were much more impressed by the potential of telecommunications for the efficient transfer of information and of items such as software and examination questions, and for the efficient access to particular information and other resources. Three of the teachers seemed to value in approximately equal manner both of these aspects, the reflective and the efficient.
In general, the impression emerged, as was expressed during the final interviews with school teams in September 1993 that:

- a major value of telecommunications for Dutch education will relate to its contribution to the professionalization of the teacher and of the school organization.

**CBAM-Predicted Changes in Teachers' Concerns**

Third, the detailed observations of what the teachers did while on-line yielded the following impression of the teachers' changes over time relative to telecommunications use:

<table>
<thead>
<tr>
<th>Stages in the adoption of telecommunications use by the teachers.</th>
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<tr>
<td>1) Orientation</td>
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<tr>
<td>2) Deepening Communication</td>
</tr>
<tr>
<td>3) Purposeful User</td>
</tr>
</tbody>
</table>

All the teachers spent some time in an orientation period, trying one thing after another out, generally superficially. During this time they made little use of communication possibilities, but browsed one data base after another. Developing their own technical proficiency also was a focus.

After a time, different per teacher, the teacher discovered a particular data base that seemed potentially relevant for his or her students, and then spent considerable time getting to know this data base well. As this occurred, the teacher was generally preoccupied with thinking of how to use the data base in a lesson, or even working out the details of the lesson. Communication on-line started to increase during this phase.

Then, some of the teachers moved into what could be called the purposeful-user level, going into the broader on-line environment in a goal-directed way, not just to a particular data base, but thinking more generally about how the overall environment could be used for different purposes. During this time, teachers' communication among other teachers and among members of the Project team also increased. Some of the teachers seemed to have clearly made this progression into the purposeful level; others seemed on the edge between the deepening and the purposeful phases. They know some data bases well, they have some specific ideas, but what really is the use of it all in education?

Thus the expectations of the CBAM Model (Section 1.4.2) were borne out by the group of teachers in the CISO Project.

**Professional Communication**

By the end of the Project however, it appeared that the teachers had come to see the communication and information exchange possibilities of telecommunications for themselves and their
schools as having the potentially greatest immediate value for the middle-vocational sector, especially as many schools in that sector as products of fusions, and staff work in different buildings sometimes at a distance from each other.

The teachers saw this on-line interconnectivity as:

- Useful for the administration of the school, for practical matters such as up-to-date information on budget or a particular student.
- Useful for communication between the school director and his or her teachers, especially when the teachers work in different buildings, sometimes for different hours of the day.
- Useful for communication among teachers, first in their own schools, then among others in their subject area from a broader radius.
- Particularly important, given the increased self-responsibility of schools in The Netherlands.

4.2.2 Teacher-Related Issues

Here, the findings of the Project that seem most relevant include:

**Time**

It took a great deal of time for effective use of telecommunications, time that is often difficult for the teacher to find, even within the Project framework.

**Home Access**

Teachers wanted and needed home access to telecommunications in order to give the time necessary for on-line work. The issue of who should pay for the teacher's costs when he or she works at home will be a major issue in The Netherlands if meaningful on-line use such as for inservice increases. (In the CISO Project, the Project paid these home costs, so this was not a direct issue, but it would have been, if the Project had not paid the costs.)

**Inservice Model**

The procedure chosen for inservice in the Project, grounded in the CBAM Model, was good: hands-on help at first with structured introductory activities, then moving into more and more discussion and reflection during regular face-to-face meetings.

**Development of Lesson Materials for the Teachers**

The attempt to develop detailed lesson plans for teachers to use with their students as a way to help the teachers get started with telecommunications use in their classrooms is probably not worth the effort. The development of a lesson appears to be a personal thing. Although the teachers did appreciate the lesson materials that were developed for them by the Project Team, the teachers would have benefited from being able to see demonstrations of learning activities being carried out by other teachers, and to be able to talk to other teachers in their subject areas about their experiences.
Support and Help
On-going professional support, both electronic and human, is needed. Technical problems will demand attempt attention; after that, the need for help with educational considerations will follow. Discussions and information provision need a skilled educator continually monitoring the on-line situations.

4.2.3 School-Related Issues
The following two points emerged most clearly. One was unexpected.

Costs
Cost issues are of central importance, as expected. Different categories of costs were clearly demonstrated within the Project.

One set of costs related to the provision of equipment for the teachers so that they could have adequate and flexible access to on-line resources. This turned out to mean that extra computers had to be acquired for the teachers, both at school and at home, in that existing school computers were not feasible for this sort of use. Existing school computers generally are all in use, often networked together in a computer room with no privacy or work-space possibilities for the teacher, and no possibilities for a telephone connection. Although a new computer is not a requirement per se, the realities of school computer organization mean that flexible and reasonable access to an on-line for teachers does not occur without special new arrangements being made for locating a computer in an apart area, with telephone access and some privacy.

Then there are the more familiar costs, such as modems and data communication software, and sometimes even new telephone lines or outlets. The CISO Project paid for these for the teachers, both at school and at home. They are one-time costs, but not trivial.

On-line costs consider of telephone charges and the costs involved with access to different on-line services. Telephone charges vary considerably from country to country, and the sometimes the cost of accessing a particular service is charged directly to the telephone account while others it is not. Thus it is rather hard to indicate meaningfully what the on-line costs of the CISO Project were, but on an average, teachers incurred about $70 (US equivalent of Dutch guilders) a month total telephone charges. In addition, the Project acquired some subscriptions to on-line services for the teachers for block amounts, meaning the charge was the same regardless of usage. Thus again, it is difficult to summarize these as costs, particularly when one such service chosen turned out to be unpopular with the teachers and thus almost never used.

There are other costs that may or may not be listed, depending on definition. These include the costs of traveling to inservice sessions (which can be lowered if inservice can be experience on-line) and the costs in time for getting started and developing basic user skills. The costs of appropriately trained support persons could also be considered, but were not separately calculated for the CISO Project.
Thus cost is a complex issue; more reason for consolidating as many costs as possible under the framework of a single Service organization.

**Jurisdictional Conflicts in the School**
A major barrier for the teacher wishing to use telecommunications in school may ironically be those who are already most active with computer use in the school. These computer specialists who have developed efficient procedures for managing use of the school computer facilities, usually networked together in a computer room. The teacher who wishes independent use of a computer, with a telephone connection, does not fit into the carefully organized computer arrangements in the school. This emerged, unexpectedly, as significant implementation problem in the Project, and should be anticipated more carefully in the future.

### 4.2.4 Issues Related to the CISO-Service Itself
Among the observations related to the electronic aspects of the CISO-Service itself the following emerged as most significant:

**Technical Problems**
The installation and configuration procedures of software, computer, and modem causes many problems.

**Information Filtering**
Data bases and other information sources need much improvement relative to helping the seeker realize what is available and efficiently retrieve it. The long on-line browsing periods the teachers engaged in may be too costly in both time and money to sustain outside of a Project framework. This self-discovery approach, as well as being time intensive and thus costly, makes it is highly likely that many of the teachers did not realize much of what could have been available to them on-line, even with the Project Team's support and guidance.

**Software**
The data communication software and its operation with different on-line environments must be improved.

**Critical Mass**
Teachers will lose interest in communication possibilities if they see no added value in communicating; thus just talking to one another if they can do it in another way is not enough. Teachers need the opportunity to enter into much larger and dynamic groups of discussants. Also, it is very discouraging to log on to look for a message and day after day not to find one. Thus, a critical mass of integrated, well managed, useful, information and communication possibilities is needed. This is one of the reasons so many countries are providing sheltered connections to the INTERNET system for their teachers as well as to local and national on-line discussions and data bases.
This, again, requires a professionally run and stable CISO-type service with adequate resources to develop momentum, maintain routine use, and build strategically on a base of already functioning CISO-type, smaller-scale systems.

4.3 Summary Impressions

Much could be indicated here about the summary impressions arising from the year-long school-based portion of the CISO Project. Perhaps the two major conclusions that emerged were,

- not unexpectedly, that getting started with telecommunications use takes much time and energy and perseverance, and often comes to involve issues and agendas far broader than those involved in making the on-line connection in itself; and

- that a focus on the applications of telecommunication use for teacher and school professionalism is highly relevant, both in terms of the local situation in The Netherlands and also in terms of the expectations of the CBAM Model as a theoretical framework to predict users' stages of involvement with an innovation.
5 Recommendations for a CISO-Service for The Netherlands

The last three chapters have given the major results of three of the streams of activities in which the CISO Project team was engaged. But a fourth stream also occurred: the continual discussion and evolution of ideas and perspectives of the Project Team itself over the year of the Project. Consistent with the multi-perspective illumination approach that we adopted for the research, we responded and readjusted again and again to insights and ideas as they emerged during the Project year. As our own understanding grew, our own perspectives on the Project, on the research questions, and on the nature and direction of the final recommendations underwent many changes.

But all the activity of the year was means to an end: the end being the making of recommendations for ‘an educationally oriented on-line communication and information system and its associated organizational service’ in The Netherlands (see Section 1.4.1). We begin by reflecting on the need for a CISO-Service. Then we offer recommendations.

5.1 Is There a Need for a CISO-Service in The Netherlands?

The word ‘need’ in education can be interpreted in different degrees and in different time frames. Also, the ‘need’ for enrichment and extension of educational opportunity is difficult to quantify. Nonetheless, we believe there is a need for an integrated CISO-Service for Dutch education. The major current educational needs, in our opinion, based on our analysis of foreign and Dutch experiences, are:

5.1.1 Priorities for students

*Enrichment through project participation*
- To motivate foreign language practice.
- To extend the Europeanization and internationalization of education.

*Workplace-related competencies*
- To provide relevant preparation for career sectors that involve use of communication technologies.

*Functional literacy*
- As was the case with computer literacy in the 1980s, to support the on-going development of skills and insight into the use of communication technologies as a tool.
5.1.2 Priorities for teachers

*Facilitating teacher professionalism*

- To provide efficient access to school, regional, subject-area specific, and Ministry-level information, all through one integrated service, a service that can be checked or browsed at times convenient to the teacher, at work or home.
- To provide a way to contact and communication with colleagues when face-to-face contacts are not convenient.
- To carry on work with colleagues between face-to-face meetings.
- To be able to take advantage of inservice experiences in part or whole available on-line.
- To have a convenient way to get help, lesson materials, and software, through on-line access to expertise and resources, with the ability to download such materials into one's own computer.

5.1.3 Priorities for the school

*Supporting the self-responsible school*

- To help school leaders in their access to appropriate professional support and in their own development of new types of managerial skills.
- To make communication and information flow more efficient and effective in schools that occupy a number of buildings, or among groups of schools.
- To streamline transmission of time-sensitive information, agenda-type information, examination questions, and in general giving self-responsible school efficient access to a range of resources and contacts.
- To help prevent the self-responsible school from being an isolated school.

Thus we believe educational needs exist for an integrated CISO-Service in The Netherlands and we suggest that the above priorities address the current needs.

5.2 Needs vs Reality: Conceptualizing an Implementation Strategy

But agreeing on the needs for and educational benefits of telecommunications use in education is not enough. Such benefits will not occur on a widespread basis without strategic help and an overall implementation strategy. We suggest the following simple model to indicate guidelines for an implementation strategy:
5.2.1 The 3-A Model

This idea, called the '3-A Model' in English (Collis & De Vries, 1993a) and the '3-G Model' in Dutch (Collis & De Vries, 1991), says that the likelihood of an innovation being successfully implemented depends on the 'vector sum' of: (a) its perceived advantage to the user, (b) its ease of access, and (c) its attractiveness of use. If this vector sum is 'large enough' to approach a certain level ('success threshold'), then the innovation is likely to be implemented. If any of the vectors, or their overall sum, is sufficiently negative so that it approaches a hypothetical 'failure level', then the innovation will not be implemented.

In the Dutch situation to date, most telecommunications experiences have been characterized by a relatively positive a- vector (in the perception of those involved with the telecommunications use, but not generally by those who have not become involved); a positive c- vector, based on the intrinsic enthusiasm that the 'pioneers' involved in the projects so far feel about telecommunications; and a dangerously negative b- vector, based on the many usage difficulties that are encountered. The fact that telecommunications use is still not widespread among schools is likely to be because teachers in general do not have a positive c- vector value (intrinsic attractiveness) and do not perceive a strong enough a- vector value (advantage) to overcome the strongly negative b- vector value (ease of access). Start-up difficulties in trying to access telecommunications, involving time, costs, technical frustrations, and organizational problems, are so strong, that telecommunications use is only a part of a relatively few teachers' and schools' routines.

5.2.2 Strategic guidelines: Make access less difficult and increase the perception of advantage

What is critically needed, then, is a strategy to improve the accessibility vector, while meanwhile also working on strengthening the advantage vector. In our opinion, however, many of the benefits that will affect the advantage vector can only occur once access is improved. Thus focusing on improving Vector b is a key strategy.
This conclusion is also that of the Nordic Council of Ministers, in their current planning for support of telecommunications in schools throughout the Nordic Countries in the Nordic Schools Project (see Ranebo, 1993, and Section 2.2.13).

It is in this 3-A framework therefore, that we make our recommendations for a CISO-Service for Dutch education.

'We take as a premise that an integrated, professionally run CISO-Service with services relating to the educational needs that we identified in Section 5.1 is an innovation whose successful implementation should be stimulated'.

We group the recommendations relative to the clusters of research questions identified for the CISO Project (Section 1.4.3).

5.3 Recommendations Relative to Priorities for Service Activities

Given the current Dutch situation (see Sections 3.2 and 4.2) and the educational needs we summarized in Section 5.1, we recommend the following initial priority focuses for the CISO-Service:

5.3.1 Emphasize teacher and school professionalism
- Give a priority focus on facilitating services valuable to the teacher and school leadership (see Sections 5.1.2 and 5.1.3)
- For vocational education, give a priority to using the CISO-Service for facilitating contact and interaction between the school and practice (the employment sector for which the school is focused).

5.3.2 Facilitate the teacher's organization of student participation in selected on-line projects
- When a teacher wishes his or her students to participate in an on-line project experience, particularly focused on language development or trans-Europe contacts, make the choice and involvement process as easy as possible for the teacher by maintaining an inventory of available, well-run project alternatives, facilitating the teacher's contact with the project, and helping the teacher with start-up difficulties.

5.4 Recommendations Relative to the CISO-Service Itself

A detailed analysis of the Project's recommendations for an on-line service, its architecture and organization, made by l. De Diana, is included in the Supporting Documents Volume of the CISO Project Final Report. At this place a summary of the recommendations:

5.4.1 Technical specifications
- We recommend that the CISO-Service offer, through a common front-end (user interface) access to a distributed network of existing on-line services, including those already established
for education in The Netherlands, and to the Internet system, as well as new services, local bulletin boards, or regional networks relevant to education that may emerge. The CISO-Service has the task of maintaining gateways to these different networks so that the user has only to enter one password and work within one familiar user interface as he or she moves among various internetworked systems. (The Nordic Council example is a model here). The CISO-Service should thus be an open system that will allow easy future expansion to different sorts of distribution possibilities (i.e., perhaps via cable networks) and to multi-media transmissions.

- Through local programming, the special characters in at least the Dutch, French, and German languages must be maintained in all on-line transactions.

### 5.4.2 Types of on-line services offered

#### Communication-support services

- The CISO-Service should support private messaging, public open discussions, and moderated conferences for specified groups. Options should be available for organizing, storing, editing, forwarding, and uploading text, as well as for getting various overviews of messages available and for directory-type information about users. Public discussions and moderated conferences must be well maintained.

#### Information-access services

- Users should have efficient ways to get overviews of available information, to move quickly to relevant information, and to specify ‘interest profiles’, so that the CISO-Service can bring relevant information to the attention of different groups of users. A service such as Gopher should be maintained so that relevant resources on the Internet system can be located for users. Those who make information available must have easy-to-use strategies for entering the information and must be assured of control of the information.

- Various options must be available so that users can retrieve what they want, but not more than they want, and can further handle the information as they wish (i.e., to send it as mail to a colleague, to save it on one’s own disk, can mark what they have already read or save some marked information for later reading).

- The CISO-Service is responsible for the timely maintenance of available information and for efficient and well-laid out formatting of the information as it appears on the screen or on print outs.

#### File transfer services

- It must be easy for users to send and receive various sorts of files via the CISO-Service, including various sorts of text files, files available through the Internet system, software, and files containing forms to be filled in and returned. The user should be able to get an overview of a file sent to him, including its length and a quick view of its contents, before deciding if he wishes to download it.

29) See the Nordic Council and Iceland examples in Sections and
5.4.3 Remote login services
Users should be able to dial into the system from home or school, and eventually while travelling. The concept of being able to be reached, where ever you are, via the same address, is a trend emerging in Europe as well as other regions (Katzeff, 1993).

5.4.4 Instrumentation
The user interface of the menus of the CISO-Service must be carefully designed, anticipating both novice and experienced users.
- Actions and options while using the Service must be consistent, and on-line help as well as escape actions, overview options, and time-spent options must be simple to use and well designed, again anticipating both novice and experienced users.
- Standard data communication software should be offered to users, so that installation and connection to the CISO-Service is as streamlined as possible.

5.4.5 Support, stimulation, and focal-point activities
- The CISO-Service must offer human help, both technical and content-oriented. Different persons, with different skills and characteristics, are needed for these different roles.
- Other sorts of activities to stimulate effective use of the CISO-Service, such as inservice training sessions, occasional face-to-face meetings, a printed guide to CISO-Service use and new offerings, and publicity about the Service, must also be handled by the CISO-Service staff.
- The CISO-Service should become a national focal point for telecommunications inquiries and ideas, from both inside The Netherlands and abroad. The Service staff should become recognized as well-informed experts in the use of telecommunications in education. The Service should use its position to negotiate economies of scale for network usage and services, and also to generally lobby for telecommunications in education.
- The CISO-Service staff can help new, local bulletin boards and regional networks organize themselves and make sure they are accessible via the CISO-Service system.
- The staff will also serve as brokers between the various supply and demand constituencies making use of the Service.
- The CISO-Service staff must be responsible for professional management of its overall services, including their financial aspects, and for implementing effective strategies to stimulate use of the Service (remembering the 3-A Model).
The identification of 'trigger events' to stimulate use of the CISO-Service is also part of the staff's role.
5.5 Recommendations Related to Policy and Overall Support

5.5.1 Establishment and financing of the CISO-Service

- External subsidization is needed for the CISO-Service, certainly during its phase-in period, but also on-going funding must be of a long-enough duration for the Service to have a chance to develop momentum in the field.
- There are a number of groups who could have a natural interest in a well-functioning CISO-Service in The Netherlands and whose commitment and support to such a Service could be critical. We can distinguish three categories of potential partners:

<table>
<thead>
<tr>
<th>Categories of potential partners</th>
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<tbody>
<tr>
<td>Government</td>
</tr>
<tr>
<td>Major Candidates:</td>
</tr>
<tr>
<td>- Ministry of Education &amp; Science</td>
</tr>
<tr>
<td>- Ministry of Economic Affairs</td>
</tr>
<tr>
<td>Business &amp; Industry</td>
</tr>
<tr>
<td>Major Candidates:</td>
</tr>
<tr>
<td>- PTT Telecom</td>
</tr>
<tr>
<td>- Banks</td>
</tr>
<tr>
<td>- Insurance Companies</td>
</tr>
<tr>
<td>- Associations representing various professional groups and trades</td>
</tr>
<tr>
<td>- (Micro)electronics companies and services</td>
</tr>
<tr>
<td>Education Support Organizations and Advice Groups</td>
</tr>
<tr>
<td>Major Candidates:</td>
</tr>
<tr>
<td>- Advice Boards</td>
</tr>
<tr>
<td>- Steering committees from various educational sectors</td>
</tr>
<tr>
<td>- National institutes supplying educational support</td>
</tr>
<tr>
<td>- Professional societies</td>
</tr>
<tr>
<td>- Parents' associations</td>
</tr>
</tbody>
</table>

31) In the Netherlands they are key groups advising the ministry on educational policy and initiatives.

There are different types of partnerships possible, each with an important contribution. Some partnerships could be largely expressed in a general sense of endorsement and commitment, important to further stimulate development of the Service. Other partnerships could be more directly focused at facilitating policy, perhaps, for example, with relation to making possible more flexible time and inservice opportunities for teachers. Still other partnerships could involve more direct support, either through financial subsidization of some range of services, or through technical support, or through a contribution to the 'supply side' of the CISO-Service by making valuable information and information about services available to schools through the Service.

We have seen examples of all of these different types of partnerships in the European CISO-type services described in Section 2. In the Belgium case, for example, a bank and a large company are both active in subsidizing certain databases available on-line. Associations representing the professional and vocational organizations in the field could take advantage of the opportunity for partnership in order to better communicate with the school sectors preparing students for eventual work in their areas. Those selling educational products and services can benefit from broader opportunities to interact with their target audiences. Those for whom accurate information and communication is important, particularly the Ministry of Education and Science, could use partnership opportunities to improve their own communication channels.

But some group or consortium must take the initiative to begin support of a centralized CISO-type Service. In most European countries it is the Ministry of Education who plays a leadership
role, in terms at the very least of a statement of support and valuation for such initiatives, in some types of policy initiatives to help access problems, and in supplying strategic information through the Network Service, to stimulate its use (see, for example, the examples from Portugal, Ireland, Luxembourg, and Geneva):

- A full-time staff is needed for the CISO-Service, as well as quality equipment and adequate funding to support the investigation of better and expanded services. An adequate budget must be available. Again, different partners, particularly from the industrial and professional world, can be key partners in this development, through contributing to different services relevant to their own areas.

5.5.2 Policy relating to costs to users

- Users should expect some costs for use of different on-line services, but some services must remain low- or no-cost. In addition, start-up use of the service should be low- or no-cost (again to make the accessibility vector as positive as possible). Teachers must be able to browse to build familiarity and personal-use skills without being penalized by having to pay for these ‘inservice’ activities.

- Costs are a critical problem for schools and teachers. As much as possible, the CISO-Service must look for strategies for keeping user costs low. Bulk buying of modems, for example, is one strategy, whereby new users can be offered at low price, a modem and data communication software already configured to that modem and to the CISO-Service.

- Approaches need to be found whereby central funding is used to support central services and to subsidize new users of the Service, but schools and regions take responsibility for telephone-connection costs and for a certain basic yearly fee for subscription to the CISO-Service for all the schools and teachers in its jurisdiction.

- Payment can be asked from those who wish to supply information to the Service if that information relates to profit-making activities.

32) The placement of ‘advertisements’ for one’s products or services is now generating considerable income for different networks in the Internet system.

5.6 Recommendations Related to the School and to Teachers

5.6.1 School issues

- School leaders must become aware of the potential organizational problems for telecommunications use in the school, particularly with respect to conflicts with the organization of computers and computer use that is already established in the school.

- The school leader must steer the process of deciding where and how on-line connection can take place within the school. Making access as easy as possible should be a guiding principle; thus teachers should not be expected to have to work in the computer room, along with students, in their use of a computer for professional activities. Teachers need a proper place to work while using the CISO-Service.
Careful consideration must be taken to support of teacher use at home of the CISO-Service. Who pays for the teacher’s at home set-up and on-line use is a policy decision.

5.6.2 Teacher issues

- On-line use, at least when the teacher is just beginning, must be made as easy as possible for the teacher; thus support needs to be available. Making it easy for the teacher to contact a local resource person or colleague should be supported by the school leadership and facilitated by the CISO-Service staff.

- Appropriate inservice is critical. The CBAM Model (Section 1.4.2) should be remembered in the development of inservice experiences. A start-up module should be carefully prepared, making first use of the Service easy, attractive, and clearly resulting in a useful result for the teacher. On-line inservice modules and informal inservice support should be available to fit the natural evolution of the teacher’s level of concerns about telecommunications use in education.

- Different teachers will respond to the opportunities for on-line professional involvement in different ways. Some will prefer what they do to be as efficient as possible, with saving time an important aspect. Others will value the opportunity for reflective discussions and browsing among new ideas. Thus at least three different broad categories of users: task directed, expansion and reflection directed, and a mixture of both, should be anticipated in teacher inservice and also follow-up support offered to teachers.

5.7 What is Next? Wait-and-See vs Proactive Scenarios

Simply stated, one of two basic responses will follow the presentation of these recommendations: an initiative will be taken to support an integrated CISO-Service, or no initiative will be taken and things will continue as they now are. As was indicated in Section 3.2, current circumstances in the Dutch situation may make it difficult for this initiative to occur, and a wait-and-see attitude may be felt to be most appropriate. We close with two scenarios, one representing Dutch use of telecommunications for education over the next few years if no initiative occurs; the other what could be the situation, based on what is happening elsewhere, if a strategically phased-in CISO-Service is initiated.

5.7.1 The Wait-and-See Scenario

This scenario predicts a situation such as the following:

Telecommunications use will continue to develop in education. Existing services based inside The Netherlands will continue, but also will continue to be technically and organizationally separate from one another; will go forward on limited budgets, volunteer services, and uncertain financial continuity; and will not have resources for much expansion of their services. Economies of scale will not develop. Internetworking, with its possibilities for exposure to new ideas and persons, will not much occur. The Netherlands will be different than all but one of the
Member States in terms of its professional development in this area, and will not be a participant in new developments and collegial interaction in this area.

Occasional student participation in an on-line project will continue, but only involving a small number of the students who could be involved. Also, those who are involved will be those lucky enough to be involved with an enthusiast teacher who has taken the time and effort to look for and work out, and find a way to pay for, a connection with an established on-line project.

Uses of telecommunications for professionalization of the school and teacher will occur in an unequal fashion, with some groups developing their own network services (as is now the case with the PRINT bulletin board). However, in general, much time and effort will be needed for schools and teachers to get installed for telecommunications use, find an appropriate on-line service for their interests, get connected to it, and become familiar with it. This 'reinventing the wheel' process will involve not only lost time but the dropping out of many frustrated potential users. Economies of scale will not be realized. Costs will continue to be prohibited for many services, beyond the local bulletin board level.

The Internet system meanwhile will continue to grow in an exponential fashion, and higher education institutions, under the support of the CISO-type service SURF, will routinely make use of the services offered by the Internet system, such as Gopher data finding services, multi-media transmission services, extensive lists of discussions and on-line available materials, and communication possibilities. The schools however will not be connected to the higher education system in their basic communication and information handling practices, not only missing an opportunity for synergy but also failing to prepare their students for the environment in which they will have to function in higher education. Similarly, interconnectivity will continue to grow in society and the workforce, increasing the gap between the school sector and the real world.

5.7.2 The Proactive Scenario

What if, however, a proactive response occurs and some sort of integrated CISO-Service is stimulated? Many factors will still need to be considered before the likelihood of implementation success increases and the likelihood of implementation failure fades (see Section 5.2). If, however, a strategic phase-in period is carried out, we think it reasonable to predict that in the next five years in Dutch education:

- Schools are supplied with modems, appropriate data communication software, and are routinely helped with their installation processes of equipment for on-line use so that teacher and school time do not have to be spent on basic technical issues (as is the case in French-speaking Belgium, Iceland, Luxembourg, Geneva and is under development in Portugal and the Nordic Countries).
- Low-cost access to a CISO-type service is available, subsidized by the Ministry or other groups, (as is the case in Germany, Iceland, Ireland, Italy, Luxembourg, Portugal, Spain, Geneva, New Zealand, and Japan).
- Internetworking, and connection to the Internet is provided to teachers and schools (as is the case in French-speaking Belgium, Denmark, Iceland, Luxembourg, Norway, Spain, and is under development in the Nordic Countries generally).
- Special support is given to teachers to help them organize participation for their students in international on-line projects (as in the case in French-speaking Belgium, Denmark, Germany, Iceland, Italy, and Luxembourg).
- An emphasis is given to efficient information transfer between the Ministry and schools (as is the case in Ireland, Italy, Luxembourg, and Portugal).
- A special emphasis is being given to support of the professional development of the teacher (as is the case in Denmark, Iceland, Norway, Spain, and Geneva).
- Special strategies are organized for efficient and effective inservice training (see for example, the strategy for the Nordic School Project, and also the examples from Spain and Denmark).
- Special attention is being given to increasing the professionalism of the school and its leadership (as is the case in New Zealand).
- A group has been formed which serves as a focal point for information exchange and innovation stimulation for telecommunications use in education, attracting support and recognition both inside the country and abroad for the Dutch experience with telecommunications in education, see for example, the groups involved in the:
  - INFA Project in Denmark,
  - the ICMENNT service in Iceland,
  - the NITEC Project in Ireland,
  - the RESTENA network in Luxembourg,
  - the KUF Network in Norway,
  - the RICOME Network in Portugal,
  - the XTEC Network in Catalonia, and the PNTIC Program in Spain (schools supported by the Ministry in Madrid),
  - the CIP in Geneva,
  - Campus 2000 in the UK,
  - the Nordic Schools Project for the combined Nordic Countries,
  - the SSINet in New Zealand,
  - as well as many examples in Japan, Australia, the United States, and Canada.

5.7.3 Final Recommendations
Thus it is hoped The Netherlands will join the majority of western countries in their proactive support of telecommunications in education. The CISO Project and this Final Report with its recommendations can perhaps serve as guideposts for making this policy decision away from "Wait and see" to being proactive and then strategically implementing an integrated CISO-Service in a way more likely to lead to its successful acceptance than might have been the case without such guideposts.
5.8 Reflections on The CISO Project

Much could be said about the CISO Project itself, from a methodological perspective as well as from the choices that it made and the conclusions it drew. We conclude this section, and the Final Report, with brief observations about two main questions: Has the Project met its goals? and, What Next?

5.8.1 Has the Project met its goals?
The overall goal of the CISO Project was to 'contribute to the long-range development of the use of telecommunications for communication and information support in Dutch education'. This goal was to be most directly addressed by a set of recommendations for an educationally oriented on-line service and its associated organizational structure. Particular attention was to be paid to educational payoff and to cost issues.

The Project has tried to address these goals. Recommendations were made, based on a strategic analysis of projected educational payoff for a telecommunications service. This analysis, in turn, was based on a consideration of the current situation in The Netherlands as well as on experiences in other European countries. The recommendations also were grounded in an implementation perspective, a critical assessment of problems likely to frustrate the growth and potential of an on-line service for the educational sector in The Netherlands. The recommendations however, offer a way forward.

The Project could not expect to find 'an answer' to how best to evolve in a complex, evolving field. Not every research question the Project originally identified received the same attention as the Project evolved, and some areas, such as the cost-effectiveness problem, were only dealt with in a practical way.

However, an important test of the impact of the Project will be if the Final Report stimulates some debate and discussion. We hope this will occur.

5.8.2 What next?
As a minimal step then, we urge the two groups commissioning the study -PTT Telecom and PRESTO- to stimulate some sort of follow-up discussion of the recommendations in the Final Report. Such discussion should involve a broad range of participants, particularly those from different groups (see Section 5.5.1) whose support is critical to further development of a professional and centrally coordinated CISO-type Service. The discussions may also lead to the identification of appropriate 'trigger events': strategies to stimulate rapid use of a CISO-Service even in its phasing-in period so that a critical mass of demand begins to develop. A close analysis of 'trigger events' that have been successful in other European countries in stimulating growth of the national CISO-type services that already function in most countries could be useful. A parallel investigation focussing on the needs of the 'self-responsible schools' in The Netherlands is also recommended.
6 References


Appendix: Contents of the ‘Supporting Documents Volume’, CISO Project Final Report

First the Dutch title is given, second the translation and a short description. The numbers refer to the numbers in the Supporting Documents Volume.

Section A: Organisation of the project
1 Organisatie, activiteiten en verloop van het project
   An Overview of the Organisation and Procedures of the CISO Project
   (P. de Vries) August 1993
   A summary of the overall Project Plan, including the governance of the Project.
2 Activiteitenoverzicht en planning
3 Scholencontract
   Contractual Arrangements with the Schools
   (W. Veen) August 1993
   The original copy of the contractual arrangements with the schools.
4 Research Questions: The CISO Project
   (B. Collins) February 1993
   An elaboration of 20 clusters of research questions, for consideration in the CISO Project.

Section B: Profile of the Teachers and Schools Participating
1 Profiel en beschrijving van de docenten en de scholen
   Profile of the Teachers and Schools Participating in the CISO Project
   (E. Lammertsma) February 1993
   A summary of relevant information about the teachers and the schools participating in the CISO Project, based on data collected at the beginning of the Project.
2 Resultaten Vragenlijst Interpersoonlijk Leraarsgedrag
   Questionnaire, Teacher Profiles in The Netherlands.
   (D. Lockhorst, W. Veen) August 1993
   In order to ascertain who representative the CISO teachers were relative to Dutch secondary school teachers in general, the teachers responded to a profiling instrument normalized over a large group of Dutch teachers.

Section C: Teacher and school support.
3 Organisatie en uitvoering nascholing
   Teachers’ Inservice Training: The Organization and Practice
   (D. Lockhorst, W. Veen) August 1993
   Summary and reflections on the year-long inservice in the CISO Project.
   On-Going Teacher Support
   (D. Lockhorst, W. Veen) August 1993 A description of the kinds of support given to the teachers in addition to their inservice training sessions.
4 Helpdesk
The Help Desk
(P. Ket, W. Veen) August 1993
A report of the organisation of the Help Desk maintained for the
CISO Project and a summary of its use by the teachers.

5 Het instrumentarium: het CISO-loket
CISO Project On-line Message System
(P. de Vries, W. Ybema) August 1993
A description of the on-line message and communication
system developed for the CISO Project.

6 Lesmateriaal
Development of Sample Lesson Materials for the CISO Project
(C. Verwijs, D. Lockhorst, W. Veen) August 1993
A summary of the kinds of lesson materials that were developed
both for the teachers themselves during their inservice sessions
but also as examples of lesson materials for students.

7 Het instrumentarium: de communicatie-software
The Communication Software Package: ‘Telelijn’
(C. van Delft, P. de Vries, W. Ybema) August 1993
A description of the data communication program ‘Telelijn’ with
a description of how it was modified for data collection for the
CISO Project.

Section D: Data from teachers and schools.
1 Individuele interviews
2 Groepsinterviews
Interviews with Teachers and Others in the
CISO Project Schools
(D. Lockhorst, W. Veen, P. de Vries) August 1993
A summary of various discussions and interviews, held during
the course of the CISO Project, with the teachers and with
others in the participating schools, relative to their expectations
and reactions to telecommunications in education, and to the
specific aspects of the CISO Project.

3 Verzamelde informatie: de diskettes en logboeken
Overview and Analyses of the Journals and On-Line Activities
of the Teachers
(E. Lammertsma) October 1993
A report summarizing the journal entries maintained by the
teachers during the Project and about their on-line activities, as
saved directly via the telecommunications software.

Section E: Other data.
1 Studiedag van 25 juni 1993 in Utrecht.
Results of the Questionnaire and Discussions from the CISO
Project National Study Day
(W. Veen, D. Lockhorst, E. Lammertsma) July 1993
A National Study Day Workshop was organized by PTT Telecom
on 25 June 1993 to focus on the issues under investigation in
the CISO Project. During this meeting, attended by persons from
throughout The Netherlands involved with telecommunications
in education, a questionnaire was filled in and notes were made
of a group discussion which occurred.
2 Raadplegen beleidsfunctionarissen
   Interviews with A Sample of Policy Makers and Decision Makers
   (P. de Vries) August 1993
   A summary of a series of 12 interviews with key policy makers from government and business as to their opinions about a CISO-type service for The Netherlands' education sector.

3 CISO-project Campus 2000 onderzoek
   CAMPUS 2000 Survey
   (B. Collis, E. Lammertsma) 28 April 1993
   A summary of a survey done among non-UK subscribers to the UK-Based Campus 2000 GOLD Service.

4 Summary of a Study Visit; Copenhagen, Denmark, and Helsingborg, Sweden, 11-13 January 1993
   Summary of a Study Visit: Copenhagen, Denmark and Helsingborg, Sweden
   (B. Collis, C. Verwijs) 19 January 1993
   A summary of a Study Visit whose purpose was to investigate the Nordic countries' experiences telecommunications projects in schools and in particular with Campus 2000.

5 De kosten, een complex vraagstuk
   Costs, a complex issue
   (E. Lammertsma, P. de Vries) February 1994
   An analysis of the various costs for telecommunications use in the CISO Project.

Section F: CISO: functionality en instrumentation

1 Functionality and Instrumentation of a CISO.
   (L. de Diana) June 1993
   An identification of critical options for an on-line communication and information system, including the functions most useful to provide to educational users, considerations relative to the ways information and other resources are organized in order to be available through the CISO, user interface considerations, and overall attention points relative to the design aspects of an on-line environment.

Section G: Publications

1 Electronic Links: A Way to Enrich the Life of Schools
   'Electronic Links, A Way to Enrich the Life of Schools' (B. Collis)
   30 September 1993
   A overview paper on applications of telecommunication to education, prepared as a Keynote presentation for a Council of Europe Meeting, 'School Links', Stockholm, 14-16 October, 1993.

2 The CISO Project: Toward a Communication and Information System for Dutch Education
   The CISO Project: Toward a Communication and Information System for Dutch Education.
   (P. de Vries, B. Collis, W. Veen) September 1993
   A paper prepared for the International Conference on Telecommunication in Education (TelED); Dallas, Texas, 10-13 November 1993.
3 Telecommunications in Education and Training in Europe: An Analysis of Research and Practice
   ‘Telecommunication and Education and Training in Europe: An Analysis of Research and Practice’
   (B. Collis, P. de Vries) October 1993
   An extensive overview of current developments in Europe with respect to telecommunication for education and training. This invited paper will be published in the Journal of Machine-Mediated Learning in 1994.

4 The Use of Telematics in Dutch Education
   ‘The Use of Telematics in Dutch Education’
   (W. Veen & F. Vogelzang) August 1993
   An overview of project experiences with telecommunications in Dutch schools in the period 1987-1993. This paper was presented at the Teleteach ‘93 Conference in Trondheim, Norway, in August 1993.

5 Project edu2000
   (W. Veen) January 1993
   A report of a multi-national project focused on communication in French. Many projects with a language-practice orientation are occurring in Europe; for space reasons these could not be summarized in the CISO Final Report. This particular document serves as an example of one such project.

6 ‘The Emerging Trans-European Network for Education and Training: Guidelines for Decision Makers’
   (B. Collis, P. de Vries) September 1993
   Summary of a study commissioned by the Task Force on Human Resources, Education, Training and Youth, Commission of the European Communities, and carried out simultaneously to the CISO Project.

Section H: References

1 Glossary
   (B. Collis, W. Veen, P. de Vries) September 1993
   Definitions of key terminology relevant to the CISO Project (Dutch versions).

2 Selected Bibliography
   (B. Collis, W. Veen, P. de Vries) October 1993
   References cited in the English and Dutch Volume of the Final Report of the CISO Project plus a representation sample of key Dutch studies.