

Morten Flate Paulsen

ONLINE



EDUCATION

*LEARNING
MANAGEMENT SYSTEMS*

GLOBAL E-LEARNING IN A SCANDINAVIAN PERSPECTIVE

With contributions concerning online education in Denmark and Sweden
by Søren Nipper and Carl Holmberg

nki 
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Introductory Part

This book comprises a rich variety of material, perspectives, insights and assessments. Valid information can be found there for researchers, for students in the field, for teachers, for managers and for politicians who are looking for reliable knowledge. It is very clear in its structure and arguments. In strategic and policy terms it discusses issues at the forefront of current debate... (Wagner, Page 14)

...online education may facilitate collaboration and stimulate discussion between people, cultures, institutions, and subject areas. It is like a melting pot for educators. Young professionals who now enter the field of online education should use these opportunities to learn from, and build on, all the experience and controversies that come from this melting pot. (Citation from interview with the author about the book)

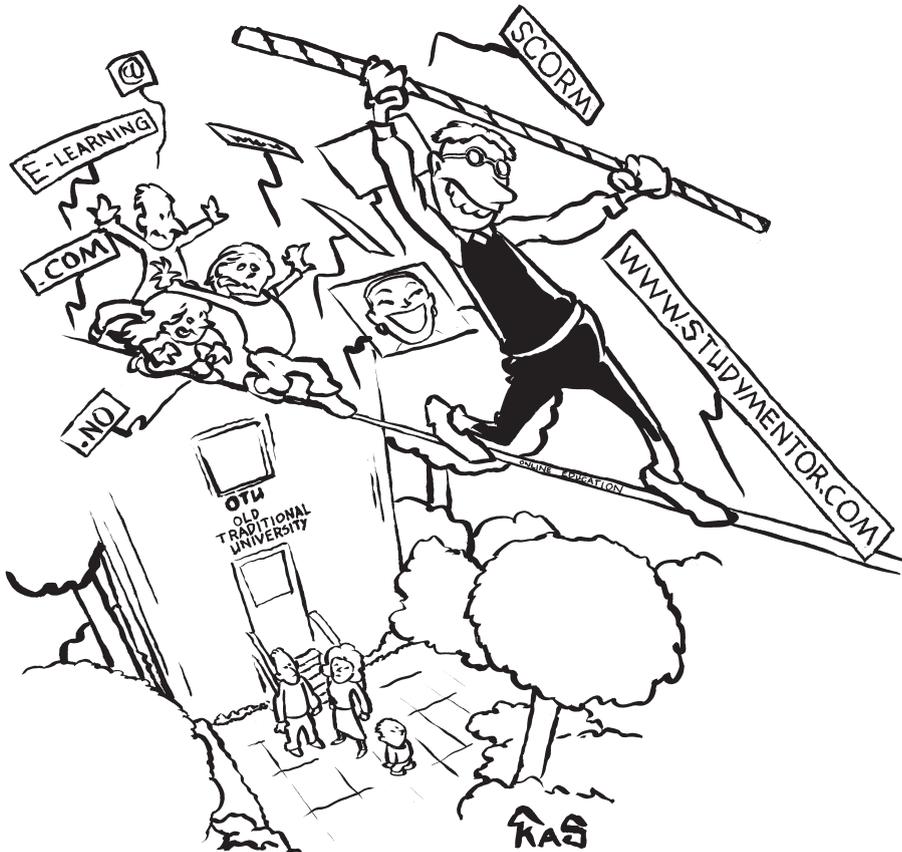
...in Australia, the official strategy is to develop education to become the second largest export industry. In the Nordic countries, however, the export of education does not seem to be an issue for public discussion. (Page 18)

One of the most obvious misapprehensions about online courses is that they should take place in front of a PC. Most online students spend much more time studying textbooks and preparing assignments than surfing the Internet. Even though both text and video can be presented online, paper is often a better medium for text and television is better for presenting video. Still, there is a tendency among online educators to substitute excellent textbooks with mediocre Web material and superb videocassettes with a tiny, degenerated PC-version of the video. (Citation from interview with the author about the book)

An online teacher once complained jokingly that he had too many lurkers in his discussion forums and that too few online students dared to expose themselves.



Figure 1. Online education surpassing old Traditional University



...a Sloan Consortium study of online learning in American higher education shows that 97.6% of all public higher education institutions in the USA offer online learning degree programmes and courses, either as fully online programmes or as hybrid (blended) formats. But even if most European and Scandinavian universities are dragging their feet, online learning will eventually be pushed onto the classical campuses by their student constituencies and the hard-hearted forces of the higher education market. (Page 225)

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Forewords



Dr. Erwin Wagner is Director of the Centre for Distance Learning and Continuing Education at the University of Hildesheim in Germany. He was President of the European Distance Education Network (www.eden.bme.hu) from 2000 to 2003. In addition to lecturing on distance education, multimedia and e-learning, he has worked as project manager of the multi-university *Virtual Campus* framework and as coordinator of the competence network *VIA-online* in Germany. Wagner has also been used as a consultant for political bodies on institutional, national, and European initiatives regarding assessment, evaluation, and quality management.

What might you – the reader – want to learn about this new book when opening it? Let me introduce your reading expedition by providing a few glances about discoveries you can expect.

First of all, this is an *interesting* book: If possible, I recommend that you read, listen to, or view the multimedia interview (www.studymentor.com) with the author about his background for writing the book. There, the author provides information concerning the (his)story of this book, the context (of long and outstanding international experience in the field), the targets (to open gateways between Nordic, European and international educators) and the integration of theory and practice. Adjusted to the modern world of multi-media there is an interesting mix of different modes. You will find very interesting theoretical concepts and sound empirical data. There are very interesting anecdotes to illuminate distance and online education in everyday practice. And readers will find a stimulating combination of different levels and perspectives: students and teachers, technology and organisation, management and policy.

Second, I regard this as an *important* book: This book by Paulsen is based on the evaluation of long and rich experience in distance education and its shift towards online teaching and learning. It is very timely indeed, focussing on some of the most important issues and tasks in the field of online education these days. In the first part you can find a broad set of useful definitions and models. It summarizes what leading researchers have contributed to the research and what many students and many online teachers have contributed to our present knowledge on how to resolve practical problems. In fact this book very effectively helps to create and structure this knowledge itself.



Third, it is an *innovative* book: It might be more precise to call it an innovative concept showing how to present relevant information from research and practice. And the book is just the central part. It is the printed part only, which proves that the author does what he claims to do: He provides appropriate resources to foster information, discussion, development and research through an intelligent combination of media for different purposes – as he treats the issue of online education. The website will enhance the use of this printed book with some real added value including different versions of the book for “electronic” readers, links, multimedia presentations and opening space for international online conferences. Regarding conceptual innovation, the presentation is based on the focal idea of “cooperative freedom” (first published by the author in 1992) which now can be regarded as one of the leading concepts among very famous ones in the history of distance education, especially valuable for online education.

Fourth, this book proves to be an *international* one: Paulsen claims to inform “online education professionals” around the world about innovative development and research in the Nordic countries. Obviously there have been very relevant experiments, projects, research activities and institutional models coming from the Scandinavian countries. Some are linked to European projects (where the author has been very active). Others are based on national or regional programmes. A few are linked to collaboration on a global level. As many professionals are quite closely following the innovative concepts and experiences in the Nordic countries, it may be regarded a little bit “coquettish” when the author asks whether Nordic professionals, and even more so business people and politicians, are too “shy” or too much “narcissistic” to present their findings, progresses and success to the world outside. But as he clearly states, there is much more at stake now: Online education has opened or widened the space for new opportunities in regional, national and global markets. So far, companies and consortia from the US, Australia and partially Europe are more or less dominating the field. To move this diagnosis very clearly into the awareness of the stakeholders concerned, the international character of the book is a double one: It presents the richness and excellence of achievements in the Nordic area to the world outside, and it emphasises that decision-makers in the Nordic countries should become aware of the chances and opportunities existing in the further development and exploitation of online education as a new “industry” inside Scandinavia.

Fifth, it is an *impressive* volume: This book comprises a rich variety of material, perspectives, insights and assessments. Valid information can be found there for researchers, for students in the field, for teachers, for managers and for politicians who are looking for reliable knowledge. It is very clear in its structure and arguments. In strategic and policy terms it discusses issues at the forefront of current debate, especially in part four: “Trends and future developments”. This shows in essence what the future of online education will be about. It will be a very vivid, inventive and busy area where the institutions and professionals in the Nordic countries could be a very influential part of the game, as Paulsen proves with his own example and this book, too.

And after all, you will find this book an *invitation* to take part in the discussion and even more so in the further development and refinement of online education – in the Nordic



countries (with their very active and influential networks and organisations), in Europe (where the European Distance and E-learning Network EDEN would serve as an excellent environment) or on a global level. This book will reward those who read it, and then it is up to the readers to gain benefit from what they have learned.

Erwin Wagner



Ingeborg Bø became President of the European Distance and E-learning Network in 2003. She is working as Executive Director of NADE, the Norwegian Association for Distance Education. She has also participated in many Nordic, European, and international projects and committees related to distance education. At the moment she is a project partner in the Baltic-Nordic Network for Exchange of Experience in Open and Distance Learning (www.boldic.net).

International educators can learn from online education in Scandinavia. The Scandinavian countries are often regarded as test beds for new technology. And the book testifies that online education has come further in Scandinavia than in most other countries. This is evident in the advancement of large-scale provision of online education and in the integration between LMS systems and national student administration systems. But on the other side, the Scandinavians do not seem to be able to capitalize on their competitive edge. A lot of Nordic students study abroad, but there is no focus on export of online education.

This book should be of interest to international readers since it presents Scandinavian online education in an international perspective. Paulsen draws heavily on his international experience from Pennsylvania State University and from participation in numerous European research projects. The American influence is most visible in *Part One: Online Education, Teaching and Learning*, which is also the most theoretical part. The European perspective is most evident in *Part Two: Commercial and Self-developed LMS systems*. There a number of important analyses of European online education are presented from the EU-funded Cisaer and Web-edu projects.

Paulsen became one of the very first European online educators when he initiated the development of the EKKO computer conferencing system in 1986 and taught his first online course the same year. Since then, he has worked continuously in the field, participated in many European research projects, and published a number of books, articles and reports about the topic. So, readers will soon discover that the book is based on practical and long-term knowledge of the field, thorough personal experience, and research to back up the many pointed statements.



Paulsen is a well-known speaker at conferences and seminars and participates often in public debate about online-education. In this way he shares his experience and knowledge with the ODL-community, a fact that is highly appreciated by colleagues both in Norway and Scandinavia. Through his active participation in the Baltic Nordic network he contributes considerably to the development of online-education in all seven countries involved. The educational community needs the willingness of pioneers like Paulsen to contribute to the theoretical and practical understanding of a field in rapid change and development.

One of the most important contributions in this book may be Paulsen's discussion on *Cooperative Freedom: A Theory of Online Education*. But also his *Definitions of Online Education Terms* and toolbox of *Online Teaching Techniques* should be of important value to international educators.

The book includes several anecdotes that illustrate real life examples of the more academic articles. These anecdotes are well written, pointed, and sometimes provocative as is the case with *The Swedish Challenges*. Paulsen's continuous work on online education is best illustrated in his description of *The NKI Internet College*. It presents an interesting review of nearly 20 years' development of the online education enterprise he has pioneered and headed.

In the introduction to his book *Nettbasert utdanning*, Paulsen compared online education with the cartoon figures *Teenage Mutant Ninja Turtles*. Both are teenagers conceived in the U.S. Online education was pioneered in the 1980s, and it is now approaching adulthood. Like other teenagers, it grows rapidly and creates many challenges and much frustration in the process. Like the Turtles, online education can be perceived as a mutation that appeared as a result of a collision between new technology and rigid educational institutions. In the resulting chaos, online education emerged as an organism with completely new genetic qualities. And the mutant may emerge as being more vigorous than its educational origin. And it may still provide completely new opportunities for education.

Ingeborg Bø



Preface



I have written this book for a broad, international audience of people who are interested in education and the Internet. It should be of special interest to students, teachers, course designers, and administrators who are involved with online education and training. It should also be of special interest to decision makers and educational officers in both public and private sectors.

I have chosen to discuss international online education from a Scandinavian perspective. There are two sets of reasons for this approach. First, I want to give Scandinavian readers a broader international view of their activities. After all, online education is becoming an international arena for competition, and we could all learn from developments in other countries. Second, I hope international readers may benefit from the findings made in the Nordic countries. They are all among the world's most developed in the field of online education, but Scandinavian online education is underrepresented in literature written in English.

The book has an international perspective, which I have developed through nearly 20 years of participation in the international online education arena. This includes my doctoral studies at Pennsylvania State University, my work as editor of the Distance Education Online Symposium (DEOS), my research on online education in Australia, and my participation in nine European research projects. At the moment, I am studying findings from open and distance learning in the Nordic and Baltic countries as a partner in the Boldic project (www.boldic.net) and the state of the art in European online education through participation in the Delphi project (www.ub.es/euelearning/delphi/).

I have deliberately chosen a Nordic perspective. As a Norwegian, I'm most familiar with the Scandinavian languages, projects, and initiatives. In 1998, I initiated the short-lived Scandinavian online education project *Nordisk Netthøgskole* with Danish and Swedish partners. Some of my research has also included Finland and Iceland. The book's Nordic perspective is most prevalent in the anecdotes. They all present examples of online education in the Nordic countries. The anecdotes are meant to be easy-to-read, but thought-provoking, examples that illustrate and vitalize the more theoretical articles.

I have worked at two institutions that have become large providers of online education. NKI in Norway has termed its initiative *Nettskolen* (www.nki.no), which means the school on the Net. Pennsylvania State University in the U.S. has named its initiative the *World Campus* (www.worldcampus.psu.edu). These initiatives are in many ways similar, but the names more than indicate the very different American and Scandinavian attitudes and ambitions. This is further illustrated by the fact that in Australia the official strategy is to



ONLINE EDUCATION AND LMS SYSTEMS

develop education to become the second largest export industry. In the Nordic countries, however, the export of education does not seem to be an issue for public discussion.

Scandinavian institutions have world-class competence in subjects such as mobile communication, environmental studies, fish farming, offshore oil drilling, shipping, and international aid and peace operations. To utilize these areas of competence in global courses, Scandinavian institutions that are not proficient in English may employ course designers in the U.S., technical support staff in India, and student counselors in Ireland. But unfortunately, it is more likely that American tutors and course content will dominate Scandinavian online education – just as American textbooks already dominate Scandinavian higher education.

I have deliberately chosen to combine theoretical articles with more popular anecdotes including pointed formulations, and personal experiences. I hope this untraditional approach has contributed to making the book an informative, interesting, and enjoyable reading experience.

In my opinion, online education may facilitate collaboration and stimulate discussion between people, cultures, institutions, and subject areas. It is like a melting pot for educators. Young professionals who now enter the field of online education should use these opportunities to learn from, and build on, all the experience and controversies that come from this melting pot. So, please treat the book as a starting point for further discussion and as an inspiration to improve future online education.

September 2003,
Oslo, Norway

Morten Flate Paulsen
<http://home.nettskolen.com/~morten/>



Introduction

This book is a collection of carefully selected articles and anecdotes. Some are updated and revised versions of material I have published earlier, a few sections are translated from Norwegian, and others have been written especially for this book. The selections, revisions, changes, and additions are above all made to present a cohesive book with a Scandinavian perspective on international online education. However, readers should be able to read each article separately and in the order they prefer. One consequence of this approach is that alert readers will find that some issues are referred to or repeated in more than one article.

The articles are longer, research based, theoretical contributions. In between these articles, there are a number of anecdotes. It is important to understand that these anecdotes are personal contributions, intended to illustrate interesting online education practice. They are not meant to be representative and objective. Instead they are colored by my personal experiences, opinions, and long-time relations with NKI Distance Education. It has been difficult to write a book that operates on two levels with theoretical articles and personal anecdotes. I hope I have found an interesting balance between the two.

The Articles

The first part of the book discusses online education, teaching, and learning. It presents my definitions of *Online Education Terms*, and an updated version of *Cooperative Freedom*, my theory of online education. The remaining part is primarily based on my doctoral thesis *Teaching Techniques for Computer-mediated Communication* and on my experiences from developing and teaching the NKI course *Online Teaching and Learning*.

The second part presents my research on commercial and self-developed learning management systems from two European Projects. The first article, *International Web-based Education and Strategic Recommendations for Decision Makers*, presents a summary of the major findings from the Cisaer project. The second article, *European Experiences with LMS Systems*, presents the results from the Web-edu project. The articles are probably also influenced by the fact that I have headed the development of EKKO – one of the world's first LMS systems, and SESAM – the LMS system currently used by NKI Distance Education.

The third part introduces *The Nordic Scene* with its achievements and barriers in an international setting. It goes on to describe *Online Education and LMS Systems in the Nordic Countries*. Further, Søren Nipper and Carl Holmberg, in my opinion the two best-qualified Scandinavians, have accepted my requests to write their personal contribution to elucidate the Danish and Swedish online education arena. In the article *Online Education*



in *Denmark: A Personal Account*, Søren Nipper presents an interesting analysis of Danish online education from its introduction in 1982, via the Big Bang in 1998, to the near future in which online learning will diffuse into all sectors of education and training in Danish society. Carl Holmberg's article, *On the Move towards Online Education in Sweden*, includes a broad discussion on how information technology in general and the many political initiatives and agencies in special have influenced the whole educational sector in Sweden.

The final part of the book presents *Potential LMS Improvements* suggested by European system administrators. It also discusses important trends and future developments in international online education. The issues included are based on retrospective observations, current developments, and analyses made in the European research projects in which I have participated. These include the development towards large-scale operations that leads to a need for systems integration, a focus on cost-effectiveness, and an interest in standardization. The technology will continue to evolve, and the spread of mobile technology and broadband networks will create new opportunities and demand for online educators. Finally, the globalization of online education is discussed.

The Anecdotes

The book includes a number of anecdotes from Nordic online education activities. They should be perceived as personal observations and testimonies presented by a Norwegian educator, devoted to the institution NKI. The selection of anecdotes and the way they are presented should be viewed in this context.

Pioneer experiences from a student perspective are presented in *Line Fjellvær: Scandinavia's First Mobile Student?* Then a veteran teacher is portrayed in *Bjørn Helgeby: Online Trainer of the Year*. The anecdote *Globalskolen: A Global Primary School* presents some experiences from online teaching of 180 Norwegian children living abroad in 58 countries. *Online Education Obituaries*, points out some conspicuous online education initiatives that have proven not to be sustainable. Further, one of Scandinavia's leading providers of LMS systems is described in *Frontier: The Story Behind a Dawning Norwegian LMS Success*. Nordic governmental initiatives to support online education are discussed in *Nordic Virtual Universities*, and the Swedish online education policy is challenged in *The Swedish Challenges: A Provocative Statement*. An in-depth description of the author's home institution is presented in *NKI Fjernundervisning: Two Decades of Online Sustainability*. Finally, NKI's experiences with online education for students with disabilities are presented in *Accessibility: Online Education for All*.

The Web-site

This book is published as a traditional, printed book. But it is also designed and developed with the intention of becoming an online publication with experimental use of multimedia. More information about this is available at the book's web-site www.studymentor.com,



which is planned to include:

- a pdf-version with colors and active links,
- an e-book version for PDAs,
- digitized audio content in MP3 format,
- multimedia presentations,
- links to additional online resources,
- an international online conference in November 2003 discussing issues in the book.



Part One

ONLINE EDUCATION, TEACHING, AND LEARNING

Sustainable online education is characterized by its ability to persist when extraordinary internal or external funding stops. Unfortunately, it seems to be a rare phenomenon. In most cases online education is sustainable when it generates an economic surplus or reduces costs. (Page 25)

Today's students often have full-time jobs and families to take care of and many are reluctant to participate if it means relinquishing high-quality family life and job achievements. They need flexible education: education that allows them to combine job, family, and education in a manageable way. (Page 43)

Both studies show that online students have better average grades and a lower percentage of failing grades. This does not necessarily show that online courses were better than traditional part-time courses, but it shows that online learning seems to work very well for students who have chosen to study online. (Page 56)

In correspondence courses, teachers are accustomed to mail carriers who deliver mail once a day. Online teachers, however, may receive e-mail 24 hours a day, 365 days a year. This online immediacy results in student demand for swifter responses and, hence, a heavier workload for teachers. (Page 74)

In traditional education and training allocation of resources is controlled by the "ringing of the bell". (Page 73)

You are going to work harder in teaching a course online, at least the first time.... Being a "virtual" professor is a little bit like parenthood. You are "on duty" all the time, and there seems to be no end to the demands on your time and energy. (Page 74)

Figure 2. The online teacher's workload



Online education offers students excellent opportunities for individual communication with their tutors. They can be contacted via e-mail 24 hours a day, 365 days a year. Few learning environments provide such opportunities for individual access to teachers. It is obvious that online students appreciate always having a personal tutor available. It is the students' dream, but it could soon become a nightmare for the tutors.

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Online Education Terms

This article presents, defines, and discusses the most pivotal online education terms that are used throughout this book. The definitions are presented and discussed in relation to each other, rather than in their alphabetical order.

Online Education, E-learning, and M-learning

Online education: There are many terms for online education. Some of them are: virtual education, Internet-based education, Web-based education, and education via computer-mediated communication (CMC). The following definition of online education is based on Desmond Keegan's (1988) definition of distance education. Hence, online education is characterized by:

- the separation of teachers and learners which distinguishes it from face-to-face education
- the influence of an educational organization which distinguishes it from self-study and private tutoring
- the use of a computer network to present or distribute some educational content
- the provision of two-way communication via a computer network so that students may benefit from communication with each other, teachers, and staff

Sustainable online education is characterized by its ability to persist when extraordinary internal or external funding stops. Unfortunately, it seems to be a rare phenomenon. In most cases online education is sustainable when it generates an economic surplus or reduces costs.

E-learning is here defined as interactive learning in which the learning content is available online and provides automatic feedback to the student's learning activities. Online communication with real people may or may not be included, but the focus of e-learning is usually more on the learning content than on communication between learners and tutors. E-learning could be viewed as an online descendant of *computer-based training* (CBT) and *computer-aided instruction* (CAI).

Unfortunately, the term e-learning is often used as a more generic term and as a synonym for online education. Kaplan-Leiserson has developed an online e-learning glossary, which provides this definition:

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E-learning covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, and CD-ROM.

The term e-learning is not very precise, and it should be pointed out that learning is just one element of education. So, the term online education should cover a much broader range of services than the term e-learning. One may also claim that e-learning companies often focus on course content, while online education institutions cover the whole range of educational services.

Computer Supported Collaborative Learning (CSCL) focuses on socially oriented theories of learning using computer technologies to support collaborative methods of instruction.

Instructional design is characterized by a systematic and reflective process of applying principles of learning and instruction to develop instructional materials, activities, information resources, and evaluation.

Mobile learning (m-learning): The term m-learning is derived from the term e-learning. It is a form of online learning that can take place anytime, anywhere with the help of a mobile computer device. The device must be capable of presenting learning content and providing wireless two-way communication between teacher(s) and student(s).

Online Education Support Systems

Online education support systems are here defined as all systems that support online education. In the following, this paper discusses two alternative models for online education support systems developed by the author as a part of the Web-edu project. The models are:

- The Jigsaw model for online education support systems
- The Hub model for online education support systems

Both models show that several online education support systems should be integrated or exchange data. This need for integration increases when online education support systems grow from small-scale to large-scale systems. Kaplan-Leiserson touches upon the need for integration in an attempt to define an integrated learning system:

IIS (integrated learning system): A complete software, hardware, and network system used for instruction. In addition to providing curriculum and lessons organized by level, an IIS usually includes a number of tools such as assessments, record keeping, report writing, and user information files that help to identify learning needs, monitor progress, and maintain student records.

To facilitate the increasing need for integration and exchange of data, a number of initiatives have been undertaken to develop standards specifications. Among these initiatives are the IMS project (www.imsproject.org) and SCORM (www.adlnet.org). Much focus has



been given to the specifications' attempts to facilitate exchange of learning content, but the attempts to standardize integration between the various online education support systems could actually be more important. This could be exemplified by the specifications IMS is developing which address key problems and challenges in integration between online education support systems:

- The IMS Learning Resources Meta-data Specifications create a uniform way for describing learning resources so that they can be more easily found (discovered), using meta-data aware search tools that reflect the unique needs of users in learning situations.
 - The IMS Enterprise Specification is aimed at administrative applications and services that need to share data about learners, courses, performance, etc., across platforms, operating systems, user interfaces, and so on.
 - The IMS Content & Packaging Specification will make it easier to create reusable content objects that will be useful in a variety of learning systems.
 - The IMS Question & Test Specification addresses the need to be able to share test items and other assessment tools across different systems.
 - The IMS Learner Profiles Specification will look at ways to organize learner information so that learning systems can be more responsive to the specific needs of each user.
- (www.imsproject.org/faqs/imsnewpage.cfm?number=6)

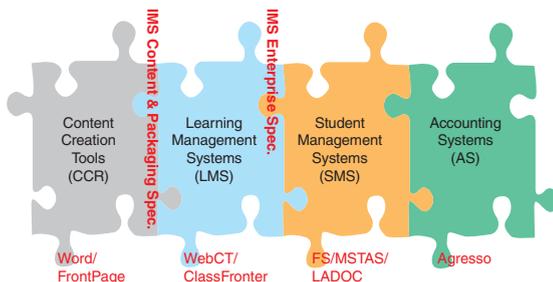
The Jigsaw Model

The Jigsaw model is a simplistic model used in the web-edu project. It includes the four main categories of online education support systems that are listed below and presented in Figure 3.

- Content Creation Tools (CCT)
- Learning Management System (LMS)
- Student Management System (SMS)
- Accounting System (AS)

It is called the Jigsaw model to indicate that these systems should fit together to exchange data more or less seamlessly. Figure 3 also presents some examples of actual systems and shows how the IMS specifications relate to the systems.

Figure 3. The jigsaw model for online education support systems

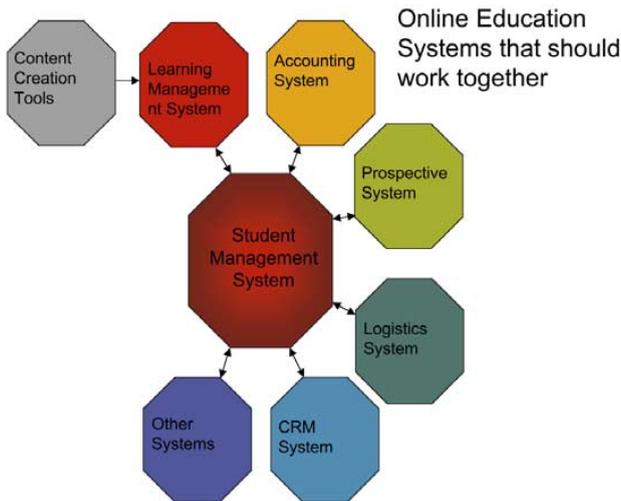


The Hub Model

The Hub model, presented in Figure 4, is more complex than the Jigsaw model. It is included to show that online education support systems are becoming more and more complex. This is partly due to the institutions' need to rationalize the operation to handle the growing number of online students and courses, and partly due to the fact that users are increasingly expecting more sophisticated services.

The model is termed the Hub Model to indicate that the Student Management System is the central, most important system for large-scale online education. For historical, legal, and financial reasons, the SMS system is the most important system for an educational institution. Hence, all other systems that offer online education services should rely on the SMS system as the master system with which they exchange data.

Figure 4. The hub model for integration of online education support systems



The Hub model includes Customer Relation Management (CRM) systems and prospective systems to show the need for integration with marketing and sales related systems. It also includes logistics systems to show that it could be necessary to integrate systems that handle shipment of textbooks and other physical material to distance students.

Content Creation Tools (CCT)

Content creation tools are the tools that course designers and teachers use to create the content in online education courses. The content creation tools are used to develop learning material. There are many types of content such as plain text, slides, graphics, pictures, animations, simulations, assessments, audio, video etc. Typical examples of these systems are DreamWeaver, FrontPage, Word, PowerPoint, and Director. These are generic tools with few features developed specially for online education.

In addition to the much-used generic CCT tools, there are a number of CCT tools that



are specially made for development of educational content. The most important of these tools are termed *authoring tools* and *assessment tools*.

Authoring Tools

Authoring tools could be regarded as a subset of content creation tools. Hall (2001) defines an authoring tool as “a software application, used by non-programmers, that utilizes a metaphor (book, or flow chart) to create online courses”. One may say that authoring tools are content creation tools that are especially developed for creation of educational content.

Assessment Tools

Content related to assignments and assessment is especially important for educators. Therefore, there are various tools available for development of different types of assignments such as for example quizzes and multiple-choice assignments.

Learning Content Management System (LCMS)

Institutions that have a large amount of learning content that they want to use in several courses and various formats may need a Learning Content Management System. Hall (2001) explains a Learning Content Management System this way:

A learning content management system is an environment where developers can create, store, reuse, manage and deliver learning content from a central object repository, usually a database. LCMS generally work with content that is based on a learning object model. These systems usually have good search capabilities, allowing developers to find quickly the text or media needed to build training content.

Learning Content Management Systems often strive to achieve a separation of content, which is often tagged in XML, from presentation. This allows many LCMS to publish to a wide range of formats, platforms, or devices such as print, Web, and even Wireless Information Devices (WID) such as Palm and Windows CE handhelds, all from the same source material.

An alternative definition is provided by Kaplan-Leiserson:

LCMS (learning content management system): A software application that allows trainers and training directors to manage both the administrative and content-related functions of training. An LCMS combines the course management capabilities of an LMS (learning management system) with the content creation and storage capabilities of a CMS (content management system).



Learning Object

It is possible to split content in a number of learning objects and reassemble them to create new learning material or courses in the same way you play with Lego blocs. Kaplan-Leiserson explains a learning object as:

A reusable, media-independent chunk of information used as a modular building block for e-learning content. Learning objects are most effective when organized by a meta data classification system and stored in a data repository such as an LCMS.

Learning Management System (LMS)

Learning Management System is a broad term that is used for a wide range of systems that organize and provide access to online learning services for students, teachers, and administrators. These services usually include access control, provision of learning content, communication tools, and administration of user groups. Another term that often is used as a synonym for LMS is learning platform.

Two examples of well-known, commercial LMS systems are WebCT and Blackboard. There are however a large number of other commercial systems and systems that educational institutions have developed themselves. Kaplan-Leiserson provides the following definition of LMS:

LMS (learning management system): Software that automates the administration of training events. The LMS registers users, tracks courses in a catalog, and records data from learners; it also provides reports to management. An LMS is typically designed to handle courses by multiple publishers and providers. It usually doesn't include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources.

Hall (2001) presents this alternative definition:

A *Learning Management System (LMS)* is software that automates the administration of training events. All Learning Management Systems manage the log-in of registered users, manage course catalogs, record data from learners, and provide reports to management.

There used to be a distinction between Learning Management Systems and more powerful Integrated Learning Management Systems. That distinction has now disappeared. The term Learning Management System is now used to describe a wide range of applications that track student training and may or may not include functions such as:

- Authoring
- Classroom management



- Competency management
- Knowledge management
- Certification or compliance training
- Personalization
- Mentoring
- Chat
- Discussion boards

On the one hand, LMS systems have similarities with the CMC systems (page 33) that started to evolve in the 1980s to support interpersonal communication and collaborative learning. On the other hand, LMS systems also have relationships with instructional design approaches and the early systems for computer-based training. Therefore, it is important to understand that LMS systems may be built on very different pedagogical methods and theories and that these underlying constraints may influence and limit the systems' pedagogical use.

Virtual Learning Environment (VLE)

Virtual learning environment is a term that to some extent is used instead of LMS. The two terms have more or less the same meaning, but one may argue that VLE focusses less on the features related to the management of learning. Bandon Hall (2001) defines a learning environment this way:

A Learning Environment is software designed as an all-in-one solution that can facilitate online learning for an organization. It includes the functions of a learning management system for those courses within the learning environment, but it may not be able to track online courses that were not created within this particular learning environment.

A learning environment is characterized by an interface that allows students to register and take courses, staying within that environment for the duration of the course. The program will usually include some self-instructional portions, along with an academic model of a multi-week course. This model is often facilitated by an instructor, where a group can proceed on a week-to-week basis with seminar assignments. Most learning environments also include an authoring capability for creation of additional courses for the instructor.

Learning Service Provider (LSP)

There are a number of institutions that host Learning Management Systems and provide this as a commercial service for educational institutions. These institutions could be termed Learning Service Providers (LSPs). Kaplan-Leiserson explains the LSP as a specialized Application Service Provider "offering learning management and training delivery software on a hosted or rental basis".



Student Management System (SMS)

The student management system is the core system in an educational institution. It is used for management of the most pivotal information about entities such as students, faculty, courses, applications, admissions, payment, exams, and grades. An effective SMS system is crucial for all educational institutions.

Two examples of commercial SMS systems are PeopleSoft and Banner. In the Nordic countries, universities have national systems such as STADS (Denmark), LADOK (Sweden), MSTAS (Norway), and FS (Norway).

Human Resource Information System (HRIS)

Companies and corporations have employees, not students. But they have systems that hold data similar to the SMS systems with important information about their employees. These could be termed Enterprise Resource Planning (ERP) systems or Human Resource Information Systems (HRIS). These systems will provide some of the same functionalities as student management systems.

Hall (2001) provides the following descriptions of ERP and HRIS systems:

Enterprise Resource Planning (ERP) is an industry term for large, often multi-module software applications that manage many facets of a company's operations including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, tracking orders, and managing resources and financials. SAP, PeopleSoft, and J.D. Edwards are some well-known ERP providers.

Human Resource Information Systems (HRIS) are similar to ERP applications but are aimed specifically at the management of a company's human resources.

Other names for related systems used in companies could be Knowledge Management Systems or Competency Management Systems. Kaplan –Leiserson defines competency management as follows:

Competency management: A system used to identify skills, knowledge, and performance within an organization. Enables an organization to spot gaps and introduce training, compensation, and recruiting programs based on current or future needs.

Accounting System (AS)

The accounting system is used for recording the economic transactions between the institution and its customers and suppliers. In an online education setting, the most important customers and suppliers are the students and the teachers.

The data from the accounting systems could be used to deny system access to students who do not pay their tuition fees. Some institutions already accept online enrollment, online

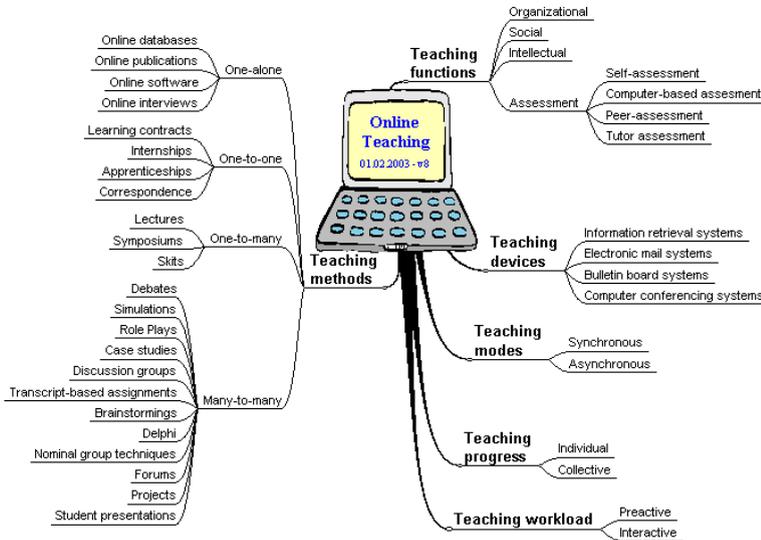


payment, and online student credit account information. Other institutions provide online tutors with their updated salary account information. This functionality requires some integration between the systems.

Online Teaching Terms

The key online teaching terms discussed in this article are presented in Figure 5. In the following, these terms are defined and discussed in a logical sequence with related pivotal terms. The definitions are based on my thesis research (Paulsen 1998).

Figure 5. Mind map of online teaching terms



Computer-mediated communication (CMC): Transmission and reception of messages using computers as input, storage, output, and routing devices. CMC includes information retrieval, e-mail, bulletin boards, and computer conferencing. CMC also comprises synchronous and asynchronous communication.

Information retrieval systems: CMC systems that facilitate searching and retrieval of information. Web pages and search engines have increasingly become the dominant systems.

E-mail systems (Electronic mail systems): CMC systems that facilitate exchange of messages between individual users.

Bulletin board systems: CMC systems that facilitate archiving and retrieval of messages posted by originators with write access and retrieved by users with read access.

Computer conferencing systems: Computer-mediated group communication systems that archive messages so that they can be read and commented on by all members of a conference.

Push or pull communication. CMC can be based on push or pull technology. In a push system, the sender is in control of the distribution process. In a pull system, the receivers



need to find and retrieve the information. These are systems with different features. Both have their educational benefits and they may have different uses. E-mail is an example of a push system and a bulletin board is an example of a pull system.

Synchronous communication: Real-time communication such as for example online chatting and video-conferencing.

Asynchronous communication: Communication where the message is stored until the receivers find it convenient to retrieve it. E-mail and computer conferencing are examples of asynchronous communication.

Teaching progress: Progress can be individual or collective. Individual progress allows each student to decide when he or she wants to start a course and how fast he or she proceeds through the course. Collective progress imposes a common schedule on all students.

Online teaching system: An online system for teaching comprising learners, one or more teachers, course content, learning resources, teaching methods, teaching techniques, and teaching devices.

Teaching method: A way of organizing people for learning. The teaching methods included here are one-online, one-to-one, one-to-many, and many-to-many.

Teaching technique: A way of accomplishing teaching objectives. According to how the techniques prescribe student interaction with learning resources, the techniques are classified as one-online techniques, one-to-one techniques, one-to-many techniques, and many-to-many techniques.

Teaching device: Tool that can assist the teaching process. This definition distinguishes between these four categories of CMC-based teaching devices: information retrieval systems, e-mail, bulletin boards, and computer conferencing.

Teaching workload: The amount of time spent on teaching functions. The teaching workload consists of the preactive and the interactive teaching workload.

- Preactive teaching workload: Workload associated with program design and teacher preparation, in other words, the teaching workload before the course or program starts.
- Interactive teaching workload: Workload associated with instruction, in other words, the teaching workload after the course or program starts.

Teaching functions: The duties teachers have with regard to the teaching process. This definition distinguishes between organizational functions, social functions, intellectual functions, and assessment functions.

Assessment: The general term used for measuring students' performance on a course against the aims and objectives of that course. In online education, it could be useful to distinguish between *self-assessment*, *computer-based assessment*, *peer assessment*, and *tutor assessment*. All four categories could be used for both formative and summative assessment.

- Formative assessment: The assessment conducted as a part of the teaching: questions and assignments set to help the student learn effectively, but not used to determine the student's course results.



- **Summative assessment:** The assessment intending to determine a student's overall level of performance on the course: questions and assignments, the grades or scores of which are used in determining the student's course result.

Facilitation technique: A manner of helping others learn. Facilitation techniques are used to carry out teaching functions.

One-online techniques: The techniques classified as one-online are characterized by retrieval of information from online resources and the fact that a learner can perform the learning task with little or no communication with the teacher or other students. One-online techniques include:

- Online databases are organized, searchable collections of information that can be utilized in the learning process.
- Online publications are periodicals, journals, reports, articles, etc., that are available to learners online or distributed to them online.
- Online software applications are software programs that learners either can execute via the network or download from the network.
- Online interest groups are people who convene online to discuss and share experiences on a topic of common interest. Learners can join the online interest group to enhance their knowledge and comprehension of the topic.
- Online interviews are online interactions between learners who ask focused questions and resource people who answer them.

One-to-one techniques: The techniques classified as one-to-one are characterized by a one-to-one relationship and by individualized teaching and learning. The teaching and learning are facilitated in the communication process. So, CMC can be an effective support for these techniques when the communication can be conveyed online. On the other hand, one may contend that some of these techniques depend so much on personal relationships that face-to-face meetings may be necessary.

- *Online learning contracts* are formal agreements which detail what the learners should learn, how they should accomplish it, and the specific evaluation criteria that should be used in judging the completion of the learning.
- *Online apprenticeships* facilitate online access to dedicated masters and peers who are willing to share their knowledge and experience with learners through goal-oriented learning interactions over a period of time.
- *Online internships* allow learners to practice online skills under the guidance and supervision of qualified professionals.
- *Online correspondence* is a form of online education in which the learning is directed or facilitated through personal, written communication between a tutor and individual students.



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One-to-many techniques: The techniques defined as one-to-many are characterized by presentation to students by one or more individual experts or by interacting experts. The learners are usually not invited to take active part in the interaction, so the communication is typically conducted in a conference or bulletin board system where students primarily have access to read. The techniques included are lectures, symposiums, and skits.

- Online lectures are organized, in-depth, online presentations that are designed for learning and facilitate online questions from learners and answers from the lecturer.
- Online symposiums are series of presentations given by a number of experts followed by questions from the learners and answers from the experts. The teacher can function as a moderator of the symposium.
- Online skits are prepared enactments in which real or imaginary online people, such as teachers and their alter egos, demonstrate or discuss certain issues or concepts.

Many-to-many techniques: A characteristic of the techniques presented as many-to-many techniques is that all participants have the opportunity to take part in the interaction. The degree of teacher involvement can however vary considerably. Such interaction is the most common application of educational CMC and it can be facilitated in open or closed computer conferences. The techniques discussed are debate, simulation, role-play, case study, discussion groups, transcript-based assignments, brainstorming, delphi technique, nominal group technique, forum, project group, and student presentation.

- Online debates are structured discussions in which the learners argue two or more sides of an important issue to clarify differences and related reasoning within a given set of rules and time schedule.
- Online simulations are online imitations of real processes that are designed to help experience and understand the dynamics of a complex process.
- Online role-plays are enactments of situations in which learners act out scenes like actors in a play. A teacher can use structured role-plays that are based on case studies or spontaneous role-plays that are based on momentary experiences.
- Online case studies are descriptions of real situations that are designed to help the learners understand and practice problem-solving and decision-making procedures in situations that are complex enough to warrant analysis and online discussion.
- Online discussion groups are places where a group of learners exchange ideas on a given topic.
- Transcript-based assignments utilize the ability to provide transcripts of online interaction that could be used to promote learner reflection. This could be done by asking the learners to reflect on their overall personal contributions during the course, or to summarize all previous contributions on a specific topic, or to rewrite an early statement to demonstrate that additional learning has taken place during the course.



- Online brainstorming sessions are used primarily to generate a pool of ideas on a given topic or to help determine the exact nature of content to be studied. The approach encourages learners to think creatively and to expand upon ideas of other learners.
- Online delphi is a technique to obtain the most reliable consensus of opinion of a group of experts using a series of intensive questionnaires interspersed with controlled opinion feedback.
- Nominal group technique is based on individual generation and ranking of ideas, followed by a public presentation of the priority ranked list of ideas, a discussion of the presented ideas, and vote for the final ranking.
- Online forums provide teachers and learners with a space where they can convene to raise and discuss issues from the course, make comments, offer information, or ask questions. The teacher usually functions as a moderator.
- Online projects are major tasks, initially loosely defined, which have composite objectives and are limited in time and scope. Online projects require online communication between the learners in the project groups and access to a variety of online resources.
- Student presentation is a technique in which learners are asked to present their work to other learners via e-mail, computer conferences, Web pages, etc. Feedback from other students is not necessarily required.

Additional Glossaries

The following glossaries are recommended for further information:

- The glossary in the elearningeuropa portal (<http://elearningeuropa.info>).
- Glossaries of Learning Technologies Terms (<http://olt-bta.hrdc-drhc.gc.ca/resources/glossariesx.html>) provides links to a number of online glossaries of learning technologies.
- The list of e-learning Glossaries provided by the e-learning Centre (www.e-learningcentre.co.uk/eclipse/Resources/glossaries.htm).
- The Global Distance EducationNet (<http://wbweb4.worldbank.org/DistEd/glossary.html>) provides a glossary of distance education terms.
- WhatIs (www.whatis.com) provides definitions for thousands of the most current IT-related words.
- Glossaries of Collaborative Technologies Center (www.edb.utexas.edu/resta/itesm2002/glossary.html) is provided by The University of Texas at Austin.



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Cooperative Freedom: An Online Education Theory

This article¹ presents a distance education theory based on existing theoretical perspectives and discusses how it applies to online education. Focusing on the tension between individual independence and collective cooperation within the dimensions of time, space, pace, medium, access, and content within distance education contexts, the theory of cooperative freedom argues that online education can foster both freedom for the individual and group cooperation.

Distance Education and CMC

In an analysis of existing theories of distance education, Keegan (1988a, 30) concluded that six major elements define a distance education program:

- The separation of teacher and learner, which distinguishes it from face-to-face learning;
- The influence of an educational organization, which distinguishes it from private study;
- The use of technical media, usually print, to unite teacher and learner and carry the educational content;
- The provision of two-way communication so that the student may benefit from or even initiate dialogue;
- The possibility of occasional meetings for both didactic and socialization purposes; and
- The participation in an industrialized form of education which, if accepted, contains the genus of radical separation of distance education from other forms.

The implications of introducing CMC in distance education are discussed for each of these elements by Mason and Kaye (1990). They conclude that the use of CMC has three major implications for distance education:

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¹ The first version of the theory was published in my monograph *From Bulletin Boards to Electronic Universities: Distance Education, Computer-Mediated Communication, and Online Education* (Paulsen 1992). The article was a first attempt to develop a theory of distance education attuned specifically to computer-mediated communication (CMC) and online education. In this revised and updated version of the article, there is less emphasis on CMC and more focus on large-scale online education.



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- The breaking down of conceptual distinctions between distance education and place-based education;
- The changing of traditional roles of faculty, administrative and support staff, and adjunct tutors; and
- The provision of an opportunity, which never existed before, to create a network of scholars, “space” for collective thinking, and access to peers for socializing and serendipitous exchange.

These implications are so important that it is necessary to re-evaluate traditional distance education theories and discuss how they attune to online education.

Distance Education Theories

Many theoretical perspectives on distance education have been presented during the last few decades. Keegan (1988b) identifies these three theoretical positions:

- Theories of autonomy and independence,
- Theories of industrialization, and
- Theories of interaction and communication.

One representative theory in each position follows and the implication of the theory for online education is discussed.

Theories of autonomy and independence. Moore’s inductive analysis of descriptions of two thousand instructional programs led to the development of a theory on dialogue, structure, and autonomy (Moore 1991). Moore perceives dialogue as interaction between learner and instructor, structure as certain characteristics of course design, and autonomy as learner independence. He argues that distance education organizations should ideally give students maximum independence with regard to choice of aims, objectives, study methods, and learning activities; study pace and progression; and evaluation (Moore 1983).

In his paper, Moore (1991) encourages analysis of the effects computer conferencing has on dialogue, structure, and autonomy. First, the introduction of group communication means that dialogue is no longer mere communication between learner and instructor. Second, relatively few courses have been designed for computer conferencing; the majority have adapted their structure from existing distance education courses or face-to-face courses. Third, computer conferencing is devised for group activity, so too much autonomy is not within its scope. However, the goal must be to devise systems that support individual freedom as well as cooperative group activity.

Theories of industrialization. Peters’ (1988) applications of industrial theory led him to conclude that the structure of distance teaching is determined to a considerable degree by the principles of industrialization, particularly by those of rationalization, division of labor, and mass production; the teaching process is gradually restructured through increasing



mechanization and mass production. These changes account for the emergence of the following structural propositions:

- The development of distance study courses is just as important as the preparatory work taking place prior to the production process.
- The effectiveness of the teaching process is particularly dependent on planning and organization.
- Courses must be formalized and expectations from students standardized.
- The teaching process is largely objectified.
- The functions of academics teaching at a distance have changed considerably vis-à-vis university teachers in conventional teaching.
- Distance study can only be economical with a concentration of the available resources and a centralized administration. (Peters 1988, 110)

Initially, the theory of industrialization did not seem to apply to computer conferencing. Bates (1991) stated:

Third generation technologies (computer conferencing) are particularly valuable where relatively small numbers of students are concerned, since they avoid the high fixed production costs of the industrial model, but they do not however bring the economies of scale of the industrial model, unless the opportunities for interaction for an individual student are dramatically curtailed. (p. 13)

But later we have seen that online education could be applied to mass education, and it is obvious that at least content development, student support services, and student management could benefit from elements of industrialization.

Theories of interaction and communication. In his theory of guided didactic conversation, Holmberg (1988) views the distance-study course and its non-contiguous communication style as instruments of a “conversation-like interaction between the student on the one hand and the tutor counselor of the supporting organization administering the study on the other” (p. 115). Constant interaction (conversation) between the supporting organization (authors, tutors, counselors) is both simulated and real: simulated through the students’ interaction with the pre-produced course materials and real through written and/or telephone interaction with their tutors and counselors.

Holmberg’s theory is developed with a focus on correspondence courses and one-to-one communication. Consequently, it does not give much consideration to group communication. However, the theory can be developed further to include group facilitation, and a number of authors have recommended related facilitation techniques for online education courses.

Initially, little pre-produced course material was developed just for online education. Much of the material is still adapted directly from existing face-to-face or correspondence courses. Even though some specialize on developing e-learning content, more work must be done in the future to produce tailor-made material for online courses. An important



feature of such material would be the potential for asynchronous group interaction. On the other hand, experience has shown that computer conferencing as currently implemented can be an excellent medium for facilitating a guided didactic conversation between the students, the tutors, and the supporting organization.

The Theory of Cooperative Freedom

The theory of cooperative freedom can be classified as a theory of autonomy and independence, as described earlier in this article. It is influenced by Knowles's (1970) theory of andragogy, which asserts that adult learners perceive themselves as self-directing human beings and define themselves in terms of their personal achievements and experiences. The theory of cooperative freedom perceives both adult and juvenile distance learners as motivated, self-directing students with a desire to control their learning outcomes. Further, the theory applies to all three categories of Houle's (1961) student motivational orientations: goal oriented, activity oriented, and learning oriented.

McCreary (1990, 120) indicates how each of Houle's categories will relate to computer conferencing systems. Goal-oriented participants will perceive CMC as a way to "keep the edge" and to use state-of-the-art technology to achieve their goals. Activity-oriented students cannot resist the always-available online activity. Finally, knowledge-oriented people may be motivated by access to all the up-to-date information and knowledgeable people that CMC provides.

The theory of cooperative freedom suggests that, independently of motivational orientation; distance students need cooperation as well as individual freedom.

Cooperation. Houle (1984) states that education is a cooperative rather than an operative art: it implies voluntary interaction among individuals during learning. Even solitary students guiding their own programs without the help of an instructor seek help and encouragement from others. In a social setting, those who take part in an educational activity should have some sense of collaboration in both planning and implementation:

At one extreme, this sharing is so complete that it requires a group to decide everything that it does together. At the other extreme, the sharing may be implicit in the teaching-learning situation, as when many people flock to hear a lecturer. Those who attend vote with their feet, as the saying goes, and one cannot assume from their physical passivity and silence as they sit in the auditorium that they are not cooperating fully in their instruction. (Houle 1984, 45)

Cooperation can be hard to achieve in distance education. A major problem for many students is the loneliness that results from limited access to student peers; the urge for individual freedom may intensify the problem. However, new group communication technologies such as audio conferencing, video conferencing, and computer conferencing have been devised to facilitate cooperation at a distance. Many online educators are studying computer supported



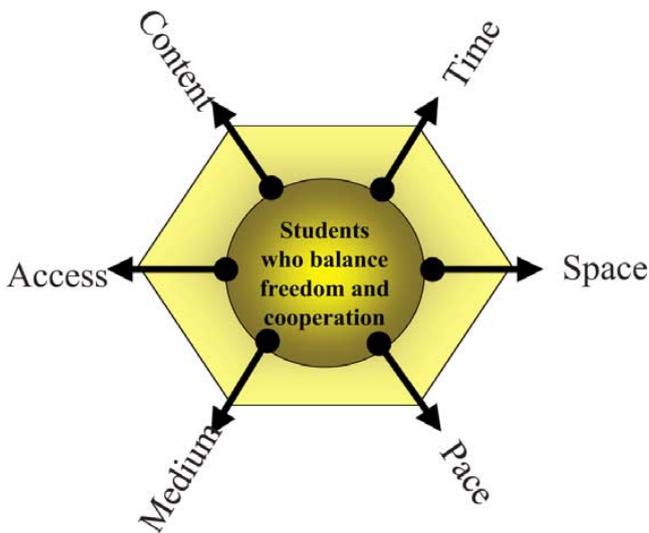
collaborative learning. In a distance education setting, collaboration is even harder to achieve than cooperation. Therefore the term cooperation is deliberately chosen in this theory.

Freedom. The theory of cooperative freedom is concerned with freedom from restraints rather than freedom from oppression. It professes that students should have a high level of freedom to choose rather than be restrained by a rigid distance education program. It states that freedom is crucial in distance education. For many people, the need for continuing education and lifelong learning is increasing. Today’s students, however, often have full-time jobs and families to take care of and many are reluctant to participate if it means relinquishing high-quality family life and job achievements. They need flexible education: education that allows them to combine job, family, and education in a manageable way.

Freedom is a complex construct. It has many facets and features. The theory of cooperative freedom suggests that the facets of special importance to distance education are time, space, pace, medium, access, and content. None of these can be described as dichotomous; each must be perceived as a continuum from complete individual freedom to total dependence on decisions made by others. This article describes important features of these six facets of freedom that program planners should consider when they develop online education programs. The facets are presented and discussed as the Hexagon of Cooperative Freedom (Figure 6).

Cooperative freedom is a fabricated term. At first sight, it seems self-contradictory. “Cooperative” indicates group interaction and interpersonal dependency, though “freedom” implies individual autonomy. Yet, if we could develop a distance education system that combines freedom for the individual with group cooperation, we would attain a distance education system based on cooperative freedom. This article argues that such a system can be made possible by online education and discusses its potential strengths and weaknesses.

Figure 6. The hexagon of cooperative freedom



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Freedom of time. In distance education, one must distinguish between synchronous and asynchronous communication. Both have distinct features and strengths, and they can be applied individually or in a combination. In asynchronous communication, the message is stored in the communication medium until the receivers find it convenient to retrieve it. Synchronous communication, on the other hand, is inflexible, but allows people to communicate in real time, as they do face-to-face or on the telephone. Scheduling of synchronous communication varies in flexibility. A telephone conversation can be initiated without any prior schedule, but a videoconference must usually be scheduled months in advance.

A high level of freedom allows students to communicate whenever it is convenient for them. Students may prefer to study during the weekends, after their children have gone to bed, during regular work hours, or whenever they have time available. In addition, human response time and system delays should be minimal.

Ideally, online education is completely independent of time. It is available 24 hours a day, 365 days a year. It gives instantaneous access to information whenever it is convenient for the user and there is no need to synchronize the operation among communication partners. Many systems provide synchronous communication as well.

Freedom of space. The first of Keegan's major elements for defining distance education dealt with the separation of teacher and learner. This separation does not necessarily imply much freedom of space. Many distance education programs, for instance those taught by video conferencing, may require students to attend classes at fixed locations. Keegan concludes that distance education may include occasional face-to-face meetings; nevertheless, too many institutions require online students to physically attend exams in a classroom.

Distance education programs with a high level of freedom let students choose where they want to study. Some may want to meet in a classroom with their peers while others prefer to study at home, at work, or wherever a busy life situates them.

Online education can be accessed worldwide, wherever there is an Internet connection. For some people and regions, communication costs though are a limiting factor. Computers tend to be smaller and more mobile, but still textbooks are more convenient to use on many locations.

Freedom of pace. Pacing can be individual or collective. It implies meeting deadlines for starting a course, for examinations, and for assignments. Deadlines, however, can be flexible or rigid. They are flexible when students can set the deadlines, or select one of several deadlines. One example of extreme pacing flexibility is seen in correspondence courses that allow individual students to start and finish at any time. A more moderately flexible example is a course with multiple starting dates that allow students to enroll at a convenient time. Shale (1987, 32) asserts that "...standardized treatments (of pacing) could be applied to all students on an individual basis." He also suggests possible justifications for rigid pacing:

1. To make the administration of a distance-learning system tractable,
2. To express a commitment to a collectivist philosophy,



3. To guarantee the credibility of examinations,
4. To enhance student motivation through group activity, and
5. To avoid procrastination. (Shale 1987)

Based on a study of students who took the same course either by correspondence or online, Rekkedal concludes that the correspondence students consider individual pacing to constitute a large advantage of correspondence studies, while the online students give more varied viewpoints (Rekkedal 1990, 91).

A high level of freedom allows students to choose the pacing they prefer. If they resent rigid pacing, they should be allowed to spend the time they require to complete a course. Other people would like to choose when to start a course and how fast to progress in it.

Wells (1992) identifies three pacing techniques available with CMC. The first is group assignments that urge coherent pacing within groups. The second is gating, a technique that denies students access to information before they have completed all prerequisite assignments. The third technique is limited time access to services such as conferences, databases, and guest speakers.

The previous discussion shows that online courses can be paced to a greater or lesser extent. Meaningful group communications, perhaps computer conferencing's major advantage, may, however, be a pedagogical challenge to surmount in an unpaced mode.

Freedom of medium. Nipper (1989) argues that there are three generations of distance education. The first generation uses correspondence teaching based on printed and written material. The second is based on broadcast media, such as television and radio, as well as on distribution of video- and audiocassettes. The third generation uses computer conferencing systems. Each generation utilizes the media devised in earlier generations.

Programs with a high level of freedom provide students with access to several media or sources of information: print, video, face-to-face meetings, computer conferencing, etc. This approach will support different learning styles and prevent exclusion of students lacking access to or knowledge of high technology media. Online education can easily and favorably be supplemented by or integrated with textbooks, audio and video-conferences, computer-aided instruction, etc.

Freedom of access. This point is related to the terms "open learning" and "open education." Charles A. Wedemeyer explains the origin of the term open learning:

This term came into use in 1969 when the British Open University was founded. It...means providing part-time learning opportunities for learners at a distance, who operate with a degree of autonomy and self-direction, but with open mediated access to learning without conventional prerequisites for acceptance or accreditation. (Wedemeyer 1981, xxvi)



Escotet (cited in Keegan 1986) characterizes open education as less restricted, exclusive, and privileged than traditional education; as flexibly paced; as encouraging new relationships between professors and students; and as willing to credit the value of students' life experiences.

In online education, there is no need to restrict enrollment because of physical limitations such as the number of available seats in a classroom. A flexible system can enroll all students who want to study. So, programs that aspire to a high level of freedom must eliminate discrimination on the basis of social class, entry qualifications, gender, age, ethnicity, or occupation. As discussed in *Accessibility: Online Education for All* (page 312), online education should also be made available to people with disabilities. Programs should not ask students to document prior education; rather, students should decide for themselves whether they are capable of pursuing the course of study. Access should be available to students with limited monetary resources, and to those with no access to or limited knowledge of distance education technology. A major concern for online education is its image as an exclusive medium closed to prospective students lacking access to necessary equipment or knowledge about how to use it. Fortunately, this problem is alleviated year by year as more people learn to use computers at home, school, or work.

Freedom of content. This facet reflects the theories of autonomy and independence discussed earlier in this article. One early example of such freedom was provided by the Electronic University Network, which in 1988 promoted transfer of credits among all its member colleges.

A high level of freedom allows students to choose among a range of courses and to transfer credits between programs and universities. The ongoing international harmonization of educational policies supports this freedom on the global level. On the institutional level, freedom of content implies opportunities for individual studies, learning contracts, internships, etc.

Online education has the potential to further increase inter-college collaboration. Several programs, perhaps from different colleges, could favorably be offered through a common LMS system. It is to be hoped that such collaboration and systems will provide students with additional course options and easier transfer of credits. It could imply a free flow of virtual mobile students in Europe and across the globe.

Discussion of Freedom, Flexibility and Cooperation

Freedom is a multi-dimensional construct. Each dimension should be regarded as continuous rather than dichotomous, as relative, not absolute. All distance education programs will have some freedom in each dimension. There are no quick, definite, or ready-made answers to the question of how much freedom an online education program should provide. Nevertheless, program planners who address this question are likely to provide better online programs.



In the book *Flexible Learning in a Digital World*, Collis and Moonen (2001, 16) present several factors that constrain learning flexibility. They state that flexibility could be unmanageable, not acceptable, not affordable, and not realistic. But it is noteworthy to realize that institutions that provide flexible online courses and programs will reach a larger potential market. A local face-to-face course with yearly enrollment covers, for example, a much smaller market than an online course with continuous enrollment as illustrated in Figure 7.

Figure 7. Potential market as a result of flexibility in time and space

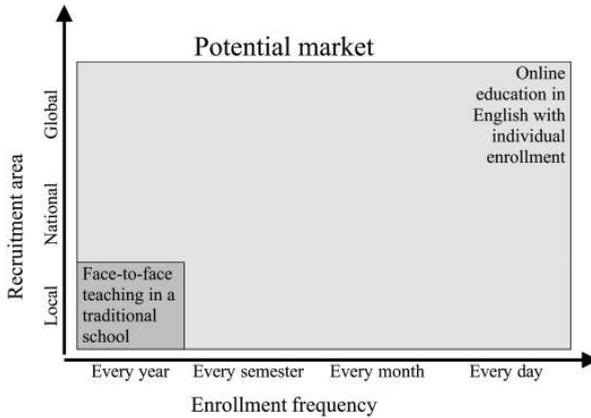
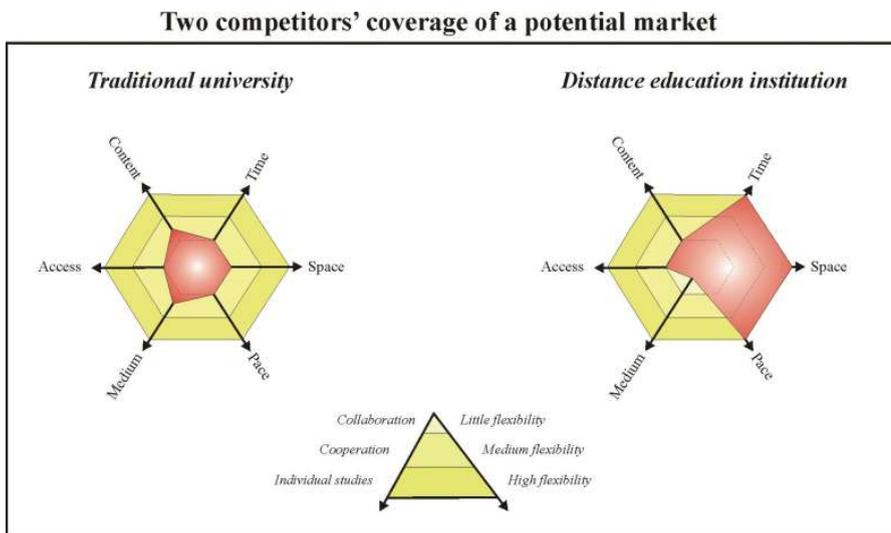


Figure 8 also shows that a traditional university that enrolls students once a year in a limited geographical area, reaches a smaller potential market than a distance education institution that offers continuous enrollment of students around the country. But in this example, the traditional college is more flexible than the distance education institution with regard to content and medium.

Figure 8. Flexibility and potential market coverage



A high level of student freedom, assumed in this article to be a desirable goal of course design, is extremely difficult to achieve. Scarce resources and rigid educational regulations often inhibit flexible distance education. LMS systems and e-learning standards could also result in reduced flexibility. Yet, the hexagon of cooperative freedom can serve as a guide for implementation of distance education.

One may say that one student's freedom ends where another's begins, that one student's freedom to act infringes on the freedom of another. As Burge (1991) points out in relation to computer conferencing, "One person's time flexibility is another's time delay." The truth of this statement is hard to refute, but reducing dependence on individual students and instructors could mitigate such negative consequences. Co-teaching, for instance, could reduce the response time since several teachers can access the system more often than one teacher can.

The pedagogical challenges with regard to accommodating individual freedom with cooperative learning are evident. How can we facilitate cooperative learning in courses with individual pacing? How can senior students who are in the final stage of a course benefit from collaboration with junior students who have just enrolled on the course? It is of course possible to create learning environments that allow senior students to mentor junior students for mutual learning, and to develop assignments that utilize the variation in curricular knowledge. But these pedagogical challenges need much more attention in the future.

Individual freedom is hard to combine with an industrialized model of education and can hardly compete in terms of cost-effectiveness with industrialized mass education. There is a general trend, however, toward customized mass production. A buyer of a new car today may choose among several accessory options. Why, then, should not large-scale, online education aim for individual flexibility?

Conclusion

Future adult students will seek individual flexibility and freedom. At the same time, many need or prefer group collaboration and social unity. These aims are difficult to combine, but online education, when integrated with other media, can be the means of joining individual freedom and collective unity into truly flexible, cooperative distance education programs.

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Anecdote 1. Line Fjellvær: Scandinavia's First Mobile Student?



In the spring of 2002, Line Fjellvær was among the three first students to utilize NKI's experimental services for mobile education. So far, she is pleased with the services and emphasizes that they make online courses more flexible. Like many other adult students, Line is a very busy person. She is the Director of Studies for the International Centre for Hydropower in Trondheim, and her work requires frequent traveling and field services. She is also a mother of three active children, age 6-9.

"I have little spare time for studying, she says. I have to do it in between – when I have some available moments. And then, I'm not always near my PC."

Line had no experience of online education before she enrolled on the *Specialization Program in International Online Education* (SPICE). She chose the SPICE program because her employer wanted to develop online courses both as separate courses and as a supplement to traditional courses. When she had finished the introductory course, she was asked to become an m-learning guinea pig in the *SPICE 603: Online teaching and learning* course. Since then, she has been a mobile student using a PDA with a mobile phone connection to the Internet. Now, she is contemplating using her SPICE courses as a part of a master's degree in pedagogy and information technology from the Danish Pedagogical University.

The course was NKI's contribution as a partner in the European-funded m-learning project (<http://learning.ericsson.net/leonardo/index.html>), headed by the Ericsson Company. Through the project, NKI provides three students and the teacher – Morten Flate Paulsen – with PDAs, Ericsson mobile phones, and free access to the Internet. Since very few potential students had access to such mobile equipment, and since it was more expensive than the course tuition, only three mobile students took part in the experiment. Ordinary students, without mobile equipment, also took part in the course. So, all mobile services were offered as optional supplements to the ordinary online course services.

Line is very pleased with the opportunity to use her PDA to study when she is traveling. She has downloaded all course readings to her PDA as e-book files in Microsoft Reader format. She can also use it to communicate with her tutor and peer students via e-mail. When she traveled to Tanzania, she experienced that she could use the PDA to write word documents and e-mail them with her mobile equipment. She admits, though, that her equipment has caused several problems:

"I was able to connect to the Internet via my mobile phone in Tanzania, but it was trouble-

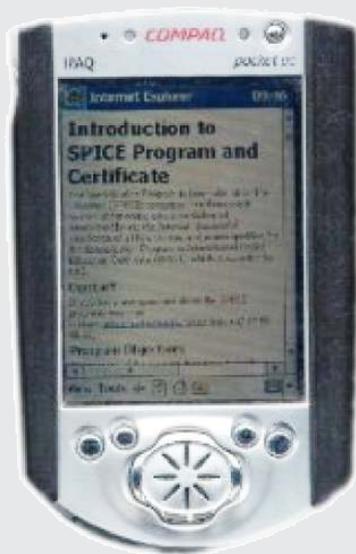


some to use as the connection was slow and often it just wouldn't connect. I tried using different phone numbers and connections through the university, Frisurf, and Tele2. For no apparent reason, only one would work. For a period I was "out of business", since the PDA lost battery power and, as a consequence of that, all the data. Then I couldn't get it to work with the phone. It was very frustrating. I fancy getting a PDA in which the phone is incorporated."

When she is at work or at home, she uses her ordinary PC for her online studies. But she has found the PDA to be a useful supplement when she would like to study in an airplane, in a hotel room, or during shorter breaks in her everyday life. "The PDA is so small that I can always take it with me," she says. "I cannot do that with my laptop."

"I have used the PDA to copy text of special interest from the readings into Word documents that I use for repetition and reflection. This is actually the function I have used most. It is not difficult to do, and it makes revising, note taking, and writing assignments easier."

"I find MS Reader very useful," she states. "When traveling, it is great that all my course readings are contained in the tiny PDA. There are always occasions where I find that I have time to study - at the airport when the plane is delayed or on the train to work in the morning. Without the PDA it is not possible, since I can't carry all my textbooks and papers in print. Since I take the PDA with me, I now have the opportunity to read, write and study at unplanned times and whenever there is an opportunity."



"In MS Reader I have used bookmarks, highlights, notes, text copying, and searching. All features have been useful. When I read, I find that I learn more when I write comments or highlight important points. I have also found it very useful for writing assignments. Using the notes function, I have added comments and experiences to remember to use them in the assignment later. For references, MS Reader makes it easier to copy the exact reference which is time-saving. I have used the bookmark function to be able to go back to text I want to read again and to find text I believe is important or will be useful for an assignment. The search function is especially useful for larger documents as well as for assignment. When for example I wanted to learn more about interview techniques, I could easily search for this in the entire course readings."

Finally, Line believes that mobile equipment could be useful at home as well. There, she would like to have wireless, broadband access to the Internet so that she easily and inexpensively could move around with an online tablet PC. This, she says, would redefine the meaning of the term *mobile homes*.



Online Teaching and Learning

Abstract

This article presents seven distinct features of online teaching. Then it introduces the characteristics of online learners and their special needs from the perspectives of distance education, adult education, and online education. It discusses some evidence showing that online students have positive experiences with and attitudes toward online education. It also presents some research on the learners' persistence, results, and grades.

There are four online teaching methods: one-online, one-to-one, one-to-many, and many-to-many. The teaching methods correspond with four categories of online teaching devices: information retrieval systems, e-mail systems, bulletin board systems, and computer conferencing systems. For each method, a number of online teaching techniques are introduced.

The article discusses teaching style, moderation and facilitation. Teaching style is based on philosophical orientation and theories of education. Facilitation techniques are ways of helping others learn. Teachers perform moderation when they preside over a discussion group or a class forum. The article looks at an online teacher's organizational, social, intellectual, and assessment functions. Further, it presents a number of recommended facilitation techniques.

It discusses individual assignments and group assignments. It also discusses the consequences of presenting student work to an individual tutor or to a larger audience. The discussion on assessment includes formative and summative assessment, self-assessment, computer assessment, tutor assessment, and peer assessment. Some strategies are suggested to organize and improve online assessment.

The article identifies some incentives and barriers to online teaching. It further discusses the preactive and interactive workload associated with the four online teaching methods. In any discussion of teaching workload, it is important to identify and refine teaching techniques, with a view to decreasing the teaching workload per student. So, in conclusion, a number of strategies to reduce the teacher workload are suggested.

Seven Interesting Online Teaching Opportunities

Online teaching differs from traditional teaching in several ways. The most important online education constraint is the fact that interpersonal communication usually is conducted via a

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www.studymentor.com



keyboard. It is therefore difficult to convey audiovisual communication etc. However as shown in List 1, online education provides several interesting teaching opportunities:

List 1. Seven interesting online teaching opportunities

1. They can conveniently utilize an overwhelming amount of online resources.
2. They can facilitate collaborative learning independent of time and space.
3. They can provide time to prepare and reflect on comments and contributions.
4. They can facilitate on-demand access to learning activities that continue for an extended time period.
5. They can provide unique opportunities to utilize discourse transcripts for analytical and reflective assignments.
6. They can conveniently utilize computer-aided instruction.
7. They can offer multimedia elements in presentations and demonstrations. However, for interaction among people, they still primarily rely on written communication with the inherent keyboard limitations.

These features provide teaching opportunities that can rarely be achieved in other educational environments. They could probably add a new dimension to familiar teaching techniques and also contribute to the development of a number of new, innovative teaching techniques.

Student Needs and Characteristics

Discussing the learner's perspective, Mason and Kaye (1990, 25) argued that "...growth toward autonomy and self directedness in learning can be radically enhanced by CMC..." On the other hand, Houle (1984) stated that education is a cooperative rather than an operative art. Cooperation can be hard to achieve in distance education. A major problem for many students is the loneliness that results from limited access to student peers. The urge for individual freedom, start-up flexibility, and progress flexibility may intensify the problem. However, group communication technologies such as audio conferencing, video conferencing, and computer conferencing have been devised to facilitate cooperation at a distance.

Stilborne and Williams (1996) have written the paper *Meeting the Needs of Adult Learners in Developing Courses for the Internet*. They discuss aspects of adult learning that should be taken into consideration in the development of online courses. Based on adult learning theory, they claim that:

- adults must want to learn,
- adults will learn only what they feel they need to learn,
- adults learn by comparing past experience with new experience,



- adults need immediate feedback concerning their progress,
- adults want their learning to be practical,
- adults try to avoid failure,
- adults do not all learn the same way.

All these aspects of adult education have implications for online education. Stilborne and Williams discuss these implications with emphasis on course design. In an introduction to its online classes in Spring 99, Howard Community College states:

Taking an online class has many advantages, including increased flexibility in completing homework assignments, the ability to communicate with your classmates and your instructor from the convenience of your own home or workplace, and enhanced access to written materials ranging from discipline-specific internet resources to saved chats and instructor's class announcements. However, an online class is not for everyone. For instance, if you need the discipline of meeting on campus several times a week and you enjoy the in-person interaction between other students and your instructor, you are more likely to succeed in a regular class... (www.howardcc.edu/online/requir_courseofferings.htm)

Howard Community College further claims that a successful online learner:

- is self-motivated (does not need a lot of direction, motivation from a teacher)
- is self-disciplined (can budget time wisely and does not procrastinate often)
- enjoys the challenge of learning on her/his own (likes to read and learn)
- takes charge of her/his own learning (willing to ask questions and get help when necessary)
- communicates well in writing
- may need a flexible schedule but understands that flexibility does NOT mean the course will be easy. (www.howardcc.edu/online/requir_courseofferings.htm)

Student Experiences and Attitudes

Torstein Rekkedal's (1999) report *Courses on the WWW – Student Experiences and Attitudes Toward WWW Courses – II* presents the results of two surveys among students at the NKI Internet College. Rekkedal concludes that a large majority of the students in both surveys agree that:

- it is possible to achieve excellence in courses that are taught on the WWW
- enrollment was facilitated because the course was on the WWW
- they would enroll again on a WWW based course
- they would encourage a colleague or friend to enroll on a WWW based course

Results, Grades, and Persistence

Much work has been done on comparing the achievements of students in different learning environments. Thomas L. Russel has compiled a bibliography (<http://teleeducation.nb.ca/nosignificantdifference/>) of hundreds of studies that show that there is no significant difference in learning achievements no matter what media you use for learning. Russell calls this *The No Significant Difference Phenomenon*. If this is correct, one might conclude that online learning can be as good as any other form of learning.

Bill Orr has compiled some references to articles (<http://teleeducation.nb.ca/content/articles/english/A-Significant-Difference.html>) that show the efficacy of new interactive media during recent years and newer studies. Similarly, it is not difficult to find assertions that online students do better than other students. One example was found at <http://teleeducation.nb.ca/content/media/0297/betteronline.html>:

EXPERIMENT SHOWS STUDENTS DO BETTER ONLINE

A sociology professor at California State University at Northridge conducted his own experiment to test online learning, randomly dividing his statistics class in half, and teaching one half by lecture and the other half by Web assignments, online discussion groups and e-mail. The students who'd been banned from the physical classroom scored an average of 20% higher than those who'd attended in-person. "The motivation for doing this was to provide some hard, experimental evidence that didn't seem to exist anywhere," says the prof., who plans to expand his research to determine whether the online students performed better because they spent more time collaborating with their classmates, or because of the online format of the class. (Chronicle of Higher Education 21 Feb 97)

Results from final examinations are often used as evidence of learning. In the fall of 98, the NKI Internet College compared 1118 grades obtained by regular part-time students with 368 grades obtained by online students. The grades were given in seven courses in which the exams were identical for the two groups of students. The results confirmed a similar study of 1302 grades from 89 to 91. Both studies show that the online students have better average grades and a lower percentage of failing grades. This does not necessarily show that the online courses were better than the traditional part-time courses, but it shows that online learning seems to work very well for students who have chosen to study online.

Peter Cookson's article *Persistence in Distance Education* reviews the research on learner persistence in distance education. In the article, Cookson (1990) suggested the fourteen interventions presented in List 2, which might stimulate learner persistence and reduce dropouts:



List 2. Fourteen interventions to stimulate learner persistence and reduce dropouts

1. Students' active participation should be sought in planning remedial or introductory courses.
2. Interviews with students while in their first year (or even before it starts).
3. Skilled diagnostic counseling to "help each applicant to explore his aims, motivation and commitment and comprehend how they might relate to the ... [institution]".
4. Counseling out of high risk students.
5. "Conditional registration ... after students have taken advantage of the counseling service, every effort should be made by the University to ensure that they are able to follow the courses they really want... Students interested in courses which entail projects should be made aware of the volume of work involved and the type of library resources required (especially remote students)".
6. "Counselors, academic advisors, course designers, and administrators of distance-taught programs should develop a diagnostic and remedial program to assist students in organizing their time and energy toward a successful completion of their study program".
7. Regulate the study load of students.
8. Active tutorial assistance during the course. This might be provided either face-to-face or via mediated communications.
9. Examination of students' completed assignments to analyze students' cognitive learning styles, strengths and weaknesses, and affective responses to the instructional materials.
10. Provide option of longer time period for students with difficulty to complete the course.
11. Monitor the performance of participant instructors for needs amenable to improve via in-service training.
12. Distance education institutions should develop programs to enhance their academic status and social credibility so as to enhance student satisfaction and commitment.
13. Concentrate resources for student advising and other assistance on the more vulnerable first-year students.
14. Periodical redesign of courses and print materials. Cookson (1990)

In 1996, NKI conducted a study that showed that of about 1,000 online courses students had enrolled in between 1987 and 1993, 81.3 percent were completed. It is not appropriate to make any firm conclusions from these data, but NKI has reason to believe that the completion rate of online courses is at least as good as that of other part-time courses.



Online Teaching Methods, Devices, and Techniques

This section deals with online teaching methods, techniques, and devices. We shall look at four online teaching methods and a number of recommended teaching techniques and devices.

Teaching Methods

Verner (1964, 36) distinguished between individual and group methods of teaching. Applied to online education, you will encounter a more detailed classification of methods. Harasim (1989) distinguished between one-to-one, one-to-many, and many-to-many learning approaches. Here Harasim's classification is supplemented with the one-online learning approach to support the four communication paradigms often used in CMC. The paradigms are information retrieval, e-mail, bulletin boards, and computer conferencing. The classification is derived from Rapaport (1991) who used it in his book *Computer Mediated Communications: Bulletin Boards, Computer Conferencing, Electronic Mail, and Information Retrieval*. In accordance with the discussion above, we will here distinguish between the four methods: one-online, one-to-one, one-to-many, and many-to-many.

Teaching Devices

Verner (1964, 37) referred to "various mechanical instruments, audiovisual aids, physical arrangements, and materials" as devices that can enhance the effectiveness of an adult education process. Verner also stated that television could be regarded as a device when used in a classroom and as a method when it is the primary medium used in a distance education setting. From this, one may argue that CMC could be regarded as both device and method. Here CMC is viewed from the device perspective.

Let us use the CMC-classification derived from Rapaport (1991). There are four major CMC-devices: information retrieval systems, e-mail systems, bulletin board systems, and computer conferencing systems. These devices correspond to the four methods: one-online, one-to-one, one-to-many, and many-to-many.

Teaching Techniques

We use teaching techniques to accomplish teaching objectives. The techniques introduced here are organized according to the four communication paradigms used in CMC. The techniques are discussed in more detail elsewhere in this book.

The foregoing considerations result in a framework of four methods, four devices, and a number of techniques as shown in Table 1. First, the techniques classified as one-online are characterized by information retrieval from online resources, and the fact that a student can perform the learning task without communication with the teacher or other students (e.g. search of online databases). Second, the techniques classified as one-to-one can be conducted via e-mail applications (e.g. e-mail based correspondence studies). Third, the techniques discussed as one-to-many will typically be conducted via the WWW, bulletin



boards, or distribution lists for e-mail (e.g. publication of a lecture). Finally, the techniques presented as many-to-many can be organized within computer conferencing systems, bulletin board systems, or distribution lists for e-mail (e.g. debates).

Table 1. Online teaching methods, devices, and techniques

Teaching Methods	Teaching Techniques	Teaching Devices
One-online	Online Databases Online Publications Online Software Applications Online Interest Groups Interviews	Information Retrieval Systems
One-to-one	Learning Contracts Apprenticeships Internships Correspondence Studies	E-mail Systems
One-to-many	Lectures Symposiums Skits	Bulletin Board Systems
Many-to-many	Debates Simulations or Games Role-plays Case Studies Discussions Transcript-based Assignments Brainstorming sessions Delphi Techniques Nominal Group Techniques Forums Projects Student Presentations	Computer Conferencing Systems

Teaching Functions and Facilitation Techniques

In this section, we shall look at the duties teachers have with regard to the teaching process. We shall study the distinctions between the teachers’ organizational, social, intellectual, and assessment functions. We shall spend some time on issues that influence teaching style, and finally, we shall study some recommended moderation and facilitation techniques.



...some conferences possess an energy that encourages active participation, while others, apparently designed to facilitate discussion of equally relevant and interesting topics, seem to spit and sputter, with minor flurries of activity and little of value to offer to the participant.... The important thing to remember is that a flexible approach to moderation is a key element in the creation of an energetic conferencing environment (Brochet 1989, 6.02-3).

The quote, which was found in a report from a closed conference on moderating computer conferences, expresses the importance of how teachers moderate computer conferences. Supporting this notion, there are many more articles that discuss moderation of educational computer conference courses (for example, Davie 1989, Easley 1991, Feenberg 1989a, Feenberg 1989b, Feenberg 1991, Hiltz 1988, Kerr 1986, and Mason 1991). My review of these articles revealed a host of experience and advice with regard to moderator roles and facilitation techniques for educational computer conferences. They are, however, mostly based on personal experiences in specific contexts that may or may not be relevant to other moderators in different contexts.

Rather than professing general guidelines for facilitation of educational CMC, we shall here argue that the way teachers handle their teaching functions is influenced by their philosophical orientation and theory of education, and that they should be aware of their options with regard to facilitation techniques. Hence, the material we shall look at is organized and discussed with regard to philosophical orientation and theories of education, teaching functions, and facilitation techniques.

Teaching Style

If you are a teacher and would like to assess your teaching style, you may use the *Principles of Adult Learning Scale* (PALS), developed by Conti (1991). High PALS scores indicate that you have a learner-centered style, and low scores indicate a teacher-centered style. The scales comprise seven factors that are of importance to your teaching style. The factors relate to the teachers' attitudes toward: learner-centered activities, personalizing instruction, relating to experience, assessing student needs, climate building, participation in the learning process, and flexibility for personal development.

Your teaching style is based on your philosophical orientation and your theories of education. In discussing adult education philosophies, Zinn (1991) distinguished between liberal, behaviorist, progressive, humanistic, and radical philosophies. These and other philosophies in adult education are presented in selected writings edited by Merriam (1984) and Jarvis (1987). An interesting online resource is *The Theory Into Practice* (www.gwu.edu/~tip/) database that contains descriptions of 50 theories relevant to human learning and instruction. With regard to distance education, Keegan (1988) identified three theoretical positions: theories of autonomy and independence, theories of industrialization, and theories of interaction and communication. Discussing these theoretical positions, Paulsen (1992b) presented a theory of cooperative freedom (page 39), which was a first attempt to establish a distance education theory attuned to CMC. In other



words, teachers will perceive their online education functions in light of their basic theories and philosophies concerning education.

Moderation and Facilitation

Facilitation techniques are ways of helping others learn. Teachers moderate when they preside over a discussion group or a class forum. According to Eastmond, successful computer conference facilitation is akin to successful facilitation of adult education in other situations:

Effective facilitators know the student group well and persist in carrying the discussion onward. They are enthusiastic, both about the subject matter and computer conferencing. They are innovative and try new instructional techniques. They are flexible, allowing for changes in plans and circumstances. Finally, they deal with individual and group problems the class is facing (Eastmond 1992, 33).

Ahern, Peck, and Laycock, (1992, 291) investigated teacher discourse in computer-mediated discussion studying 80 volunteer students in an undergraduate introductory educational theory and policy course at a large public university. The study compared question only, statements only, and conversational discourse. It concluded that conversational discourse is possible and desirable and that it produced higher levels of student participation with more complex interaction patterns.

Addressing facilitation of discussion in general, Brookfield (1991, 195) stated that "discussion is by its very nature unpredictable." He elaborates on this through five components in his theory on discussion leadership:

1. *Be wary of standardized approaches.* Every discussion group comprises participants with different backgrounds, personalities, and learning styles. So, no standardized approach can be presumed to be appropriate for all groups.
2. *Use a diversity of approaches.* It is recommended to have a reservoir of questions and discussion leads at hand to personalize the discussion.
3. *Welcome the unanticipated.* Discussion is always unpredictable and moderators should be ready to depart from the general line of discussion to follow up themes which arise unexpectedly.
4. *Attend to the emotional dimension.* Discussions can become competitive and emotional battlegrounds or highly personal fora for sharing of private thoughts. Moderators must be prepared to handle such charged situations.
5. *Be authentic in the group.* The most damaging mistakes moderators can make is to pretend to a personality they don't possess. It is far better for moderators to accept their personality and build on their inherent strengths.

Brochet (1989) stressed the importance of moderation to the success of computer conferencing and discussed the following six role functions:



1. *The goal setter*, who makes plans for the conference and decides whether the plans should be changed during the conference.
2. *The discriminator*, who differentiates between useful and useless ideas.
3. *The host*, who creates the feeling of trust and motivates contributions.
4. *The pace setter*, who removes communication barriers and promotes cooperation.
5. *The explainer*, who relays overlooked messages and raises questions that have remained unanswered.
6. *The entertainer*, who evaluates the conference mood and ensures that participants are relaxed.

Categories of Teaching Functions

In an article on effective facilitation of computer conferencing, Eastmond (1992, 30) argued that the moderator role includes duties such as spelling out the expectations and the norms of behavior; defining the objectives, tasks, resources, and division of labor; developing the conference agenda; monitoring the participation; giving recognition; keeping a positive climate; directing and summarizing the conference; keeping the participants focused on their objectives; recognizing constraints; providing discussion and reflection on the communication process; and finally exercising editorial rights to censor, or harmonize interaction.

Discussing group dynamics in general, Forsyth (1990, 112) classified the roles into two basic functions: task roles and socio-emotional roles. According to Eastmond (1992, 33), Feenberg (1986) proposed that CMC instructors must apply procedural and intellectual leadership. Combining Forsyth's and Feenberg's approach and focusing on computer conferencing, Mason's 1991 article on moderating educational computer conferencing identified three role functions that computer conferencing moderators must possess. Based on a literature review, Mason stated that:

The advice on tutoring skills for educational computer conferencing falls generally into three categories: organizational, social, and intellectual.

Organizational role. One of the first duties of an online tutor is to "set the agenda" for the conference: the objectives of the discussion, the timetable, procedural rules and decision-making norms. Managing the interactions with strong leadership and direction is considered a sine qua non of successful conferencing...

Social role. Creating a friendly, social environment for learning is also seen as an essential moderator skill. Sending welcoming messages at the beginning and encouraging participation throughout are specific examples, but providing lots of feedback on students' inputs, and using a friendly, personal tone are considered equally important...

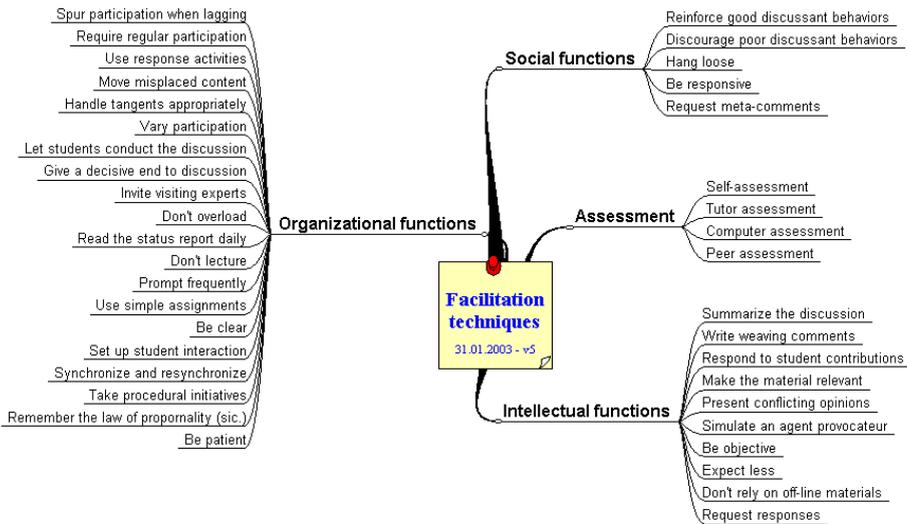
Intellectual role. The most important role of the online tutor, of course, is that of educational facilitator. As in any kind of teaching, the moderator should focus discussions on crucial points, ask questions and probe responses to encourage students to expand and build on comments... (Mason, 1991).



Mason did not focus on assessment, but obviously assessment is an important teaching function and a major part of many teachers' workload. Assignments and assessment techniques should therefore be designed with this in mind. In her discussion on student activities, Thorpe (1987, 11) presented the assignment types: in-text questions for self-assessment, computer-marked assignments for computer assessment, and tutor-marked assignments for tutor assessment. Here, peer assessment is introduced as a fourth category. All four assessment techniques can be applied in online courses, and especially computerized assessment tools such as multiple choice assignments could benefit from integration with CMC.

Some pioneers (Eisley 1991, Feenberg 1989b, and Hiltz 1988) have discussed moderation of educational computer conferences in particular. Eisley's contribution was based on his experiences from a graduate program offered through computer conferencing at Boise State University. Hiltz' report was based on research on teaching in a virtual classroom through the EIES system at the New Jersey Institute of Technology. Feenberg's perspective was derived from his CMC work at Western Behavioral Sciences Institute. In Figure 9 and the following paragraphs, their recommended facilitation techniques are compiled and organized according to the four teaching functions: organizational, social, intellectual, and assessment. Several of the techniques may fit into more than one category, so the suggested categorization is meant to be a guide rather than a definitive classification. Further, some of the statements presented here seem to contradict each other, and others seem to be redundant. They are, however, included to indicate the array of recommendations available.

Figure 9. Mind map of facilitation techniques



Based on recommendations by Eisley, Feenberg, Hiltz, and Thorpe



With regard to the social function of distance education, Holmberg's theory of guided didactic conversation postulates that: "Feelings of personal relation between the teaching and the learning parties promote study pleasure and motivation" (Holmberg, 1988, 115). However, in discussing facilitation techniques for educational computer conferences, authors tend to focus on the organizational function of the moderator role. One may infer that this is because the intellectual and social functions are less influenced by the medium than the organizational function. Hence, the facilitation techniques presented in the following demonstrate a preoccupation with the organizational function. The techniques are based on Eislely's, Hiltz', Feenberg's, and Thorpe's personal experiences in specific contexts that may or may not be relevant to teachers in other contexts.

Facilitation Techniques for Organizational Functions

1. *Spur participation when it is lagging.* For example, request direct comments and responses to the issues discussed (Eislely 1991).
2. *Require regular participation.* To maintain an active dialogue, it is necessary to exhort students to log on at least twice a week. One feasible mechanism to handle this is the weekly quiz (Hiltz 1988).
3. *Use response activities.* The response activity feature of the EIES conferencing system was developed to force active participation. Here, each student must post a response to a question before access to the other answers is granted (Hiltz 1988).
4. *Move misplaced content.* Immediately move contributions under a wrong discussion heading (Eislely 1991).
5. *Handle tangents appropriately.* Refer inappropriate digressions to another conference, or guide the students back to the original topic (Eislely 1991).
6. *Vary participation.* Ask the overly outspoken privately to wait a few responses before contributing. In the same way, ask less outspoken individuals to participate more actively, and call on specific individuals just as a teacher might call on a student in a traditional class (Eislely 1991).
7. *Occasionally have a student conduct the discussion.* Students could take turns as assistant moderators (Eislely 1991).
8. *Give a decisive end to each discussion.* Conclude discussions that drag on after they have served their purpose. Such discussions will distract from other topics on which students should focus (Eislely 1991).
9. *Invite visiting experts.* Guest experts may join the conference, and students may be asked to present questions to the visitor (Hiltz 1988).
10. *Be patient.* Be prepared to wait several days for comments and responses, and don't rush in to fill every silence with moderator contributions (Feenberg 1989b).
11. *Don't overload.* Post about one long comment a day. If the students have much to offer, the moderator should contribute less so that the slower participants can keep up (Feenberg 1989b).
12. *Read the status report daily.* Don't let too many of the participants fall far behind (Feenberg 1989b).



13. *Don't lecture.* Use open-ended remarks, examples, and weaving. An elaborate, logically coherent sequence of comments yields silence (Feenberg 1989b).
14. *Prompt frequently.* Use private messages to urge participants to take part in the discussion, to initiate debates, and to solicit suggestions (Feenberg 1989b).
15. *Use simple assignments.* Don't be apprehensive about presenting assignments to the group, but keep the threshold of participation low (Feenberg 1989b).
16. *Be clear.* Begin with an opening comment that succinctly states the conference topic and the moderator's initial expectations and continue to clarify the topic and the expectations as the conference proceeds (Feenberg 1989b).
17. *Set up student interaction.* Encourage participants to address each other as well as the moderator (Feenberg 1989b).
18. *Synchronize and resynchronize.* Make sure everyone begins concurrently and offer periodic occasions to restart in unison (Feenberg 1989b).
19. *Remember the "law" of proportionality.* Recall that faculty generally contributes about one quarter to one half of the online material (Feenberg 1989b).
20. *Take the procedural initiative.* Avoid frustrating procedural discussions by providing groups with strong procedural leadership (Feenberg 1989b).

Facilitation Techniques for Social Functions

1. *Reinforce good discussant behaviors.* Say, for example, thank you to students who respond effectively online (Eisley 1991).
2. *Request change in poor discussant behaviors.* For example, tacitly point out that the class should be more directly responsive to each other's comments (Eisley 1991).
3. *Hang loose.* Don't present an elaborate seminar agenda at the outset, just follow the flow of the conversation while guiding it toward the subject (Feenberg 1989b).
4. *Be responsive.* Respond swiftly to every contribution either by posting a personal message to the contributor or by referring to the author's comment in the conference (Feenberg 1989b).
5. *Request metacomments.* Invite participants to express how they feel about the course within the conference (Feenberg 1989b).

Facilitation Techniques for Intellectual Functions

1. *Summarize the discussion.* If the discussion is an especially lengthy one, summarize occasionally (Eisley 1991).
2. *Write weaving comments.* Summarize the state of the conference every week or two as a means of focusing discussion (Feenberg 1989b).
3. *Respond to student contributions and weave them together.* It is not advisable to respond to each individual contribution; it is better to respond to several at once by weaving them together. Do refer to students by name (Hiltz 1988).
4. *Make the material relevant.* The course material could be made more relevant by developing questions and assignments that relate to student experiences and current events (Hiltz 1988).



5. *Present conflicting opinions.* Conflicting opinions could be exposed through instructors with different backgrounds, debates, and peer critique (Hiltz 1988).
6. *Request responses.* The instructor may ask individual students to comment on specific issues that are relevant to their specific backgrounds (Hiltz 1988).
7. *Simulate an agent provocateur.* By using a pen name, instructors can question or challenge their own entries. This device could be used to set up a discussion or to set an example for student inquiries (Hiltz 1988).
8. *Be objective.* Don't generalize about a conference without considering the contributions with regard to contents, author, and time of announcement (Feenberg 1989b).
9. *Expect less.* Be content if the moderator succeeds in communicating two or three good major points in the course of a month of discussion (Feenberg 1989b).
10. *Don't rely on offline materials.* The discussion must be largely self-contained to succeed, so summarize assigned readings online (Feenberg 1989b).

Facilitation of Assessment Functions

1. In-text questions (ITQs) could be used for *self-assessment*. (Thorpe 1987)
2. Computer-marked assignments (CMAs) are made for *computer assessment*. (Thorpe 1987)
3. Tutor-marked assignments (TMAs) are made for *tutor assessment*. (Thorpe 1987)
4. *Peer assessment* is a fourth category of assessment.

Evaluation of Online Students

This section is about important issues to consider when developing an assessment system for an online course. Assignments are an important part of an assessment system. We shall be looking at self-assessment, computer assessment, tutor assessment, and peer assessment.

Assignments

Assignments are specific tasks (e.g. essays or problem sets) given by course designers or tutors at regular intervals throughout a course, as part of the overall assessment of students. Moore and Kearsley (1996) provide the following guidance on using assignments effectively in distance education courses:

Most formal distance learning courses involve a series of assignments, nearly always an essay or other written exercise, to be completed on a regular basis (e.g., every week or two) during the course. This structure serves not only to provide the student with feedback on progress but also to pace the student through the course. In general, setting assignments with cutoff dates motivates the student to keep up with the work, and helps to prevent them from dropping out. However, assignments are only effective if the student receives meaningful feedback from the instructor or tutor. If students only receive a grade or acknowledgment that the



assignment was received, the utility and motivational value of assignments is significantly diminished. Instructional designers have to be careful not to overload students with too many assignments...

(<http://wbweb4.worldbank.org/DistEd/Teaching/Instruction/asgn-02.html>)

They also tell us something of what students expect in terms of grading and feedback on assignments:

- fair and objective grading
- to have their work treated with respect
- an explanation and justification of the grade awarded
- a clear indication of how they can improve both in terms of specific responses to questions and in general
- encouragement and reassurance about their ability and progress
- constructive criticism and advice
- an opportunity to respond if desired
- a timely response (i.e., before the next assignment is due)

(<http://wbweb4.worldbank.org/DistEd/Teaching/Instruction/asgn-02.html>)

Formative and Summative Assessment

Assessment is a major concern in designing and running online courses, and Derek Rowntree has presented an overview of the main strategic issues in his article *Designing an Assessment System*. In the overview he focuses on the following questions:

- What is assessment?
- Why might we assess?
- What might we assess?
- Who might do the assessing?
- How might we assess?
- What might we do as a result of assessment?

Assessment could be used both as a tool for measurement of student performance and as a tool for helping students to learn. The *Production Handbook for Open University Courses and Packs* provides the following definitions:

Assessment is the general term used for measuring students' performance on a course against the aims and objectives of that course. Assessment may be formative or summative.

Formative Assessment is assessment as part of teaching: questions and assignments set to help the student learn effectively, but not used to determine the student's course results.

Summative Assessment is assessment to determine a student's overall level of performance on the course: questions and assignments, the grades or scores of which are used in determining the student's course result.

There is a potential conflict between formative and summative assessment as Rowntree



(www-iet.open.ac.uk/pp/D.G.F.Rowntree/Assessment.html) describes in his article *Designing an assessment system*:

While formative assessment is usually for the student's benefit, summative assessment is often for the benefit of other people – e.g. other teachers or potential employers – who might use the information you provide to make decisions affecting the student's life-chances. Herein lies a potential conflict of roles for the teacher – between helper and informer – and a conflict between formative and summative assessment. Students who most need help may be reluctant to reveal their difficulties, or to choose learning options that are more challenging, for fear of being adversely reported on.

Four Types of Assessment

Assessment could be done in several ways. According to Thorpe (1987, 11) the Open University, UK used in-text questions (ITQs) for self-assessment, computer-marked assignments (CMAs), and tutor-marked assignments (TMAs). Here, peer assessment is included as a fourth category of assessment.

ITQs are developed for *self-assessment*. For example, they could include questions that ask the students to review, revise, or summarize what they have learned from the course material. As a guide to self-assessment, the course material could also include suggested solutions and discussion of pitfalls.

Example of an assignment that applies self-assessment: Write down your own definition of an ITQ and compare it with the one you find in Thorpe's article.

CMAs utilize *computer assessment*. They are typically multiple-choice questions, and Thorpe (1987, 15) stated that over 90 percent of the CMA question sets at the Open University have been of the multiple-choice type. Variations of interactive multiple-choice assessments are short-answer, jumbled-sentence, crossword, matching, ordering, and gap-fill exercises. More and more multimedia examples of these assignments are also available. CMAs are well suited for online assessment since both technologies are based on computers. But it could be both difficult and a lot of work to develop high quality quizzes, alternative answers, and a comment or an explanation for each alternative answer.

Example of an assignment that utilize computer assessment:

Which of the following answers is correct?

CMAs utilize :

- Self-assessment
- Computer assessment
- Tutor assessment
- Peer assessment

Check Answer



There are both free and commercial tools available for computer-assisted assessment. Among them are Teaching Templates (www.tac-soft.com), Questionmark Perception (www.questionmark.com), and Hot Potatoes (<http://web.uvic.ca/hrd/hotpot>). More information can for example be found at:

- Computer Assisted Assessment: Tools, Resources and Articles (www.ulst.ac.uk/cticomp/CAA.html)
- Knowledge Statistics (www.kstats.com)
- QuestBack (www.questback.no)

TMA's are made for *tutor assessment*. These could take the form of an essay or a problem to solve. Thorpe (1987, 16) wrote that the TMA's were the most important elements of the continuous assessment part of all undergraduate courses at the Open University. Obviously, TMA's could be a major contribution to the teacher workload, and should therefore be carefully designed with this in mind.

Example of an assignment in which tutor assessment results in a heavy workload: Write an essay in which you discuss tutor assessment from both the learner's and the tutor's point of view. Post the essay as an e-mail to your tutor.

Example of an assignment in which tutor assessment results in a less heavy workload: Write an essay in which you discuss tutor assessment from both the learner's and the tutor's point of view. *Write the essay together with two other students*, and post the essay as an e-mail to your tutor.

Peer assessment is included as a fourth category of assessment because online education provides more opportunities for peer communication than the traditional distance education setting at the Open University as described by Thorpe (1987). Peer assessment could be both informal comments among students collaborating on an assignment and more formal feedback on individual assignments.

Example of an assignment that involves one peer student: Write an essay in which you discuss peer assessment from both the learners' and the tutor's point of view. Find a peer student who would like to collaborate with you, and exchange essays for mutual peer assessment.

Example of an assignment that involves several peer students: Write an essay in which you discuss peer assessment from both the learners' and the tutor's point of view. Submit the essay to the discussion forum. Then comment on two essays submitted by your peers.

All four categories of assessment could be used for both formative and summative assessment. As a teacher, you may benefit from using the matrix presented in Table 2 to plan your assessment scheme.

Table 2. Assessment matrix used for assignment analysis in an ongoing online course

Assessment categories	Formative assessment	Summative assessment
Self-assessment	Self-assessment found to be applied in assignments 1 and 5	Students were asked to write a self-assessment report (20 % of final grade)
Computer assessment	Computer assessment found to be applied in assignments 2 and 4	Computer assessment was not used for summative assessment in this course
Tutor assessment	Tutor assessment found to be applied in assignment 3	The tutor has to assess the final report (80 % of final grade)
Peer assessment	Peer assessment was used to receive comments on the draft report	Peer assessment was not used for summative assessment in this course

My assignment analyses (Paulsen 1998, 181) of 23 online courses revealed 14 instances of tutor assessment, 11 of self-assessment, 6 of peer assessment, and 5 of computer assessment. This indicates that tutor assessment and self-assessment are more common than peer assessment and computer assessment. Further, no course was found that applied all four assessment functions. In this study, I did not distinguish between formative and summative assessment.

Five Strategies to Organize and Improve Online Assessment

Assessment systems are strong indicators of how seriously course providers value their aims. One could argue that summative assessment is such an important issue for students, teachers, and course providers that experimentation with online assessment functions is risky and hard to find support for. Two obvious challenges for online assessment are authentication of student identification and detection of plagiarized digital material. However, there are some strategies that could improve online assessment. In my thesis work (Paulsen, 1998), I have suggested that course providers should consider the five strategies in List 3 to organize and improve online assessment.

List 3. Five strategies to organize and improve online assessment

1. *Consider testing the learners' ability to find and apply information, rather than to memorize and reproduce it. One possible approach to online assessment could be to focus more on the students' knowledge management abilities and less on their knowledge of the course content as Mason discussed in her book on global education:*



...content-based methods of assessment are still being applied to conditions which demand a skills-based approach. This is undoubtedly because it is easier to design reliable assessment systems, which test content rather than process. We have much less experience in assessing students' knowledge management abilities, the ways in which the course has transformed their thinking, and developed their skills in communicating and working with colleagues in the domain of the course content (Mason 1998, 42).

2. *Consider applying assessment that does not require face-to-face sessions.* It is noteworthy to observe that online assessment is not necessarily viewed as an important part of courses. However if online courses rely on assessment in face-to-face sessions, flexibility for the students is substantially limited. For example, centralized, face-to-face examinations are not convenient for students who live far from the examination site. In comparison, assessment based on project reports and term papers are much more flexible with regard to time and space.
3. *Consider including computer assessment.* Computer assessment would suit online courses very well since course providers and learners have computers at their disposal. Such assessment could include simple multiple-choice assignments or more complex tutorials that monitor the students' progress. Further, computer assessment could provide immediate feedback and reduce teacher workload.
4. *Consider including peer assessment.* CMC could be very well suited for peer assessment because students easily can share and comment on contributions. After all, most CMC systems are developed to facilitate such collaboration. Further, by requiring peer students to take part in the process, assessment could become an integral part of their learning experience.
5. *Consider using group assignments.* Assessment of group assignments is likely to require less teacher workload than assessment of similar assignments prepared by individual students. Further, collaboration among online students could increase learning and result in a product of higher quality.

Teaching Incentives and Barriers

In this section we shall be discussing what motivates online teachers and the problems they encounter when they teach online. It focuses on the teachers' preactive and interactive workload, their perception of the workload, and alternative strategies to reduce the workload.

The available literature on the perspectives of distance education faculty is also relevant to online teachers. Moore and Kearsley (1996) have summarized some reviews on faculty perspectives and evaluation about distance education in general – including teaching via



video, audio and computer conferencing. In the article they present the following findings from Dillon and Walsh (1992):

- Faculty indicates that distance teaching requires a personalized and empathic rapport with students.
- Communication skills (voice quality, eye contact, body language, clarity) are critical for distance teachers.
- Faculty who teach at a distance are generally positive toward distance education, and their attitudes tend to become more positive with experience.
- Faculty motivation for teaching at a distance comes from intrinsic (e.g., challenge) rather than extrinsic (e.g., financial rewards) motivation.
- Faculty believes that distance teaching experience improves their traditional teaching as well. (<http://wbweb4.worldbank.org/DistEd/Teaching/Instruction/tut-01.html>)

Moore and Kearsley (1996) also refer to Blanch (1994) who analyzed the barriers to faculty adoption of distance education approaches at California State Polytechnic University. They stated that the greatest obstacles were:

- a lack of awareness on the part of the university community of the general benefits of distance education;
- lack of incentives for faculty to be involved in distance education;
- the unreasonableness of expecting faculty to commit themselves to a very different teaching approach without any trial period; and
- the faculty's sense that distance education was not integrated within the university's programs and plans. This last obstacle emphasizes the importance of an institution-wide policy regarding distance education. (<http://wbweb4.worldbank.org/DistEd/Teaching/Instruction/tut-01.html>)

Finally, Moore and Kearsley (1996) included the following recommendations to administrators who wish to support good distance teaching. The recommendations are based on Barker and Dickson's (1993) experiences at Western Illinois University:

- Hire support personnel to provide assistance with instructional design and the installation, operation, or maintenance of equipment.
- Establish a faculty development laboratory to provide a place to try out and practice with technology.
- Provide administrative support for distance education efforts.
- Be sensitive to faculty's needs for incentives and recognition for distance teaching efforts.
- Provide faculty training, not only in the use of the technology involved but also in presentation and participation skills. (<http://wbweb4.worldbank.org/DistEd/Teaching/Instruction/tut-01.html>)



The three studies presented above focus on distance education, not on online education. They indicate, however, that a number of changes must be made both institutionally and individually to ensure successful online teaching. In particular, administrators of online programs must develop strategies to reduce barriers to online teaching and provide sufficient incentives to recruit and keep competent online teachers.

Teacher Workload

Teaching workload can be defined as the time spent on teaching. As we shall see later, teaching workload consists of a preactive and an interactive phase. The workload relates to the teaching functions, and one may assume that teaching workload depends on several factors such as the number of learners, the teaching system context, the preferred teaching methods and techniques, the moderator's teaching style and facilitation techniques, the course design, the characteristics of student assignments, and the assessment requirements.

Weiss et al (1994) compiled a list of possible teaching workload measures. They fell into the following five major areas:

1. *Overall Faculty Teaching Workload:* These indicators included broad, general measures of teaching workload such as credit units per faculty FTE [full-time equivalent], student/faculty FTE ratios, and measures of the number of majors and degrees awarded per faculty FTE.
2. *Individual Faculty Teaching Loads:* These indicators included number of courses taught per ladder-rank faculty and were designed to measure students' exposure to ladder faculty as a function of course level.
3. *Number of Courses Offered:* These indicators involved looking at the unique course offerings in the curricula of different departments and disciplines and were included in order to assess the diversity, scope, and breadth of course offerings available to students.
4. *Number of Class Sections Offered:* These indicators involved looking at the total number of courses offered by level of course: lower division, upper division, graduate; and by type of course: regular primary (lecture, seminar) vs. exceptional instruction (independent study), and provided an assessment of the availability of classes.
5. *Class Size:* These indicators included measures of the relative size of courses at different levels and the number of courses offered below minimum policy, providing indicators of instructional quality and utilization of instructional resources.

The workload measures presented by Weiss et al. are compiled with the emphasis on university faculty. For online teachers, there are other concerns:

In traditional education and training the allocation of resources is controlled by the "ringing of the bell"; the bell bounds the dialogue. The curriculum and the bell are useful instruments in the process of estimating the consumption of resources. Even in education or training based on counseling the learner has to make an



appointment and estimate the duration and there might be other students at the office waiting for guidance. You can “see and hear” the boundaries of the resources and above all, these boundaries are socially accepted (Jensen 1993, 72).

In correspondence courses, teachers are accustomed to mail carriers who deliver mail once a day. Online teachers, however, may receive e-mail 24 hours a day, 365 days a year. The online immediacy results in student demand for swifter responses and, hence, heavier workloads for teachers.

In 1982, Turoff (1982, 76) wrote: “There is a tremendous investment in teaching a course online.” A number of authors have since supported the statement. Experiences from the NKI Electronic College showed that the teacher’s main reservation about educational CMC is the heavy teaching workload introduced by the medium (Paulsen 1992a, 14; Paulsen and Rekkedal 1990, 9). In a report on teaching in a virtual classroom, Hiltz concluded:

You are going to work harder in teaching a course online, at least the first time.... Being a “virtual” professor is a little bit like parenthood. You are “on duty” all the time, and there seems to be no end to the demands on your time and energy (Hiltz 1988, 31).

In an article that focused on the teacher’s role in the Arts Foundation courses at Jutland Open University in Denmark, Christensen (1990) concluded that CMC introduces more work for the teachers. Likewise, Kaye (1989, 19) wrote: “Conferencing is likely to require more inputs, and more time, from tutors than the traditional distance education situation.” Reporting from an online interview with 20 teachers, Jensen (1993, 69) confirmed that the majority of the respondents pointed out that they “spend more time on online teaching than they would do teaching the same material real-time.” Comparing face-to-face and online tutoring in a two-year, part-time program for Management Development at Lancaster University, UK, Hardy (1993, 343) stated that tutors have “little control over the amount of activity online and therefore less control over his or her volume of work.”

Describing his experiences from teaching three computer programming courses via Bitnet, Johnson (1993) stated that teaching a course for the first time on a network multiplies the amount of time required almost tenfold as compared with on-campus teaching. He further contended that subsequent courses require at least double the amount of time needed for on-campus courses. In an international review of CMC, Wells (1992, 12) stated that successive offerings of a course might be less time-consuming and argued that other ways to control instructor workload may be to:

- encourage peer learning as a means to redistribute some instructional responsibilities;
- allow former students to become active alumni by retaining their participation privileges;



- broaden the range of contacts available to students; and
- divide the instructional responsibilities between individuals.

Preactive and Interactive Workload

In an article about correspondence studies, Moore (1990) discussed the preactive and interactive phases of teaching, commonly referred to as program design and instruction:

While preactive teaching is deliberative, a highly rational process, interactive teaching is more spontaneous and to some extent controlled by the students' questions, requests, and reactions (Moore 1990, 348).

Søby (1992) argued that CMC could shift the focus of distance education from an institution-centered model based mainly on a preactive structure to a participant-centered model within an interactive learning environment.

How much work should program planners and teachers invest in each of the two phases depends, among other things, on the number of students that are expected to enroll on the course. In a large-scale correspondence course at the British Open University (BOU), a design team of ten to twenty people could work two years with the preactive phase (Moore 1990, 349). Describing BOU courses that enrolled more than 1,000 online students, Mason (1990, 64) concluded: "conferencing is a viable medium in tutoring large numbers of students at a distance." On the other hand, Bates stated:

Third generation technologies [computer conferencing] are particularly valuable where relatively small numbers of students are concerned, since they avoid the high fixed production costs of the industrial mode, but they do not however bring the economies of scale of the industrial model, unless the opportunities for interaction for an individual student are dramatically curtailed (Bates 1991, 13).

Describing the experiences from NKI in Norway, Rekkedal stated:

Teaching via conferencing often becomes "labor intensive" on the part of the tutor. Originally we had a hypothesis that the supposed increase in learning quality in the "virtual school" could be compensated for by less emphasis on the development of learning material. So far our experiences have not supported this assumption. Thus, it seems that investments in pre-produced learning material will be approximately the same as in other large-scale systems if the total quality is to be satisfying (Rekkedal 1993, 710).

In my thesis on *Teaching Techniques for Computer-mediated Communication*, I did a survey of 150 teachers regarding their perceptions of teacher workload associated with 24 different teaching techniques. Based on this work I drew the following conclusions:



The general perception found in the questionnaire is that teacher workload is high. In 18 of the 24 techniques, there were more or as many teachers who perceived the workload to be high than to be low. It varies, however, considerably with technique and context. First, the interviews indicate that one-online techniques have relatively low preactive and interactive workloads. Second, they imply that one-to-one techniques have divergent preactive workloads and high interactive workloads. Third, one-to-many techniques have high preactive workloads and divergent interactive workloads. Fourth, for many-to-many techniques, the preactive workloads vary considerably with technique, and the interactive workloads seem to be high when teachers are highly involved in the interaction with students. (Paulsen 1998, 195)

These findings support the fact that CMC teaching is perceived to have a high workload and that it is important to identify and refine efficient strategies to decrease the workload as was discussed in the literature review. However, the survey also shows that most of the teachers teach courses with small-scale enrollment. So, one might expect that teacher workload could become a major challenge for large-scale enrollment.

The perceptions of the teachers surveyed can be summed up in Table 3.

Table 3. Perceptions of preactive and interactive workload

Methods	Preactive Workloads	Interactive Workloads
One-online	Relatively low	Relatively low
One-to-one	Divergent opinions	Very high
One-to-many	Relatively high	Divergent opinions
Many-to-many	Vary considerably with technique	Depend on teacher involvement

Eight Strategies to Reduce Teacher Workload

The major concern arising from my thesis research (Paulsen 1998, 186) was how to keep teacher workload at an acceptable level. Hence, I suggested the eight strategies presented in List 4 to reduce the workload per student associated with large-scale enrollment.

List 4. Eight strategies to reduce teacher workload

1. *Form a group of experienced and welltrained teachers.* The survey shows that the teachers have relatively little experience in CMC teaching, and one may assume that the workload may be reduced as teachers are trained and gain more experience. Courses on CMC teaching and teacher training programs should be developed and made available to teachers. The survey revealed



that a number of such courses exist, but as additional research and experience on CMC teaching become available, more and better courses should be developed. Further, the literature review and the interviews indicate that the workload is especially high the first time one teaches a CMC course, and that material developed for one course could be used again in other courses. A group of teachers could possibly also benefit from collaboration and exchange of experience and course material. To facilitate teacher collaboration, the organization could organize face-to-face seminars and online faculty lounges for their teachers.

2. *Establish a system for technical and administrative support.* Some of the teachers suggested that support staff or the supporting organization should handle some functions for the teachers. For example, technical questions could probably be handled better by the technical support staff, and administrative requests could probably be answered better and more efficiently by administrative staff. Even senior students could be engaged to support new students in order to relieve teachers of trivial support work.
3. *Shift attention from spontaneous interactive teaching to deliberate course design.* An interactive workload depends more on the number of enrolled students than the preactive workload does. Interactive workloads could be decreased through careful preactive design and preparation. The course designers should also carefully consider which teaching techniques are suitable for the course. So, one possible way to handle high enrollment figures would be to adapt the large-scale model with more emphasis on course design.
4. *Pay special attention to the assessment workload per student when you design course assignments.* The number and form of course assignments are especially important for teacher workload. So, course designers should pay especial attention to the teacher workload generated by the assignments. The teachers' assessment workload could be reduced considerably by substituting teacher assessment with peer-, computer-, or self-assessment. Further, group assignments could entail less teacher assessment than individual assignments do.
5. *Restrict teacher interaction with individual students and small groups of students.* Since the interactive workloads seem to be high in one-to-one techniques and in many-to-many techniques with high teacher involvement, high enrollment courses may have to use less of these interactive techniques even though they are perceived to have high learner outcome. These results support Bates (1991, 13) when he stated that the technology does not bring economies of scale unless the opportunities for interaction for individual students are dramatically curtailed.



6. *Encourage and facilitate interaction among students.* Students should be regarded as a resource for mutual learning. Services, teaching techniques, and assignments could be designed to encourage and facilitate interaction among students. Former students could become active alumni and be encouraged to participate in some interaction.
7. *Automate responses.* The teacher could develop a response library of often used comments and even present this on a bulletin board for Frequently Asked Questions (FAQ). Further, automatic responses could be designed into a course, for example as automatic e-mail responses or self-correcting quizzes.
8. *Develop a scheme to handle the demand for expedient responses.* Several teachers comment that the time flexibility and the expected response time influence the nature of their workload. Therefore, one might argue that relaxing the requirements for expedient responses and allowing more flexible working hours could ease some teachers' perception of workload. However, students want expedient feedback, so co-teaching, shift work, and the use of teaching assistants might be considered as schemes designed to share a continuous and increasing workload among several individual teachers. All teachers should also inform the students about their online work schedule, so that the students know which days of the week and what time of the day responses from teachers could be expected.

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Online Exercises (<http://math.uc.edu/onex/compare.html>)

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Anecdote 2. Bjørn Helgeby: Online Trainer of the Year



In 1999, the NKI Internet College wanted to increase the focus on excellence in online teaching and stimulate the discussion among teachers, students, and staff regarding the characteristics of exemplary online teaching. To accomplish this, NKI decided to invite the students to elect the school's best online teachers.

A jury comprised of two students and one staff member was established. The jury invited all students to nominate their favorite among the school's 75 online teachers and give the reasons for their nomination. On this basis, Bjørn Helgeby was honored as the best online teacher.

In its justification, the jury pointed out that Helgeby delivered swift, encouraging, and comprehensive responses to student requests. He produced constructive, thorough feedback with both positive and critical comments on student assignments. He provided good student support and inspired and motivated his students. He took active part in the discussion forum providing advice and cues. He also received praise because he supplemented the readings with his own introductions.

Helgeby has worked as a full-time IT-consultant in Oslo since 1985. He is a father of three, living in Holmestrand, a small, coastal town south of Oslo. He is also a part-time online teacher and does his teaching on the train during his two-hour daily commute. Helgeby taught about 150 students in an introductory course on information technology, and 100 students in a foundation course on programming. Information technology is his specialty and he benefits from it in his teaching.

Aboard the 4.39 pm train from Oslo, he opens his laptop and starts commenting on his students' assignments. He has developed an extensive database of useful comments and helpful explanations. He skillfully merges adequate material from the database with personal advice to each student.

"I spend at least two and a half hours on the train every workday, so I want to do something useful," he says. "Frankly speaking, my time on the train is peaceful and quiet. Both at home and at work there is always someone who wants my attention. So, on the train, I can concentrate on my students. I'm confident that they appreciate that I give them almost immediate feedback. On the train, I reply all incoming messages twice a day."

"The students may reach me via telephone, but they seldom do," he says. "Almost all communication with individual students is via e-mail. This communication is obviously deprived of body language, facial expressions, and gestures. But the advantage is that students come up with better-worded questions and I can concentrate on formulating thorough and pedagogically structured feedback."

"I have taught these NKI courses online since 1990, so I have answered 80 percent of all questions earlier. Therefore I can retrieve most of my feedback from a comprehensive database of comments that I have developed over the years. This makes my work very efficient, and I'm sure that an inexperienced teacher would need much more time to teach these courses."



Online Teaching Techniques

This article² presents experiences with teaching techniques that were found in the literature and that were recommended by some of the 150 online teachers that were interviewed about their experiences with teaching techniques. The analysis of the interviews showed that discussion groups, project groups, lectures, correspondence studies, and use of databases were the most used online teaching techniques.

Teaching Techniques in Adult Education Literature

There is an abundance of literature describing techniques that can be used to facilitate adult learning. A brief review of these techniques is included to identify techniques one may expect that designers of CMC courses are familiar with and therefore would consider adapting to CMC. The books referred to in the following have been especially useful for the identification of the techniques included in this review of adult education literature. In *Adult Learning Methods*, edited by Galbraith (1990, 131-390), the following techniques were discussed in detail: learning contracts, lecture, discussion, mentorship, case study, nominal group technique, demonstration and simulation, forum, panel and symposium, computer-enriched instruction, internship, and correspondence study. In *Approaches to Training and Development* Laird (1985, 129-168) described these techniques: lectures, readings, demonstrations, skits, field trips, note-taking, programmed instruction, panel discussion, structured discussions, panel discussions by students, topical discussions, question-answer panels, cognet, open forum discussions, behavior modeling, interactive demonstrations, performance try-outs, brainstorming, case studies, action mazes, incident process, jigsaws, inbaskets, team tasks, buzzgroups and syndicates, agenda-setting buzzgroups, role-plays, reverse role-plays, doubling role-plays, rotation role-plays, finding metaphors, simulations, games, clinics, critical incident, fishbowls, t-groups, hot role-plays, and organization development data gathering. Comparable lists of techniques were presented by Knowles (1980, 239) and Knox (1987, 77-106).

In *Effective Strategies for Teaching Adults*, Seaman and Fellenz (1989, 25-145) discussed and categorized the techniques into techniques for presentation, action, and interaction. The

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² The article is based on my *Online report on pedagogical techniques for CMC* (www.nettskolen.com/pub/artikkel.xsql?artid=123). The original version, which was published in 1995, has been used in several courses at universities around the world. It is my most referenced work, and it has been translated to several languages with and without my knowledge. A Google search reveals several hundred references to it.



presentation techniques included lecture, symposium, panel, dialogue, debate, demonstration, and interview; the action techniques comprised in-basket exercises, simulation games, role-plays, and case studies; and finally the interaction techniques included fishbowl, expanding groups, buzz groups, brainstorming – including delphi and nominal group technique, listening teams, audience reaction teams, colloquy, forum, committee, and committee hearing.

The techniques mentioned above are common in adult education, and the literature review has shown that teachers and researchers have adapted these well-known techniques to online teaching and describe their experiences within this well-established paradigm of terms.

Teaching Techniques Discussed in CMC Literature

Articles that give an overview of teaching techniques for CMC are more scarce than articles that discuss teaching techniques in general adult education. However, many descriptive articles, presenting opinions on and experiences from one or a few CMC courses, include some information about teaching techniques, but the issue is rarely pivotal. These articles are referred to in the review of each technique. Just a few articles have been found that address the issue from a broader perspective. These articles are reviewed in the following section.

According to Henri (1988, 88) many educational applications of CMC can be imagined, such as: a) replying to queries and requests from students, b) providing advice and guidance, c) helping students to solve problems with regard to the subject matter, d) serving as a transmission medium for homework and test papers, e) discussing projects and work with the tutor, f) bringing students together in accordance with their interests and their needs, and g) encouraging team projects and setting up self-help groups.

A few authors have attempted to give a more detailed overview of the educational use of CMC systems (McCreary and Van Duren 1987, Harasim 1991 and 1992, Rekkedal and Paulsen 1989, Rekkedal 1990, and Kaye 1992). A closer examination of their articles revealed, though, that they are just preliminary attempts to cover the gamut of teaching techniques that are available in CMC systems. An overview of the techniques discussed in these articles is presented in Table 4 and explained in the following text.

Table 4. Overview of possible teaching techniques

McCreary and Van Duren (1987)	Harasim (1991 and 1992)
The notice board The public tutorial The individual project Free flow discussion The structured seminar Peer counseling Collective database Group product Community decision making Inter-community networking	Seminars Small group discussions Learning partnerships and dyads Small working groups Team presentations/moderating by learners Simulations or role-plays Debating teams Peer learning groups Informal socializing: the online cafe Mutual assist for help Access to additional educational resources



Rekkedal and Paulsen (1989)	Kaye (1992)
Distribution of information Two-way communication An alternative to face-to-face teaching The public tutorial Peer counseling Free flow discussion The library	The virtual seminar The online classroom Online games and simulations Computer-supported writing and learning Multi-media distance education adjunct Lecture-room adjunct The education utility

Teaching Techniques Discussed by McCreary and Van Duren

Based on a study of applications of the CoSy conferencing system at the University of Guelph, McCreary and Van Duren (1987, 108) identified the following ten educational components and functions of computer conferencing:

1. *The notice board.* Conferences may have the same function as announcements in face-to-face classes. The instructor can, for example, introduce office hours, class readings, assignment deadlines, material on reserve in the library, and examination advice. The electronic notice board is equally accessible to those who attended class and those who missed. It is permanently displayed and automatically marked with the date etc. Since it is interactive, it also allows for clarification of announcements. For administrative details, it offers advantages over announcements or handouts in face-to-face classes, as well as over students' telephone calls and visits to the professor's office.
2. *The public tutorial.* It is likely that if one student has a problem understanding or interpreting, other students will share the problem. So, in order to benefit both inquirer and readers, conferences have been used for questions and answers that can clarify issues and elaborate on material presented in class. When issues are raised online, tutors are more inclined to produce a detailed discussion knowing that it would not be necessary to repeat the explanation for subsequent inquiries from other students.
3. *The individual project.* An online conversation between two participants can be useful in situations such as rewriting a term paper, guiding an independent reading course, or writing a thesis proposal. Online supervision may be slower than direct spoken consultation. On the other hand, it may be more thoughtful and more productive use of contact time.
4. *Free flow discussion.* A free flow discussion conference may be used to continue and supplement interaction in a face-to-face class. Participants can pursue ideas between classes after they have read further and reflected on the issues. For example, free flow discussion conferences have been used successfully for informal reflection on a futures theme. The discussion does not need to be inconclusive or aimless since any participant can focus on a series of comments and test group consensus.



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5. *The structured seminar.* In a structured seminar, sub-topics have been matched to units of course material. This is particularly useful for distance learners and individuals who have incoherent course progress.
6. *Peer counseling.* Conferences for peer counseling are primarily for student-to-student interaction. These conferences provide a medium for mutual support and advice on academic issues such as exam preparation, administrative aspects concerning registration procedures and fees, existential crises related to work on thesis proposals, and how to survive as a part-time student. Although peer counseling takes place in conferences with other purposes, its function is important enough to merit a separate conference or inclusion as a separate topic in a course conference.
7. *Collective database.* Collective databases; such as annotated bibliographies, listings of journals, directories of sources for scholarships, and calendars of events, can be established within computer conferencing systems. Conferencing systems provide a means for soliciting and collecting contributions from individuals.
8. *Group product.* Conference systems can facilitate group work such as case study preparation, project development, and team presentation. Conferences can further provide forums in which classes can analyze problems, coordinate individual work, prepare group papers, and review and revise each other's work.
9. *Community decision-making.* A conference open for all students, faculty, and staff can address management of educational resources, procedures for comprehensive exams and thesis defenses, curriculum changes, and preferences among nominees for visiting faculty. Especially at the graduate level, shared decision-making is beneficial in building true academic communities.
10. *Intercommunity networking.* Linkages between similar academic groups at different universities have been attempted to promote common research and scholarly interests. This seems to work best among people with previously established relations through on-site conferences, shared study interests, or exchange of papers.

Teaching Techniques Discussed by Harasim

Based on her work with CMC courses at the Ontario Institute for Studies in Education and at the Simon Fraser University, Harasim (1991 and 1992) offers eleven learning techniques that have been found effective online. Her presentation of these techniques is paraphrased in the following:

1. *Seminars.* In online seminars, students prepare by reading the assigned material before they log on to discuss pivotal issues with peers and instructors in an appropriate conference.
2. *Small group discussions.* In small group discussions, three to ten users discuss a particular topic, usually guided by an instructor or a group leader. The discussion often follows a seminar discussion or a plenary discussion. It may also complement a parallel face-to-face or online activity.
3. *Learning partnerships and dyads.* In learning partnerships and dyads, learners are paired for mutual support and group work. These techniques can serve as icebreakers in early phases of online classes and they are also useful for joint writing projects.



4. *Small working groups.* Small working groups can facilitate collaborative work. Student groups can, for example, solve problems, undertake research projects, and write reports. Effective groups, though, require clearly defined tasks, roles, and timeliness.
5. *Team presentations/moderating by the learners.* Online students can be asked to moderate class discussions and to present papers in a computer conference. Students may, for example, work in small groups to present, moderate, critique, and synthesize a discussion on a class topic.
6. *Simulations or role-plays.* Simulations and role-plays allow students to apply and test theoretical knowledge in a simulated environment. Examples of successful role-plays in online environments include a “management lab”, an “evaluation manor”, and “Sam’s Café”. In the management lab, students take on various roles in managing a hypothetical corporation. In the evaluation manor, learners assume the perspectives of various evaluators to debate evaluation procedures and approaches. Finally, in Sam’s Cafe, the participants adopt the personae of characters in a bar to explore different philosophical perspectives and positions.
7. *Debating teams.* In debating teams, learners have the opportunity to improve their analytical and communication skills by formulating ideas, defending positions, and critiquing counter positions.
8. *Peer learning groups.* In peer learning groups, learners assist one another with writing assignments, problem solving, etc. Students may, for example, collaborate online to improve their writing skills.
9. *Informal socializing: the online cafe.* Since social communication is an essential component of educational activity, online educational environments should provide opportunities for informal discourse. An online cafe can contribute to a sense of community among the users, forging a social bond that may offer motivational and cognitive benefits.
10. *Mutual assistance for help.* Valuable online support, based on mutual assistance, can be organized in an online conference where students can ask one another for help. Such a conference may be especially useful with regard to technical problems and system support.
11. *Access to additional educational resources.* Additional online resources for educational use include international networks, databases, library catalogues, and information pools. To benefit the curriculum, these resources could be an integral part of the online activities.

Teaching Techniques Discussed by Rekkedal and Paulsen

Based on literature review and research on computer conferencing courses at NKI in Oslo, Rekkedal and Paulsen (1989, 64) identified seven areas where computer conferencing can be applied in distance learning systems. Their accounts are paraphrased in the following:

1. *Distribution of information.* Distance teaching systems need to increase the efficiency of distributing and updating information to students, faculty, and staff. Computer conferencing can, for example, be used for distribution of updated learning materials and information about courses, seminars, examinations, and student activities.



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2. *Two-way communication between student, tutor and staff.* In most distance teaching systems, submission of assignments for correction, evaluation, and feedback is important. Research shows that extended turnaround times may have destructive effects on course completion. It often takes too long for students to get help when they encounter problems in their studies. To some extent, telephone support has been used in these situations, but computer conferencing systems function more conveniently. Students may, for example, ask questions at any time, without the time delay of land mail. Draft solutions may be discussed, introducing a more flexible organization of tutoring and assessment. Student answers may be made available to other students, before or after submission deadline. Computer-scored tests can also be included in online systems, as a substitute for traditional off-line computer scoring. In higher-level education, two-way communication by e-mail may be used in the guidance of individual student projects.
3. *An alternative to face-to-face teaching, introduction of group discussion and project work.* Many distance education programs include occasional face-to-face meetings between tutors and students, but practical or geographical considerations restrict many students from taking part in these meetings. Sometimes, face-to-face meetings develop into one-way presentation of subject matter. Computer conferencing, on the other hand, mainly involves information exchange and interpersonal discussion. Electronic classroom discussions can develop into exciting experiences of group learning. In the same vein, the medium seems to foster equality of status between the participants. Finally, special group-learning techniques – such as group submission of assignments, group learning and presentations, seminars, and project work – may be applied.
4. *The public tutorial.* Most distance education systems are designed for individual learning, but communication between one tutor and a number of individual learners is time-consuming. Questions, answers, and comments from one student will, however, often be of relevance to others. In a conferencing system, such interaction could be made accessible to all students along with pre-produced information of general interest.
5. *Peer counseling.* Informal peer counseling and cooperation are regular activities in on-campus programs. In computer conferencing, the possibilities for such collaboration are obvious and actively supported in the majority of learning programs. Peer help in solving problems may often come from an unknown friend. Peer counseling may be of particular value in large-scale systems where hundreds of learners are studying the same subject.
6. *Free flow discussion.* A number of educational conferencing systems have established social conferences, such as the cafe, the pub, or the coffee shop. These conferences have shown that informal discussions and non-academic activities can thrive in educational conferencing systems.
7. *The library.* In an online text database, articles, lectures, research reports, etc. can be made available to the students.



Teaching Techniques Discussed by Kaye

In a literature review paper on collaborative learning, Kaye (1992) described the following seven applications of CMC in education and training programs:

1. *The virtual seminar.* The International Executive Forum organized by the Western Behavioral Sciences Institute (WBSI) in La Jolla, California, from 1982 to 1991 is paradigmatic of the virtual seminar model. In this model, a small group of articulate peers exchange ideas and information over several months. The high quality and value of the online discussion is evident even from a retrospective analysis of the conference transcripts (Mason 1991).
2. *The online classroom.* Applications of the online classroom model have often been inspired by the "virtual classroom" research carried out at the New Jersey Institute of Technology (Hiltz 1990). Now, there are three common features of most online classrooms. First, the group size is comparable to that in a face-to-face class. Second, there is at least one person responsible for guiding the group's activities and, third, computer conferencing represents the principal mode of communication. Varieties of online classrooms depend on the age of student groups, the educational levels, and the roles taken by the people responsible for the groups.
3. *Online games and simulations.* The online game or simulation is a variety of the online classroom, which merits further development, since it can build on computer processing in addition to computer conferencing. Examples of such simulations are the "virtual management practices laboratory" (Hsu 1990) at the New Jersey Institute of Technology and the Arab-Israeli conflict simulation (Goodman 1992) at the University of Michigan.
4. *Computer-supported writing and language learning.* Since the combination of CMC and word processors essentially has a textual nature, it has attracted interest within the field of the teaching of writing and language skills. Examples include Connected Education's creative writing courses and Rio Salado Community College's courses in creative writing, technical writing, and English composition.
5. *Multi-media distance education adjunct.* There appear to be strong arguments for introducing CMC into multi-media distance education programs in addition to print, broadcast, educational software, correspondence, telephone, and face-to-face meetings. E-mail can provide more regular and faster communication between students and tutors. Conferences provide a means for group discussions and interactive learning; communication amongst students, tutors, and course development and support staff, and opportunities for socializing and cooperation amongst students. Online databases can provide access to reference and library resources. Two examples of multi-media distance education providers are the British Open University (Mason 1989 and Thomas 1989) and EuroPACE.
6. *Lecture-room adjunct.* In large on-campus lecture classes, there is little time for individual students to ask questions and the format does not invite discussion. In such a context, universities may establish conferences where students can get help from teachers and other students.
7. *The education utility.* The education utility is a set of online resources that students and faculty can access. The Campus 2000 system, run by British Telecom and Times



Newspapers, is one system that provides schools and further education colleges with access to databases, computer-based training material, international e-mail, and a computer conferencing system. Campus 2000 hosts some distance education programs and many intercultural networking projects.

Framework for Online Teaching Techniques

A teaching technique is a manner of accomplishing teaching objectives. The techniques are organized according to the four communication paradigms used in computer-mediated communication. The paradigms are information retrieval, electronic mail, bulletin boards, and computer conferencing. The classification is derived from Rapaport (1991) who uses it in his book; *Computer Mediated Communications: Bulletin Boards, Computer Conferencing, Electronic Mail, and Information Retrieval*. Additional support for this classification is found in a paper by Harasim (1989). Presenting "the Collaborative Learning Horizon", she distinguished among one-to-one, one-to-many, and many-to-many learning approaches.

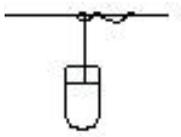
The foregoing considerations result in a framework of four classes of techniques as shown in Table 5. First, the techniques classified as one-online are characterized by retrieval of information from online resources and the fact that a student can perform the learning task without communication with the teacher or other students. Second, the techniques classified as one-to-one can be conducted via e-mail applications. Third, the techniques discussed as one-to-many will typically be conducted via bulletin boards or distribution lists for e-mail. Finally, the techniques presented as many-to-many can be organized within computer conferencing systems, bulletin board systems, or distribution lists for e-mail.

Table 5. Framework for online teaching techniques

<p>One-online Techniques</p> <ul style="list-style-type: none"> Online databases Online journals Online applications Software libraries Online interest groups Interviews <p>One-to-one Techniques</p> <ul style="list-style-type: none"> Learning contracts Apprenticeships Internships Correspondence studies 	<p>One-to-many Techniques</p> <ul style="list-style-type: none"> Lectures Symposiums Skits <p>Many-to-many Techniques</p> <ul style="list-style-type: none"> Debates Simulations or games Role-plays Case studies Discussion groups Transcript based assignments Brainstorming Delphi techniques Nominal group techniques Forums Project groups
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One-online Techniques: The Online Resource Paradigm



This section describes techniques that utilize online resources. The resources may be information (online databases and online journals), software (online applications and software libraries), or people (online interest groups and individual experts). Teachers can employ techniques that utilize these resources via CMC. The techniques may be more or less structured, but they all require minimal interactive participation by the teacher.

Discussing CMC and student self-directed learning, Seaton (1993, 52) argued that the potential of CMC lies in its ability to provide a gateway to resources, collaborative learning, and individual achievement. He further stated that although CMC is neither a necessary nor a sufficient component to develop self-directed learning, it increases the possibility that such learning can take place at a distance.

The last of Harasim's eleven group-learning activities is access to additional educational resources. In her explanation, she stated: "Most university computer conferencing systems provide access to other online resources such as international networks... as well as access to online databases, library catalogues, and similar information pools. These resources could be integrated into the design of online activities to benefit the curriculum." (Harasim 1992, iii)

Howse (1991) presented another description of online resources in his article *Internet - The discoveries of a distance educator*. He discussed the following Internet resources with relevance to distance educators: e-mail, newsgroups, distribution lists, library systems, electronic journals, databases, and remote software applications. In his conclusion, Howse (1991) stated that "Access to information and computing power, and use of this access, will not only enhance learning but it will empower those who have these skills. Distance educators should explore the Internet. Better still, they can use the network to help their students."

This was supported by Wells (1993, 85) who stated that "the array of resources available through the Internet is expanding at a dizzying rate with the result that increased access to remote library catalogs, online databases, and other material will immeasurably enrich the academic experience for all students."

The Canadian Southern Interior Telecommunication Project (SITP), described by Teles and Duxbury (1991), is one early example of a project with advanced use of online resources. The project was initiated by eleven school districts in British Columbia in early 1989, and the objective was to improve the educational system in the region by providing more resources to support the teaching and learning process through appropriate use of online resources. Representing 82 elementary and secondary schools, 359 teachers (and their classes), librarians, and staff joined the project. The participants were given access to e-mail via Bitnet and Internet, various computer conferencing systems in Canadian and U.S. institutions, and online databases such as Grolier, ERIC, and the Simon Fraser University



Library database. Online experts were available to the participants. In addition, two accounts for Dialog, the NewsSource, the Web, and the AT&T Learning Circle were given to each district (Teles and Duxbury 1991, 12). According to Teles and Duxbury (1991, 50), the most used resources were "electronic mail, followed by computer conferencing, and databases....The primary use of CMC was to support peer communication and professional development, and to enhance curriculum-based classroom activities". They further concluded that the reported impact on students, as perceived by the teachers, was greater access to information, increased enthusiasm, more opportunities to collaborate in larger groups, and increased incorporation of real life experience into classroom activities. Finally, the authors (Teles and Duxbury 1991, 50) report that the majority of the participants were "highly positive and enthusiastic about the project, for enhancing teaching and learning activities".

Online Databases

Online databases are organized collections of data that can be accessed via CMC. Utilizing these resources, a course provider can maintain local databases of relevance to both students and faculty. An easier solution than maintaining local databases is to provide access to external databases. A growing number of such databases are now available via CMC networks. At Murdoch University, Howse (1991) stated the directory of library services that are accessible via Internet is seventy pages long. In the same way, students and faculty at the Ohio State University had access to at least nine major libraries and a number of databases via the Internet (Dixon 1991). CompuServe users can access the Academic American Encyclopedia, Dissertation Abstracts, ERIC, Magazine Database Plus, and Peterson's College Database. In an article on library services to off-campus students, Bazillion and Braun (1992) argued that the online library catalogue for the Brandon, Manitoba, and Saskatchewan Universities provided a way to teach research skills to all their online students. A paper describing the UK Open University online database was presented by Melton and Ismail (1993).

Online Journals

Online journals are periodicals that are available to readers via CMC networks. They are increasingly important resources for information and learning. Supporting this statement, *U.S. News & World Report* (1994, 60) claimed that more than 2,700 newspapers experimented with one or another kind of electronic venture in 1994 compared to only 42 in 1989. Strangelove (1992) compiled a directory of about 35 electronic journals and 90 newsletters that were available via the Internet. Utilizing these resources, teachers have encouraged and helped students to subscribe to online journals and to use them as an integral part of a course or as a supplement to course work. In a paper considering CMC's potential for pre-service and in-service teacher education, Marantz and England (1993, 76) stated that they used the electronic journals DEOSNEWS and NETWEAVER as up-to-date and accessible educational resources. Gunawardena (1992, 63), describing her experiences from a graduate course on the theory and practice of distance education at



the University of New Mexico, stated that the students found DEOSNEWS and the On-line Journal of Distance Education and Communication to be invaluable resources for their research papers.

Online Applications

Online applications are software programs that can be executed on a remote computer via a computer network. The remote session may be established using for example a modem connection or the Internet Telnet service. The online applications include a range of applications from software development tools, via specific applications for statistics, economic analysis, and so on, to computer-aided instruction (CAI) applications. The following two examples present early experiments from the NKI Electronic College described by Paulsen (1992a).

As a part of the Introduction to Computer Science course, Lindland used the EKKO online multiple-choice database (EKKO-base) for the first time in the fall of 1989. The students could download a number of multiple-choice questions, then spend the time they needed to figure out the answers, and finally upload their responses for automatic scoring. EKKO-base is further described by Quale (1990 and 1991). In another trial at the NKI Electronic College, Børsum taught a programming course that allowed the students to access the host computer's Cobol compiler. Although it was more convenient to use a local PC-compiler, the experiment showed that remote students can access host computer applications, such as compilers, software for statistical analysis, and tools for the development of databases.

Hiltz and Turoff (1978, 309 and 310) contended that CAI has suffered from a lack of the incorporation of structured communications and that it will require the integration of CAI systems with computer conferencing systems to allow the encompassing of the total educational process. In an article on integrating CAI with computer conferencing, Lauzon (1992) described how VITAL, a computerized course authoring system, was utilized together with the TCoSy conferencing system in a communication process course at the University of Guelph. Online, students just selected VITAL or TCoSy from a menu. Five VITAL multiple choice quizzes provided immediate feedback to the learners. Each quiz was available online for about three weeks and the students had three chances to pass the quiz. The quizzes were designed to facilitate lower-level learning to prepare students for higher-level learning in the conferencing system. In conclusion, Lauzon (1992, 44) reported that the evaluation suggested that instruction provided via CAI and computer conferencing can engender positive attitudes toward computers and communication technology.

Kaye (1991, 43) mentioned the French insurance company, Union des Assurances de Paris, as an early example of a corporation that has provided CAI via the company's national computer network. The employees can, both from home and work, access CAI material to study French, English, mathematics, physics, information technology, law, economics, and insurance. Kaye (1991, 48) further stated that a combination of CAI material accessible via the Alitalia airline's computer network, self-study texts, and so on, has cut the costs of face-to-face training programs by 70 percent.



Software Libraries

In addition to accessing remote online applications, students may download application programs from remote software libraries so that they later can execute the programs on their PCs. Such application programs are available from a number of host computers. The Internet provides a standardized file transfer protocol (FTP) to obtain copies of software applications, and a large number of the popular PC-based bulletin board systems have software exchange as their main activity. One way to apply such resources in education is to provide online software libraries with relevant educational software for the students. Boston (1992) wrote that the Houston Community College System in several courses provided courseware that students could download and study off-line. He (Boston 1992, 50) especially mentioned the use of courseware in teaching history, economics, and data communications. The history and data communications courseware was designed by the course instructors while the economics courseware was provided by the publisher of the textbook. Some faculty, however, resisted developing courseware because it required more work than they got paid for. Referring to his personal and professional growth experience as a teacher, Boston (1992, 57) concluded that: "One feels the renewal and satisfaction that comes from creating new courseware, from improving it, and from seeing it used successfully by students miles away, students who are themselves thrilled to be learning this way."

Online Interest Groups

An online interest group (OIG) is a group of people with a common interest who convene via CMC. There are thousands of OIGs that can be accessed via international CMC networks, and it can be argued that they all have some sort of educational use. Howse (1992) stated that more than 1,000 scholarly lists are distributed via Listserv on the Internet and that over 1,000 international newsgroups, carrying more than 250,000 items every day, can be accessed at Murdoch University.

There are many documented examples of CMC-based OIGs that are relevant for education. Bull, Harris, and Drucker (1992) described experiences from the electronic academic village in the Curry School of Education at the University of Virginia, U.S.A. The electronic village was based on a CMC system that linked teachers in the public schools, students in the teacher education program, and faculty at the University. In addition, the system linked the participants to teachers across the nation and in other countries. The system provided an OIG environment in which people could exchange thoughts and ideas.

Friedman and McCullough (1992) presented a project linking English teachers from seven rural high schools in the United States. The OIG was organized as a computer conference at the Bread Loaf School of English. Pierce (1992) explained how CompuServe and BITNET have been used worldwide by researchers in education. The purpose of these OIGs was to facilitate communication among researchers who wanted to share and compare findings about education and to communicate with consumers of research in education. Braatane (1993) presented Teachers in Network, a BBS-based cluster of OIGs, open to all teachers in Norwegian secondary education and sponsored by the Norwegian Ministry of Education. Stewart (1993, 859) reported use of OIGs in the Schools Sharing



Information Network in New Zealand. Odasz (1992) described the Big Sky Telegraph CMC system that linked one-room schools in rural Montana, U.S.A. The mission of the system was to empower rural residents through the sharing of knowledge access skills among rural teachers. These accounts show that access to OIGs obviously has been of value to students in teacher education programs.

Interviews

An interview was described by Seaman and Fellenz (1989, 70) as: "a presentation in which an interviewer asks questions of one or possibly two resource persons before an audience. The resource persons are knowledgeable about a previously determined topic of interest to the audience and should have been informed about the kinds of questions that will be asked, especially those that will open the interview. Questions may be prepared in advance, improvised by the interviewer as the activity progresses, submitted to the interviewer on small cards by members of the audience, or a combination of the above."

Etzkowitz (1989) reviewed e-mail as a communication and interviewing medium. His article discussed an experiment in using e-mail in qualitative social research in which the face-to-face focused interview was adapted for electronic use. The article presented the concept of the focused interview and its electronic adaptation as well as a comparison between e-mail and face-to-face focused interviews. Etzkowitz concluded that the e-mail interview combines characteristics from both formal and informal interviewing techniques and that it: "is emerging as a hybrid of the structured written questionnaire, the focused interview, the anthropologist-informant relationship and the longitudinal panel study" (Etzkowitz 1989, 531).

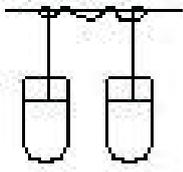
An example of an online interview was presented by Paulsen (1992e). In the introduction to the interview he described how the interview was conducted via the Internet:

This interview with Bruce Scriven, program chair of the 16th ICDE World Conference, was conducted via e-mail. The first set of questions was posted in January. In February, a second round of questions was posted to clarify and elaborate on the questions and answers. Finally, after the additional information from the second announcement flier was included, the interview was dispatched to Bruce Scriven for approval. Except for some technical problems with lost messages, this was an interesting experience using an interview technique that can be recommended. Paulsen (1992e)

A more concrete example of an educational application of an interview could be to give the students the following assignment: Each of the small groups could conduct an e-mail interview, focusing on a topic that is relevant to the course, and post the interview to the class.



One-to-one Techniques: The E-mail Paradigm



The techniques included in this section are learning contracts, apprenticeships, internships, and correspondence studies. These techniques are characterized by a one-to-one relationship and by individualized teaching and learning. The teaching and learning are facilitated in the communication process. So, computer-mediated communication can be an effective support for these techniques when the communication can be conveyed by written text. On the other hand, one may contend that some of these techniques depend so much on personal relationships that frequent face-to-face meetings may be necessary.

Learning Contracts

A learning contract is a technique that can be used to individualize the learning process. According to O'Donnell and Caffarella (1990, 134), it is "a formal agreement written by a learner which details what will be learned, how the learning will be accomplished, the period of time involved, and the specific evaluation criteria to be used in judging the completion of the learning."

Marantz and England described their experiences at Empire State College with a learning contract carried out via CMC:

Not only was none of the value of face-to-face contract mode lost, but much more was added. Online together, we developed a learning contract, "Telecommunication in Education: exploring the future," and carried the study to completion using all capabilities of the medium - e-mail, Bitnet communication, database file transfer, a Caucus conference, and Phone "chat" - in a way that enhanced learning for each of us. It involved close reading, intensive discussions and critical argument, a broadly ranging survey of users, and the development of three substantive papers. We found that by maximizing CMC strengths and identifying potential shortcomings, this electronic "distance" study achieved at least as much, and often more, than what face-to-face tutorials provide by way of "close" collaboration and meaningful mutual learning. (Marantz and England, 1992)

Apprenticeships

An apprentice is a learner of a trade who has agreed to work for a number of years in return for being taught. Levin, Haesun, and Riel (1990, 211) stated: "Patterns that we've observed in instructional electronic network interactions resemble those described in face-to-face apprenticeships.... Thus we may see emerging a new pattern, 'teleapprenticeships', with some of the properties of face-to-face apprenticeships."



The skills to be learned by online apprentices are predominantly cognitive in nature. In an article discussing cognitive apprenticeship on global networks, Teles (1993, 271) stated that "Online apprenticeship, also called teleapprenticeship, refers to apprenticeship mediated by access to masters and peers on computer networks.... In this environment, online apprentices can build and share knowledge through goal-oriented learning interactions with peers, experts, and mentors, and through full-time access to specialized sources of information" He further illustrated mentorship and peer collaboration as two approaches to online apprenticeship. In the following, mentorship and peer collaboration is discussed in more detail.

Mentorship: A mentor is a wise and trusted advisor and helper to an inexperienced person. Daloz (1990, 223) stated that effective mentorship is akin to "guiding the student on a journey at the end of which the student is a different and more accomplished person. In a formal learning situation, mentoring functions can be understood as variously providing support, challenge, and vision."

For more than a year, Kort (1991) corresponded by e-mail with a disadvantaged seven-year-old boy in Atlanta. With an average of two letters per week, the transcripts of the correspondence filled a one-inch binder. The exchange format, similar to a Socratic dialogue, was intended to engage the boy in an exploration of scientific material. Kort stated that the boy's literacy and communication skills improved dramatically as his scholarship, attitude toward school, and self-confidence progressed from problematic to exemplary.

Teles (1993, 274) stated that many literature and creative writing classes in Canada provide students with access to online mentors, such as poets, authors, and English professors. In one example, a student submitted a class assignment poem to a professional writer, newspaper columnist, and English professor and asked this mentor for stylistic improvements. The request initiated a one month learning interaction of suggestions, responses, and revisions that resulted in a poem improved in prose, images, and rhythm.

Peer collaboration: An illustrative example of peer collaboration apprenticeship in Digital's corporate network was provided by Gundry:

... that conferencing networks offer the potential for learning outside formal educational channels was brought home to me in the case of a young man who works in our group. This man is 21, and is a specialist in VAX system management, hypermedia, and DECwindows/Motif programming. He joined us four years ago having completed a Digital-sponsored information technology awareness course in the local town, after leaving school at 15 with almost no qualifications. Virtually everything about his specialties that he has learned since he joined Digital has come from participation in conferences. He has attended a couple of formal training courses, but he has gained most of his expertise through conferencing. When he has encountered a work-related problem that he cannot solve himself, his first reaction is to consult the network, and then to search and research for the answer or for someone who can tell him the answer. (Gundry 1992, 173)



Mason (1993, 577) reported that the final assignment at the Online Education and Training course at the Open University included a peer-assessment exercise. The plan was to give potential online teachers experience of marking online work, but there was a general revolt against the idea of peer-assessment. According to Mason, two possible reasons for this could be that the students had reached their limits of experimental tolerance or that they resisted more self-directed work.

Teles (1993, 277) related *Writers' Link*, a program where grade four students wrote short stories and submitted them to online peers for revision. Review groups of three to five students gave feedback to the authors. With the support of their classroom teachers, the reviewers identified several aspects of the stories that should be praised and criticized. Through this process, both authors and reviewers learned about revision and sentence structures.

Tillyer (1993) described his experience with e-mail pen pals to be very satisfying. Tillyer enlisted a group of sociology students from Arizona State University as pen pals for his upper level English as a second language (ESL) writing class at City College of New York. The ESL class used a cultural anthropology reader as the text and the sociology students as consultants. Tillyer concluded that e-mail was satisfying to the students because it allowed them to write something that was meaningful both to themselves and to their pen pals.

Dagiene (1993) reported on peer reviews of computer code in a project of distance teaching of Informatics at the Lithuanian Young Programmers School. In this project, the team solutions to a programming assignment were distributed to all teams for examination and evaluation. Each team was asked to choose some of the solutions for detailed examination and evaluation according to a given set of rules. Dagiene concluded that distribution of the solutions ensured cooperation among distance students.

Internships

Internship is a technique allowing students to practice a future profession under the guidance and supervision of qualified professionals. Presenting the experiences with international electronic communication projects at Preston College, in the United Kingdom, O'Donoghue (1993, 637) reported that he introduced student-centered in-service training to reduce faculty workload. Reporting from the experiences teaching an upper secondary biology course in Norway, Sande and Eide (1993) stated that computer conferencing facilitates the use of students as assistant teachers. They further stated that the student teacher scheme worked very well and that the students looked forward to their weekly teaching assignments.

Wired, a California-based magazine, announced an online internship this way: "If you love net.stuff, are Unix literate, and want to help us migrate Wired from paper to electrons, this internship is for you. Lousy pay, fabulous opportunities. Please send resume and references to: online-nerd@wired.com (no snail-mail, fax, or carrier pigeon submissions, please)." (Wired 1994, 70)



Correspondence Studies

One definition of correspondence study was suggested by Moore (1990, 346): "Correspondence study is that form of distance education in which the learning is directed or facilitated through communications in print and in writing, although these communications might be supplemented by other media."

Comparing traditional correspondence assignments with online correspondence assignments at NKS in Norway, Fjuk (Fjuk and Jenssen 1992, 6 and Fjuk 1992, 34) reported that online correspondence may be faster and that it has the potential to be more efficient if the teachers utilize modified standard response files. However, teachers with experience from traditional correspondence courses complained about inconvenient procedures for file transfer and a lack of possibilities to annotate and comment with "red ink". The same observation was offered by Kaye (1989, 17). He stated that in written correspondence tuition tutors should evaluate, annotate, and grade written work submitted by students. Hence, there are certain advantages to using paper - students receive their work back with the tutor's comments and annotations against the relevant parts of the text. When assignments are submitted electronically, current CMC systems require the student's text to be sliced into a series of discrete messages so that the tutor can include text-based comments.

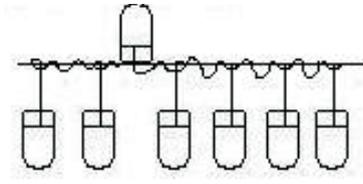
The Electronic University Network (EUN) provided a framework of communication services and administrative procedures for organizations that offered distance education courses online. Courses and programs from several traditional colleges and universities were available through the EUN. The EUN did not provide computer conferencing for group communication, just e-mail for one-to-one communication between the student and his tutor. For each course, the students received Protege, a software package comprising communication software, a text editor, and a course-specific module. The tutors used another software package called Mentor. The EUN lacked group communication facilities. Without these, the EUN may be regarded as a distance education organization that had upgraded traditional correspondence courses to more immediate e-mail courses. (Electronic University Network 1991)

Hoffman (1993, 393) described the following six kinds of e-mail feedback that were used in second language professional courses at the City Polytechnic of Hong Kong.

1) Response to questions about assignments, 2) teacher comments inserted in passages in which students asked for critique, 3) teacher comments inserted in assigned drafts, 4) elaboration on responses to questions, 5) information for individuals or groups of students, and 6) summative comments and grades. Comparing face-to-face teaching and e-mail, Hoffman concluded that e-mail appeared to produce more effective and expanded feedback for students, fuller exploitation of the principles of process writing, and greater satisfaction for teachers and students.



One-to-many Techniques: The Bulletin Board Paradigm



The techniques discussed in this section are characterized by presentation to students by one or more individual experts or by interacting experts. The learners are usually not invited to take part in the interaction, so the communication is typically conducted in a conference or bulletin

board system where students have read only access. The techniques discussed are lecture, symposium, and skits.

Lectures

In a concise description of a lecture, Knox (1987, 87) stated that a lecturer is an “expert [who] presents participants with an organized in-depth presentation, often accompanied by audiovisuals and questions and answers.”

In a CMC system, a lecture could be presented as text posted to a bulletin board. It could take the form of complete articles, excerpts of articles, study guides, outlines, or statements that prepare later discussions. The technique could be especially useful when a guest expert is invited to contribute to a part of a course.

A very early example of an online lecture was described by Hiltz (1985, 11) who conducted an intensive “electure” (electronic lecture) for about 100 participants on the Source in the Fall 1982. The lecture was presented in sections of one to two pages each, and one section was added each day for a week. Each segment was followed by balloting and discussion. After the experiment, the evaluators concluded that the “electurer” tended to take a less dominant role than a face-to-face lecturer, and that computer conferencing made the post-electure interaction less of a question-and-answer period and more of a free-for-all discussion.

In a study of conferences at NKS in Norway, Johnsen (1992, 88) described the use of lecture conferences. The best example was the Public Administration conference, which had just 26 notes; the teacher posted 18, and the ten students posted the remaining 8. The lecturer dominated the conference completely, posting contributions that were several pages long every second week. The total number of lines posted to this conference equaled another conference with 170 notes.

In an article describing his experiences in teaching three computer programming courses for the humanities via Bitnet, Johnson (1993) found that the students had to be allowed to work at their own pace. He uploaded all lectures, data files, exercises, and solutions onto a network listserver and allowed the students to retrieve them whenever they preferred. In conclusion, Johnson (1993, 5) stated that “there is no doubt that it is worthwhile to offer courses such as Computer Programming for the Humanities via computer networks because students can thus complete classes that would not be available to them in any other way.”

Harasim (1987, 132) argued, though, that delivering lectures online is awkward,



because it requires instructors to write and students to read much text on a screen. Hence, online lectures would not likely be attractive to students or instructors. As the technology has improved, more and more lecturers publish their PowerPoint slide presentations on the Web. Some have also started to publish audio- and video recordings of their lectures on the Web.

Symposiums

Sisco (1990, 285) defined a symposium as “a series of presentations given by two to five persons of notable authority and competence on different aspects of the same theme or closely related themes. The symposium tends to be formal in nature because of the authoritative presentations. However, once the presentations are given, questions are encouraged and accepted. Rarely do the invited speakers converse with one another and almost never does one of them interrupt another during the formal presentation of ideas. A program chair typically organizes the symposium and is in charge of the actual proceedings.”

The Bangkok Project (Anderson 1993, Anderson and Mason 1993) was organized as a pre-conference to the 16th ICDE World Conference on Distance Education held in November 1992 in Bangkok, Thailand. The project was an experimental venture aiming to link distance educators on all major electronic networks. Presenting the project, Anderson explained:

“Six internationally renowned scholars volunteered to serve as ‘First Speakers’. The First Speakers started each of the 6 topics by uploading 5-7 screens of information and issues for discussion. A volunteer host served each topic discussion as facilitator and moderator. The information provided by the First Speakers, as well as subsequent questions, comments and rebuttals was distributed across a group of between 20 and 30 different computer conferencing systems or networks by volunteer ‘porters’ who screened or filtered information provided by participants for relevancy and coherency.” (Anderson 1993, 32)

During the six-week symposium, about 240 messages were posted by various participants in: “at least twenty states of the United States, from five different sites in Canada, from several parts of Australia and the United Kingdom, and from New Zealand, Norway, and Venezuela.” (Anderson and Mason 1993, 12). Finally, the authors concluded that: “electronic networking can provide cost-effective, yet meaningful, interactions among distance education professionals.” (Anderson and Mason 1993, 15)

Another example was provided by Davie and Inskip (1992). At a master’s level course on program evaluation offered through the Department of Adult Education at The Ontario Institute for Studies in Education, practicing program evaluators visited the class. With some individual instruction, the three visiting experts were able to use the system (Participate) conveniently and without difficulty. Further, the experts had the opportunity to read the previous course discussion and, hence, adapt their contributions. Davie and Inskip concluded that the experts enjoyed the experience and indicated willingness to contribute in later courses.

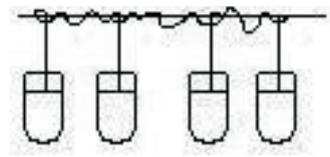


Skits

Laird (1985, 136) defined a skit as: "a prepared enactment, with precise dialogue provided for the 'actors', who are usually students reading their roles from scripts."

In CMC, an instructor could conduct a skit by using more than one user ID. One simple example that could be developed into a skit was provided by (Turoff 1982, 77) who stated that he has on occasion posed as an anonymous student to ask himself the questions he wanted to be asked. He perceived skits as a technique that can be helpful in "breaking the ice" with a new class.

Many-to-many Techniques: The Conferencing Paradigm



A characteristic of the techniques presented in this section is that all participants have the opportunity to take part in the interaction. Such interaction is the most common application of educational CMC and it can be facilitated in open or closed computer conferences. The techniques discussed

are debate, simulation, role-play, case study, discussion groups, transcript based assignments, brainstorming, delphi technique, nominal group technique, forum, and project group.

Debates

Seaman and Fellenz (1989, 65) wrote: "A debate is a structured discussion during which two sides of an issue are presented and argued by two or more individuals within a given time period." Knox (1987, 88) offered another explanation: "Similar to a lecture or panel, but two or four debaters argue two sides of an important issue to clarify differences and related reasoning."

Clark (1992a and 1992b) organized a CMC debate about war protesters and freedom of speech in February 1991 as a part of the *What's in the News Telecomputing Project* at Pennsylvania State University. The participants were fifth and sixth graders in two local schools. The debate centered on a proposition that stated United States citizens should not stage protests in times of war. Before the debate, neither team knew which position it would be assigned, so each had to research the issue and learn as much as it could about both points of view. The affirmative side supported the proposition and the negative one challenged the affirmative one. The object of the debate was to see which of the teams could do a better job of presenting the case. Two students from the university debate team and a doctoral student in history were enlisted to evaluate the debate.

Clark (1992a, 58) offered these guidelines for an electronic debate with regard to participation, preparation, coordination, and evaluation:



- *Participation.* A debate could engage two classes that agree to participate actively, two teachers who know how to telecompute, one impartial coordinator who knows how to telecompute, an experienced debater to help students learn the process, and two or more evaluators familiar with the proposition.
 - *Preparation.* Give the coordinator a list of curriculum-related issues, become familiar with the evaluation criteria, and decide whether a winner will be declared. Set up speech deadlines within a four-week framework, and agree on a maximum word length for each speech. Organize classes into teams by role or by speech, and have groups research both sides of a proposition
 - *Coordination.* The coordinator should formulate and announce the proposition, randomly assign groups to affirmative or negative, and channel speeches between the two sides. Further, the coordinator should mediate the debate, keep team identities secret until after the last speech is sent, and enlist evaluators and manage the evaluation process.
 - *Evaluation.* After the debate, feedback from the evaluators could be discussed and students could exchange comments on the issue and process.
- Clark (1992a, 58) also recalled the sequence of debate events:

Day 1: Topic received
 Day 4: Sides assigned by coordinator
 Day 5: Material from speech I reviewed
 Day 7: Opposing speech I received
 Day 11: Speech II sent
 Day 12: Opposing speech II received
 Day 14: Rebuttal sent
 Day 15: Rebuttal received, teams identified
 Day 17: Participants exchanged e-mail about themselves

Simulations or Games

Simulation can be explained as “imitation of interpersonal or other dynamics, often using materials and roles, to help participants feel as well as understand the dynamics of a complex situation.” (Knox 1987, 89)

Discussing simulation and CMC, Hiltz and Turoff stated:

The major defect that most games exhibit, especially educational ones, is that the communications actually used in the face-to-face game environment usually do not reflect the real world. By putting the game into a computerized communications environment, we can program the structures for communications that the game implies. This may include which players in the game can talk to whom and in what circumstances; costs or resources that must be expended for communications; leaks of communication; rumor simulation and unanticipated breakdowns or



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busy signals. The computer can act as the game controller, scheduling the events to occur and providing the outcomes based on the actions the role-players take. One very significant aspect of this flexible degree of control is the ability to control the clock. Because of this, the game can be played in a regulated time manner (such as every week of play representing a year) or in real time. There are many games where playing in real time rather than accelerated time would be beneficial to enhancing the realism, including some of the disaster type games designed to educate people on how to deal with crisis situations. Since people can interact at a time of their own choosing, a computer-based game can go on over days, weeks, or months, just as for a computerized conference. (Hiltz and Turoff 1978, 308)

An excellent example of simulation was the Management Practices course taught via the Electronic Information Exchange System (EIES) by Hsu (1989 and 1990) at the New Jersey Institute of Technology. This course integrated a *Business Simulation Game* with computer conferencing in a Management Practices course. The students were divided into six groups of four students. Each group represented a company, and each student was assigned a role as CEO, Financial Officer, Operations Chief, or Marketing Executive. These companies competed against each other in a Business Simulation Game, through three phases of the companies' life cycles (start-up, growth, and independence). The game simulated nine years during nine weeks of the course. Each year the students "employed" in each company established crucial input data, such as price, advertising, purchase, production, size of sales force, and so on. The data was submitted to the instructor, who compiled it and executed the game. This process resulted in a set of output data for each company, consisting of units sold, back orders, market share, operating income, income tax, net income and so on. The companies were evaluated based on the final results after nine years. Each company was assigned a private conference in which the employees could discuss the simulation input and output data. In another conference, called *Managers' Corner*, the students could participate in management-related discussions.

Another example, described by Rawson (1990), was the *International Business Negotiation Simulation (IBNS)* course. The course was developed jointly by the University of Maryland, University College and the University of Maryland, College Park. The simulations consisted of three half-day workshops, each of which used a computer conferencing-based simulation to teach business executives how to negotiate successfully in a specific cross-cultural business environment. The course setting comprised five nodes:

1. the United States company negotiation team at a U.S. site;
2. the overseas company negotiation team, located in the overseas country;
3. the U.S. company headquarters;
4. the overseas company headquarters; and
5. the simulation manager.



The program planners acknowledged that stress and timing are often important factors in negotiations and that traditional, asynchronous conferencing can hardly provide a trustworthy simulation of these important negotiation factors. To ensure that these aspects of negotiation were addressed, the IBNS course used virtual synchronous computer conferencing. The information was technically stored and retrieved as in traditional asynchronous conferencing, but the interactivity approached synchronous conferencing because the participants were present at scheduled hours and were urged to respond quickly.

The *Earth Day Treasure Hunt*, described by Levin, Toth, and Douglas (1993), involved students from twenty sites. Each classroom was asked to write up five or six treasure hunt clues describing a geographical place. The clues were to describe a particular location on earth such as a city, a mountain peak, a lake, etc. and they could include information about latitude, elevation, climate, vegetation, industry, ecology etc. According to Levin, Toth, and Douglas (1993, 558), there were six steps to the Treasure Hunt:

1. Students at each site e-mailed clues describing the location along with the answer to the organizers.
2. The organizers arranged the clues and added map location clues.
3. The clues were sent to the participants a few days before Earth Day.
4. The treasure hunt was conducted on Earth Day and the participants e-mailed a progress report with the locations discovered within one week to the organizers.
5. Results from all participants were summarized and returned.
6. A Merit Certificate was mailed to all participants.

Levin, Toth, and Douglas (1993, 560) concluded that most participants enjoyed the Treasure Hunt and commented on the educational value of such projects.

Role-plays

According to Rothwell and Kazanas, role-play is "a range of methods in which trainees put themselves in dramatic situations and act out scenes like actors in a play.... There are essentially two kinds of role-play: structured and spontaneous.... Structured role-play is based on a case study.... Spontaneous role-plays are based on momentary experiences." (Rothwell and Kazanas 1989, 415)

A very early example of role-play, carried out in a Fund for the Improvement of Post-Secondary Education (FIPSE) course, was reported by Hiltz (1986, 98). During the course, a complex setting was described, and the students were assigned roles to play. Each of them was given additional information describing the role he or she was asked to play, and they could use a pen name if they preferred anonymity. Hiltz argued that such role-playing games are usually hard to organize in large classes and that participants may feel too shy or too time-restricted to participate effectively in realtime role-plays.

In their 1978 book, *The Network Nation: Human Communication via Computer*, Hiltz and Turoff (1978, 307) argued that games and role-playing is "one of the most promising exploratory subjects" for computer conferencing.



They further stated:

Once the group has compiled item lists (such as roles, action options, consequences, and environmental factors) and the relationships among these, we can incorporate the design of a generalized game controller that will allow the generation of an event-sequenced scenario-game in (computer conferencing) form. This means that the group can play out the “world” model or Gestalt that resulted from their contribution of judgments and views. Such a result also becomes a helpful vehicle for conveying to others what the group has arrived at and discovering if others agree or disagree.

Further, Hiltz and Turoff (1978, 309) stated:

The role-playing could probably be done more realistically through the computer than in some of the face-to-face acting games used, especially if the student were not able to tell which of the other players were students, faculty, or real-life job-holders playing at their convenience from their own terminals.

Goodman (1992) described how the University of Michigan used the Confer CMC system to involve schools around the world in two different role-plays. In *The Arab-Israeli Conflict Simulation*, groups of students were assigned roles as countries in the Middle East, the United States, and the U.S.S.R. Other groups took on roles as representatives for the West Bank, the PLO, the Moslem and Christian factions in Lebanon, and so on. In *The United States Constitutional Convention Role-play*, historical figures who played important roles in shaping the U.S. constitutional history were revived to discuss the Constitution. Groups of students played the roles of Thomas Jefferson, Martin Luther King, Jr., and so on.

Ragsdale and Kassam (1993) described the *International Communications and Negotiations Simulation* (ICONS) project at the Teletech School in Ontario, Canada. The Teletech school had many newly arrived immigrants among the students and in the simulation, students became negotiators representing their countries in a series of issues. The issues negotiated were arms control, international economic problems, nuclear proliferation, and human rights. The simulations took place in the Confer system at the University of Maryland and they continued for several months. The first weeks were spent in preparation, the actual simulation took four weeks, and the last few weeks were spent on the debriefing. Ragsdale and Kassam (1993, 681) argued that the students were given specific tasks and that they were evaluated in well-defined ways. They further stated that the simulation was a success as far as the students did negotiate and they did produce solutions that were included in student papers.

In the fall of 1988, Johannesen taught an Information Systems course via the EKKO conferencing system (Paulsen 1992f, 28). In a conference, she introduced an assignment that described a company planning to invest in a new office automation system. The students were assigned roles as user, accounting officer, project manager, labor union representative, and so forth. Over a period of about fourteen days, the students were to elucidate the different facets of this project reflected through the different roles.



Manuel (1991, 22) reported on a role-play initiated to discuss the extension of Hertbury airport in the United Kingdom: "Nine teams had been assigned terminals at the various schools which have access to Education 2000's electronic conferencing system, known as Ebenezer. Each team was assigned a character such as Sidney Primrose, managing director of Herts Road Haulage, Sir Peter and a handful of environmental busybodies." Further, Manuel (1991) pointed out that CMC role-playing is easily monitored and stored for later analysis and that it is useful for long simulations.

The Tall Pines Fantasy Role-play was another documented example. Here, each student assumed the role of one of the authors presented in the class readings and defends the author's positions. Comparing CMC role-plays with face-to-face role-plays, Davie and Inskip (1992) argued that the extended time in CMC courses allowed the role-plays to be more comprehensive. In addition, the simulated discussion between the "authors" helped the students to understand the theoretical positions represented.

The Planet Project was an application of e-mail centered round the imaginary planet X where school children played roles as space voyagers who settle on planet X. There they invent topography, mythology, etc. and share experiences, problems and decisions with "voyagers" from other schools via e-mail. Clifford and Warren (1993, 151) argued that the children stretched their use of language and form because they had to use their language to create the reality of planet X.

Case Studies

A case study can be explained as a "discussion of a prepared case situation, which helps participants understand and practice problem-solving and decision-making procedures" (Knox 1987, 89). An alternative explanation was offered by Seaman and Fellenz (1989, 111): "Generally [case study] refers to a description of a real and relevant situation that is complex enough to warrant analysis". Marsick (1990, 226) stated that cases typically include three interrelated components: a case study or report, case analysis, and case discussion.

Rasmussen (1993) described some experiences from Nordreisa upper secondary school in Norway using *The My World is Your World Case Study* in teaching English as a second language. The case was based on the UN report *Our Common Future* by the Brundtland Commission and sponsored by The Netherlands' UNESCO Committee. Schools from countries such as the USA, Australia, England, Indonesia, The Netherlands, Russia, New Zealand, and Norway participated. The schools received a videotape and the Brundtland report along with a case description and a schedule. The case introduced these three rounds of topics:

- What do we see as key-problems in our environment?
- Do we all have similar problems? Does my lifestyle affect your environment?
- What has to be changed?

For each round, the topic was analyzed in the local classrooms. Then the analysis was distributed via e-mail to the participating schools for discussion. According to Rasmussen (1993, 693), there was no doubt that international e-mail is a rewarding activity for most



students if it is well organized. He also stated that the work emphasized student independence and an investigative attitude. He further described the role of the teacher as that of an adviser, helper, and administrator.

Discussions

Knox, (1987, 88) explained discussion this way: "Participants exchange ideas face-to-face on a topic of shared interest in a group typically between six and twenty for about an hour, depending on topic and group size." Discussion groups may be implemented as buzz groups, subgroup discussions, expanding groups, and colloquies.

Buzz groups are "small clusters of learners who are temporarily grouped together for a short period to address a topic presented by a facilitator." (Seaman and Fellenz 1989, 131)

In subgroup discussion, the "audience divides into small subgroups for discussion of ideas presented, questions for speakers, implications." (Knox 1987, 88)

The *expanding group strategy* "allows the size of the group to change during an activity. Groups start with a small number and are increased in size with each round of activity." (Seaman and Fellenz 1989, 130)

In a discussion of *colloquy*, Seaman and Fellenz (1989, 139) stated: "A simple definition of the word colloquy is "to talk with." As a structure for a learning situation it retains this basic notion of talking together but establishes a format that makes such conversing feasible among members of a large audience."

These discussion group techniques can be employed by establishing separate conferences or e-mail distribution lists for each of the groups. In some systems, the participants can establish these groups themselves, in other systems this has to be done by a system operator. The grouping often necessitates thorough planning and explanation.

In a comparative study of communication process and outcome in face-to-face groups versus computer conferencing groups, Hiltz, Johnson, and Turoff reported that:

There were two to three times as many communication units in the face-to-face groups consisting of five members each as in the computerized conferencing mode of communication during the same elapsed time. Group decisions were equally good in the two modes, but the groups were less likely to reach agreement in the computerized conferencing mode. There were proportionately more of the types of task-oriented communication associated with decision quality in the computerized conferences. (Hiltz, Johnson, and Turoff 1987, 225)

Cooper and Selfe (1990) reported their experiences with computer conferencing during two years of graduate and undergraduate courses at the Michigan Technological University. There the students were asked to discuss course readings and issues. Cooper and Selfe stated:

At their best, these computer conference discussions are what we often hope in-class discussions will be: discussions in which everyone investigates problems and



ideas of common concern. The discussions are focused on the topics of the course and explicitly bring in ideas presented in the readings. But because entries in computer conferences are written, students do not have to compete for the floor and can say as much as they want to without being interrupted, although they still must be responsive to the interests of their classmates if they don't want to be ignored. (Cooper and Selfe 1990, 848)

Reporting from two online graduate courses at the Ontario Institute of Studies in Education, Harasim (1987, 133) concluded that collaborative group learning based upon group discussion and interaction among learners was effective online.

Facilitating an online discussion is in many ways similar to facilitating a discussion using face-to-face techniques. According to Carlson, the facilitator needs to:

help people get started, give them feedback, summarize, weave the contributions of different folks together, get it un-stuck when necessary, deal with individuals who are disruptive or get off the track, bring in new material to freshen it up periodically, and get feedback from the group on how things are going and what might happen next.... (Further, the facilitator needs to) communicate with the group as a whole, sub-groups, and individuals to encourage participation. (Carlson 1989, 6.11)

Based on his experiences as designer and facilitator of online courses at The Ontario Institute for Studies in Education (OISE), Davie (1989, 83) reported that he introduced two group assignments in a course rather than only one. First, Davie presented a short assignment for groups of two students. Then, he combined pairs of learning partners into groups of four or six. Davie further contended (Davie 1989, 84) that students liked the experience of writing together and that they found two strategies helpful. The first was to log on to the system at the same time to speed up the communication process, and the second was to pass drafts of papers back and forth.

Phillips, Santoro, and Kuehn (1988) described the use of CMC in a small group performance course. They argued that instruction in such courses is often ineffective because of the instructors' inability to effectively monitor group discussion. Using a computer network has three benefits:

1. instructors can closely monitor progress in the groups;
2. students receive detailed feedback about their performance of communication skills in their groups; and
3. the instructional staff can increase their monitoring efficiency to effectively advise more groups than in non-computerized group performance courses.

Albrektsen (1995, 105) concluded, from a Listserv-based test that merged a resident school course in church history with a distance learning module, that the technique has "enormous flexibility and educational integrity in its online form. While more research needs



to be done, it seems likely that [the technique has] the capability to provide an educational experience equivalent to methodology and outcome to those conducted live in an on-campus setting."

Another example of discussion groups was described by Johnson-Lenz and Johnson-Lenz (1990) in an article about *The Living on Purpose Course*, offered as a collaboration between Chinnok Learning Center and Living on Purpose. Before the course, the participants signed a covenant to keep each other's items confidential. Online, as a part of the course, participants answered questions such as "What is important in your life?" and "What do you think of yourself?" Participants must scrutinize their lifestyles to formulate answers to share - in writing - with the group. Many people found it less frightening to share their inner feelings and thoughts via computer conferencing than to do so face-to-face. In this way, technology may facilitate valuable human interaction between people who feel comfortable with the medium. In the course, "a talking stick" that represented permission to speak was passed around a circle. Each person spoke his or her truth in turn while everyone else listened with respect. This virtual circle concept encouraged everyone to express opinions and avoid reticence.

Based on his experiences from a graduate program offered through computer conferencing at Boise State University, Easley (1991, 38) described the following thirteen discussion formats for CMC that could help to keep discussions focused, productive, and interesting:

1. *The critique.* The students could be asked to point out the strengths and weaknesses of a proposal and then suggest improvements. It is possible to ask the students to restrict their contribution to one or two comments so that the critique is not exhausted before all students have commented.
2. *The group report.* A group of students could work in a restricted conference. A summarized report from the work could be presented in a public conference and followed by questions from the other students.
3. *Twenty questions.* The moderator could act as a client and ask the students to narrow down the client's needs through an interview.
4. *The poll.* The moderator could pose a question and ask the students to register their votes on the issue by posting an e-mail message to the moderator.
5. *Timed disclosure.* The students could be asked to review an article or comment on an issue and post it to the teacher via e-mail before a deadline. At a certain point in time, the teacher could share all the comments with the class. In this way, students could make their first contributions without too much influence from dominant peers.
6. *The assigned debate.* Students could be assigned to affirmative and negative positions and asked to debate an issue.
7. *Free association.* The students could be asked to express their thoughts and ideas on a subject without too much structure of the discussion format.
8. *The hot seat.* One student could be asked to "sit in the hot seat" and the other students could be asked to pose questions to him or her on a specific topic.



9. *The Socratic dialogue.* First, the teacher could ask a question, then one student could answer it, and then the teacher could ask a new question. In this way, every other comment would be from the teacher.
10. *The shotgun.* The teacher could post a number of related questions at the same time. Then, each student would be asked to answer whichever ones appeal to him or her.
11. *Go around the circle.* Each student could be asked to respond to the same question, and when all students have contributed, the topic could be closed.
12. *Guided discovery.* The class could be asked to pose questions about a research report so that the teacher could reveal the results when the students hit on questions that were addressed in the research.
13. *Blind man's bluff.* The moderator could pose a purposely misleading statement and let the students discover the false premise through discussion.

Transcript-based Assignments

Davie (1987, 14) stated that "one of the main advantages of a computer conference is that the medium provides a complete transcript of the course interactions". Building on this observation, Davie and Wells (1991, 21) suggested the following three types of transcript-based assignments to promote student reflection:

[First,] students might be required to retrieve all the comments they authored during the course. The assignment could then ask the students to reflect on their contributions and provide a statement of the overall framework or perspective embodied in them.

A second possibility is to ask students to pull together all the comments related to a particular topic and to write an essay discussing which comments they agree with and why, or to critique the comments from the perspective of a particular theory.

A third possibility is concerned with improving the student's analytic and writing skills. Too often, students write to please the teacher. This contribution is graded and then ignored by both parties. Instead of this dead end process, students can be asked to retrieve an earlier note or assignment and rewrite the work either to make it more effective, or to reflect the current state of learning. This kind of recursive learning can help the student to build skills in a way that is simply not feasible in the face-to-face classroom. (Davie and Wells 1991, 21)

These techniques resemble the traditional observation team techniques described by Seaman and Fellenz (1989) as listening teams, audience reaction teams, and fishbowls.

Listening teams are "small groups of learners who are assigned to listen for specific information during a presentation. The assignment of topics prior to the presentation provides the listener with a structure for organizing the information presented. The division of labor among several individuals or groups allows the listeners to specialize in one aspect of the presentation with the assurance that others are critically analyzing other aspects of the presentation. Through discussion after, all points of the presentation are shared." (Seaman and Fellenz 1989, 137)



The audience reaction team technique is similar to the listening team approach. However, "members of an audience reaction team need not restrict their remarks to the end of a presentation. They may interrupt the presenter at any point to seek clarification or to direct the trend of the presentation to the needs or interests of the audience." (Seaman and Fellenz 1989, 138)

The fishbowl technique was explained this way by Seaman and Fellenz (1989, 130):

"The fishbowl strategy involves group members in observations of one another. It derives its name from the analogy of people observing the activities of fish within the controlled environment of an aquarium or bowl. While some group members discuss a topic or perform a behavior related to the assigned task, other members observe them.... After the active group members have completed their activity, the observers will provide feedback to the group."

Discussing the DT200 course at the Open University, Mason (1993) reported that the students had to write a summary of the course conference. The summary was to focus on the most important aspects of the discussion and on significant aspects that were not included in the discussion. Mason concluded that the assignment turned out to play a very significant part in the educational value of the course. She pointed out, however, that writing a summary of about 100 conference messages is harder than summarizing a book or a lecture because of the relatively "chaotic" structure of a conference.

Brainstorming sessions

One definition of brainstorming is "an interaction strategy used to generate ideas or to help determine the exact nature of content to be discussed. This approach encourages group members to think creatively and to expand upon ideas of fellow group members. The primary purpose of brainstorming is to create a pool of ideas on a topic." (Seaman and Fellenz 1989, 134)

Hiltz and Turoff (1978, 300) stated that in brainstorming, criticism is ruled out, free-wheeling association is welcomed, quantity is wanted, and combination and improvement are sought. Further, they suggested that a computer conferencing system "designed to optimize brainstorming would probably limit text items to a small size, might censor items containing negative words and phrases, and utilize stored profiles on individuals to suggest group members. It might also use automated indexing techniques to group and organize items."

One possible adaptation of brainstorming to CMC could be brainwriting which is:

"a modification of brainstorming - based on written communication - that could be adapted to CMC. Two variations are common...: (1) the brainwriting pool, and (2) batelle-bildmappen-brain-writing (BBB). In the first approach, a problem is read to a small group (six is a good number). After group members brainstorm on the problem aloud, they are given several photographs or drawings unrelated to



it. Then they write down ideas suggested to them by the pictures. Solutions are read to the group and used to stimulate more ideas. In the second approach, a problem is read to a group. Individuals scribble ideas on a piece of paper. After several ideas are listed on the paper, it is placed in a pool at the center of the group. Individuals remove different sheets, record new ideas on them, and place them back in the pool." (Rothwell and Kazanas 1989, 437)

Hiltz and Turoff (1978, 301) offered that brainwriting is essentially written brainstorming: "Each person writes an idea down and passes it to a neighbor, who must add to it. These pieces of paper are passed around until everyone has commented on every piece of paper. With slight changes, in most (computer conferencing) systems this would mean passing a comment to each participant in turn, to make a required addition before incorporating it into the conference."

In a description of the IBM internal CMC network, Rueda (1992, 97) presented a brainstorming-related activity that took place over four days in September 1991 on the C-lang forum. The activity was initiated by a request for an elegant method of branching over the value of a character string in the C programming language. In the following interaction, nineteen participants from thirteen locations contributed thirty-five entries and nine distinct solutions.

Delphi Techniques

Referencing Dolkey and Helmer (1963, 458), Rothwell and Kazanas (1989, 438) stated that the Delphi procedure is a technique for "obtaining the most reliable consensus of opinion of a group of experts ... by a series of intensive questionnaires interspersed with controlled opinion feedback. It is used to scan the environment to identify possible changes, their effects, training needs, new work methods and approaches, and issues worth exploring." (Rothwell and Kazanas 1989, 438).

Hiltz and Turoff (1978) distinguished between *forecasting delphies*, in which a group of people come up with a joint forecast, and *policy delphies*, in which the objective is to develop the strongest arguments for or against particular resolutions. They further expected the following advantages to emerge from computerized delphi:

Besides the reduction of elapsed time to carry out a Delphi via the computer, the other significant impact is the ability for the process to flow steadily and incrementally. In other words, forecasting of one variable or one policy resolution can be examined first in computerized conferencing and carried through the whole process. Alternatively, different items could be in different phases of the process according to the wishes for the group. This provides a greater ability for the group to focus its effort and should result in raising the quality of the result. (Hiltz and Turoff 1978, 293)



Some CMC systems include balloting functions that can support the delphi technique. According to Hiltz and Turoff (1985, 687), EIES provides several voting scales that can be attached to comments. Feasibility and desirability scales can, for example, be attached to a project proposal. The system would then automatically count the votes and display the results. In this way, a delphi group has a tool to make a quick determination of the issues on which they need to focus discussion.

Waggoner (1992) described a computer conferencing delphi that was conducted by a consortium of eight intermediate school districts in Michigan. The consortium examined the question: "What will be the impacts of high technology on the content, delivery, and organization and administration of instruction (K-Adult) conducted by local and intermediate school districts over the next five years?" (Waggoner 1992, 160)

The study contained three components: "a statewide teleconference, a national delphi study, and a future scenarios workshop.... The delphi study was intended to develop forecasting and planning data about a range of questions by explicating the opinion of a nationally distributed panel of experts on technology and education." (Waggoner 1992, 160)

An elaborate, thirteen-step delphi process was developed and implemented, employing eighteen paid experts and the Confer computer conferencing system. Each expert was initially asked to identify and elaborate on the significance of the three most important technological trends or products that will influence education. The responses were compiled into thirty-five issues, and the experts then voted and commented on each of the issues. For a further clarification of some of the issues, nine of the issues were entered into a second round of votes and comments. Finally, the delphi process was synthesized in a set of fourteen findings. Summing up, Waggoner concluded:

"The group found the potential to be greater than was achieved in this particular case. This was so despite the fact that the group was quite satisfied with the other participants, that the process was clearly communicated, and that they were relatively comfortable with the medium (use of computers and terminals)." (Waggoner 1992, 180)

Nominal Group Techniques

Seaman and Fellenz (1989, 136) stated that the term nominal group technique "comes from its use of participants as individuals - only nominally (in name only) as a group - for the initial stage of idea generation. This approach calls first for the silent generation and priority ranking of ideas by each group member. This is followed by a public listing of ideas usually by asking for each person's top-ranked idea and then moving on to second- and third-ranked ideas until everyone's list is exhausted.... Once this is completed, group members are allowed to discuss the ideas.... After the discussion, a vote is taken in which group members are asked to rank the ideas that have been generated."

A more thorough discussion of the nominal group technique was presented by Korhonen (1990, 247-259). Hiltz and Turoff (1978, 294) noted that the first stage of the technique



could be handled by computer conferencing “without the uneasiness that sometimes accompanies sitting around a table and looking at one another without talking.” They further (Hiltz and Turoff 1978, 289) imply that computer conferencing is well suited to handle anonymity and that “the introduction of anonymity is ... one of the strongest techniques to prevent conformity to group pressures.”

The University of Auckland has developed a groupware system to support synchronous group sessions, and Sheffield and McQueen (1990) reported on the experiences from a management course exercise using the groupware. Two groups of ten students took part in an assignment using the Nominal Group Technique. One of the groups utilized the groupware, the other group used traditional tools such as wall-mounted sheets of paper and felt markers. Both groups expressed satisfaction with: “the technical and the socio-emotional aspect of the discussion” (p. 181). The students using the groupware completed the assignment in less time than the other students, and as the result of the groupware process, they developed a written assignment report.

Forums

A forum can be explained as a technique where “participants question and discuss the presentation as a total group.” (Knox 1987, 88). Alternatively, a forum can be defined as “an open discussion carried on by one or more resource persons and an entire group. It is used when large groups of twenty-five persons or more meet for the purpose of diffusion of knowledge, information, or opinion. The forum tends to be semiformal in nature and is directed by a moderator. The moderator is responsible for guiding discussion during which the audience is encouraged to raise and discuss issues, make comments, offer information, or ask questions of the resource person(s) and each other.” (Sisco 1990, 285)

Forum is a common use of computer conferencing systems in education. Several systems, among them Compuserve, actually use the term Forum as the name of their conferences.

Describing the experiences from a course about distance education and CMC at the University of Oslo in the spring of 1991, Jenssen (1992, 13) reported on a traditional use of an informal CMC forum. First, the moderators and the participants were asked to introduce themselves. Later, the system was mainly utilized as a forum where participants could post questions and receive answers. In addition, the moderators used the forum as a channel for distribution of information. The moderators had not planned any structured discussions and just a few longer threads of spontaneous discussion emerged.

Projects

In Andersen et al (1987, 15), a project was defined as a human endeavor which creates change, has composite goals and objectives, is unique, is limited in time and scope, and involves a variety of resources, with different skills, responsibilities, and competence.

Sligte and Meijer (1993, 798) reported that the European Schools Project (ESP) has expanded to over 200 secondary schools and educational institutions in 20 countries involving hundreds of projects. Many of the ESP projects, called teletrips, had primarily a language-focus.



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Riel (1990) described her experiences from the AT& T Learning Network regarding a form of projects she termed “electronic learning circles”. She defined a learning circle as a small number of classrooms that interact electronically to accomplish a shared goal in which each classroom acts as a team that contributes to the overall end product (Riel 1990, 450). The following five steps of interaction were suggested:

1. Teachers and students select a project topic and start communicating electronically with the classrooms with which they are grouped.
2. Each classroom plans a learning task and forwards the plans for discussion within the learning circle.
3. The students work closely with peers in their local classroom as well as with students in distant locations to carry out the learning activities.
4. Each classroom collects, analyzes, and arranges materials for a project report. The reports from each of the projects are compiled into a collective publication of project reports.
5. The collective report is distributed to all participants.

Riel (1990, 452) further claimed to have provided educational support to hundreds of teachers in learning circles. She also stated that the circles helped teachers and students acquire knowledge, develop teaching/learning strategies, increase self-esteem, and develop meaningful relationships.

In a later article relating her experiences from the AT& T Learning Network, Riel described global education through learning circles and stated that the aim of global education is “to help students see the complexity of the world through the eyes and minds of people whose viewpoint is very different than their own” (Riel 1993, 221). She further stated (Riel 1993, 223) that learning circles provide “an effective way to integrate communication technology, classroom curriculum, and the aims of global education.”

In the global education learning circles, six to nine classes formed a learning circle. Teachers and students sharing academic interests but representing different geographic or cultural perspectives constituted a circle. Each class, together with its teacher, chose and taught one of the projects in the learning circle. Donath (1993) described the AT& T Learning Network experiences of a 9th grade German class that chose a project on xenophobia. The advantages of this and other projects were summarized in this way: “English as a foreign language is used in a realistic communicative situation with mainly native speakers while the topics are interesting enough to be researched locally and discussed internationally. The motivation is not only based on the communicative situation but on the autonomous learning principle as well.” (Donath 1993, 209).

In addition to the previous German project, Riel (1993, 229) mentioned these project examples:

- Students in British Columbia, Canada asked the other classes to contribute on environmental issues for a collective newspaper.



- California classes discussed the whaling industry with Eskimo children.
- An elementary class in Canada integrated weather and pollution data from the United States and Australia in a project on weather patterns and the greenhouse effect.
- Students in Belgium chose a project on waste management.

Riel (1993, 223) stated that: "Studies of network projects have found an extremely low success rate (1-2 percent) among projects that are introduced by individuals on open structure, free-access networks". Learning circles, however, "provide teachers with the necessary direction and support to explore creative ways of integrating communication technology with school curriculum and community programs. The project approach to exploring and solving real problems that characterizes learning circle activities encourages the integration of different subjects helping to place knowledge and skill in the context of their use in the adult community." (Riel 1993, 234)

Finally, Riel (1993, 235) claimed that teachers involved in learning circles regarded "their own professional development as more significant than the enhancement of student learning."

Another example is the NKI Electronic College Project Assignment Course, taught via the EKKO system by this author, in the 1991 spring semester (Paulsen 1992a, 8). The course work involved collecting information, both by doing interviews and a literature search. An important goal was to make the students accustomed to project management and cooperation. A second main objective was to teach students to produce a written report of the project results. The students were encouraged to find a project related both to knowledge obtained through the NKI Program and to their job. They were asked to form project groups of one to three students.

Each student received two Norwegian textbooks through regular mail. "Goal Directed Project Management", also available in English (Andersen, Grude, Haug, and Turner, 1987), is a general-purpose textbook for project management. It emphasizes that project development comprises people, systems, and organizations. The other book was written as a guide to project work for on-campus students at the NKI College of Computer Science. In addition to the textbooks, the students received a fifteen-page study guide that was developed for both correspondence students and EKKO students. It comprised extra guidance for distance students, course requirements, and assignments. Because the study guide was completed a few days after the course started, it was distributed via EKKO.

Twelve students, ten men and two women, enrolled on the course. For most of them, this was the 10th and final course in the program, so they were all advanced computer conferencing users, with no need for user support. Most of the students enrolled on more than one course during this semester. The course started the first week of February 1991, and the final project report was due May 10th. During this period the students had to complete four assignments. The assignments were not paced, that is, they had no due date. The first assignment covered the theory from the textbooks. Each student had to turn in a short essay via e-mail. In addition, the students were asked to present project ideas in the class conference. In the second assignment the students had to form a project group and present their project task, milestone plan, and responsibility chart. The third assignment



asked each group to write a progress report, and the fourth assignment asked for the final project report.

The teacher's job was to comment on the assignments and help the students whenever they had questions about their projects and the project management tools. Most of this feedback was routed via e-mail to each specific group, but information of general interest was posted on the class's bulletin board, or in the class's conference.

Describing the experiences from online project work at the NKS College in Norway during the spring of 1989, Fjuk (Fjuk and Jenssen 1992, 7 and Fjuk 1992, 34) reported that students experienced peer dependence and reduced flexibility. Due to these two factors, NKS decided not to include obligatory online project work the following semester.

Drayton (1993, 215) described the Eratosthenes Project in which students and teachers on LabNet estimated the circumference of the earth by simultaneously measuring the angle of sunrays at two locations in different latitudes. LabNet was used to coordinate the data collection and to share the findings. According to Drayton (1993, 217) the project demonstrated how the network could facilitate learning through project design, coordination, data collection, and sharing of results.

Prims (1993, 668) presented collective construction of materials and structured gathering of data as two basic models that have been used in Catalonia, Spain. Examples of collective construction of materials mentioned were: Magazine Production, Gathering of Tales and Legends, and the collective written tale of Penelopy. Penelopy was a fictional 10-year-old girl who traveled from one village to another in a journey covering 26 schools. When she visited a school, the students introduced their school and village to her. In addition, the students had to write a description of her way from the previous school. Among the projects involving structured gathering of data were: Meteorological Data Collection and The Millenium Game. In the first project, each school collected a set of meteorological data which was compiled into a common database. In The Millenium Game, schools compiled records for a Catalan history database.

Sternheim and Sternheim (1993, 849) presented a list of telecommunication projects and activities with the intent to illustrate how teachers had used SpaceMet, a PC-based bulletin board system for teachers and students. Among the project listed were The Acid Rain Project in which classes shared and compared data from middle and senior high schools, The Weather Data Project that linked schools in the United States, Canada, and Australia via K12Net, and The Mung Bean Experiment that studied the germination and growth of mung beans exposed to gamma rays. Sternheim and Sternheim (1993, 845) argued that projects require: "a good facilitator or moderator, a 'critical mass' of participants, realistic time lines, and a simple concept.

Kristensen (1993, 526) mentioned that a computer network of seven primary schools in western Norway was used to exchange meteorological data via a mailing list. A database program was available for the students to compile and organize the data collected. Also using a database for registration, Gjerløw (1993, 304) mentioned an acid rain project (Milda) conducted by secondary schools in Norway. In this project, students registered and discussed precipitation pH values. Among other projects, Anttila and Eriksen (1993)



referred to the Acid Rain and Aquadata projects. They concluded that “Many telematics projects have proved to have a positive effect on the quality of the work and the motivation for students as well as for the teachers. It improves the communicative foreign language use and increases intercultural consciousness.” (Anttila and Eriksen 1993, 103)

Stefansdottir (1993, 833) mentioned two projects conducted at the Ismennt network in Iceland. In the Geographical Project, students from five locations exchanged information about their local areas. One part of the project was for each group to plan a two-day tour of their location for a visit. The resulting itineraries included both visits to shopping malls and moose hunting and the teachers maintained that the project made the geographical locations more interesting for the students. In The Counting Bird Species project, the students were asked to count as many species of birds as possible and a standard notebook was distributed to the observers via a conference. Some of the participating classes focused on birds, some on computer communication, and others on outdoor activities.

Techniques not Found to be Utilized in CMC

Several of the techniques frequently discussed in the adult education literature reviewed were not applied in this review of teaching techniques. Since this review has showed that so many traditional adult education techniques have been adapted to CMC, the following discussion suggests how some more techniques could be used in CMC. The techniques discussed are in-basket exercises, panels, committee hearings, cognitive networks, and jigsaws.

In-basket Exercises

The in-basket exercise “derives its name from the manager’s in-basket or mailbox. It is a simulation strategy in which items that might appear in a manager’s box are presented to participants, who must then make a decision on the proper strategy for responding to each item” (Seaman and Fellenz 1989, 83).

The in-basket exercise could be an excellent technique for CMC. E-mail can take away some of the restraints of a face-to-face exercise and keep up a time pressure which cannot be accommodated by correspondence courses. Automatic recording of time may be a useful feature in negotiations where time is critical. However, correspondence including brochures, stationery, graphics, etc. cannot easily be sent to an e-mail in-basket.

Panels

Knox (1987, 87) gave this brief explanation of a panel: “Two or more speakers make presentations on different aspects of an issue, otherwise similar to a lecture.” A more extensive explanation was presented by Sisco (1990, 285): “A panel is defined as a small group of three to six persons, who sit around a table in the presence of an audience and have a purposeful conversation on a topic in which they have specialized knowledge. The panel is typically informal in nature, usually lasts under an hour, is guided by a moderator who starts the session and sustains discussion, and has no audience participation other than watching



and listening. Because of the latter characteristic, the panel is usually followed by a forum which does allow verbal participation by the audience."

A panel could be organized in a bulletin board system where each expert in a group presents a paper, an idea, or a statement on a well-defined topic. The panel then continues to discuss the topic led by a moderator. Audience participation could be limited by giving the audience only read access, not write access, to the bulletin board.

Committee Hearings

Seaman and Fellenz (1989, 144) stated that: "By definition, the committee hearing is the questioning of a person or several persons by a group. It is basically an interview to which the dynamics of group interaction have been added. It can be structured to deal with several individuals by questioning more than one at the same time or by interviewing them in sequence."

External examiners, faculty, and even co-students could participate in a two or three day online examination period. The candidates could prepare hard copy or upload the examination paper to their challengers some time before the online examination starts. During the examination period, the challengers are expected to post questions about the examination paper which the candidates must then answer in a plenary conference. The advantage of this compared with a traditional oral examination is that both questioners and answerers have more time to contemplate, than in a hectic one hour face-to-face examination. The online examination is, of course, much more interactive than a traditional written examination.

Cognitive Networks

In cognitive networks (cognet) "all participants do some reading and answer the same questions before they gather - but only several people read the same material. When they gather these "homogeneous" groups meet to prepare group answers which they share in reports to the other teams." (Laird 1985, 144)

A cognitive network could be applied in a setting where several students read various online publications, write papers or presentations on a given topic, and post them to the class' conference system. In this way, the presentation would introduce different perspectives to the conference and hence be more varied and interesting for all students.

Jigsaws

Describing jigsaws, Laird (1985, 151) stated that "... participants may be given parts of a design or of an organization; they assemble these into a 'System' or an 'Organization Chart.' They may be given the elements of a letter or a report; they put it together into a logical outline. They may be given the key variables of a decision-making problem; their task is to select from the pieces of the jigsaw the proper action to take for every conceivable combination of variables."

A group of students could be asked to develop a joint paper on a political issue. One student could then be assigned to each of the political parties and asked to study and present the views of the party in the paper.



Summary of Online Teaching Techniques

The techniques presented here are by no means meant to constitute an exhaustive list of online teaching techniques. However, they represent a comprehensive array of examples that show the gamut of techniques that are available for teachers, program planners, and designers of CMC courses. Based on the examples found in the literature review, some techniques seem prevalent and others seem rare. It should also be noted that some of the techniques found in the review of adult education literature were not found to be utilized in CMC. The review showed, though, that practitioners have a wide range of techniques to choose from, and that many-to-many techniques seem to be more common than other techniques.

One may criticize the approach used in this literature review for relying too much on techniques developed for face-to-face teaching. The approach could be regarded as viewing new paradigms through a rear-view mirror and as marching backwards into the future. However, comprehension of accumulated knowledge is a necessary step in the evolution of online education.

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Anecdote 3. Globalskolen: A Global Primary School



Online education is not only for adult students. In 2002, Globalskolen (www.globalskolen.no) provided primary education for 180 Norwegian students abroad and 15 students in Norway. Students from 58 different countries followed

courses from Globalskolen. The students were from 6 to 15 years old. Similar initiatives have been implemented by Netskolen (www.netskolen.dk) in Denmark and two Swedish institutions; Sofia Distansundervisning (www.sofiadistans.nu) and Pippis Hemskola (www.pippishemskola.nu).

Originally, Globalskolen was a pilot project primarily developed for children of Norwegian diplomats and missionaries living abroad. To ease the children's return to the Norwegian educational system, Globalskolen provides online education in distinctive Norwegian subjects. Now, Globalskolen attracts children from rural schools that are struggling with small student numbers and children of itinerant families, for example circus artists. In addition, the school is popular with Norwegian families on sabbatical leave abroad, and with immigrants on lengthy visits to their home country.

Globalskolen follows the official Norwegian curriculum in all subjects and they give weekly individual support to every student. There is also pupil cooperation on the Web and an online newspaper for each grade. The courses are asynchronous and based on weekly work plans.

Primarily, Globalskolen offers 27 courses online. These are the three distinctive Norwegian subjects (Norwegian language, Religion and ethical subjects, and Social studies) from 2nd to 10th grade. In addition, they teach mathematics for 10th grade and a reading preparation course for 1st grade. Globalskolen also aims to provide as many subjects online as possible – perhaps with the exception of physical education, music, carpentry, and home economics.

In 2002, Globalskolen for the first time offered online education for first graders. Twelve children, living in Italy, Greece, USA, The Emirates, Hong Kong, Australia, Turkey, Canada, and Syria, have started to study the Norwegian language. But is it really a good idea to teach six-year-old children online?



Bente Rui, their online teacher, says: "It's too early to evaluate the outcome of this first online trial with six-year-old students. However so far, it has been an incredibly enjoying, exciting, and creative pedagogic challenge."

"I have used a multi media program to develop a weekly work plan that includes pictures, sound, animations and interactive quizzes. Using this, the children have increased their proficiency in the Norwegian language through systematic use of basic Norwegian concepts and phrases."

"The parents are important partners for me, and they work as my personal teaching assistants for their children. It is, however, interesting and stimulating to see that the children already have started to take some responsibility for their own learning. The feedback the parents provide regarding the children's involvement is exclusively positive. As their online teacher, I'm very proud of my clever first-graders. And I tell them so, in the weekly reports I send them."

Glenn Erik Haugland is a Norwegian composer spending one year in Italy with his family. Since his two daughters are students at Globalskolen, he decided to become the parents' online contact for the 10th graders. He provides the following comments:

"Our experiences are exclusively positive. The online teachers are very competent, and the online learning environment supports reflective thinking. Since Globalskolen relies much on written communication, I have noticed that the children's writing and reading skills have increased. The school provides a learning arena – the Internet – that caters to the pupils' lifestyle and interests. It also helps them to develop work habits that they will benefit from in the future."

Principal Helge Standal confirms that parent evaluation of Globalskolen for some years on average have been between 4 and 5 on a scale from 1 (worst) to 6 (best). He also states that Globalskolen's students receive grades that on average are equal to or better than the grades in the teachers' ordinary schools.

"We have 10 online tutors," says Standal. "They teach face-to-face courses in ordinary schools, but have a reduced workload in their schools because they also handle online teaching. The tutors sign a contract that includes a description of their responsibilities. We have established a separate discussion forum for the tutors, and we organize two face-to-face seminars per year for the tutors. We have also given them tools for design of graphic material and multimedia content. The tutors develop weekly schedules and publish them online via PedIT, our LMS system. Our instructional designer develops other resources using FrontPage or DreamWeaver. We have little use of animations and video, because of bandwidth limitation, especially in some countries."

"In 2000 we developed and mailed a VHS videocassette to all students in the school year 2000/01. The video explains and describes how the students should use our resources and how they can study effectively online. The students receive individual feedback on their written assignments, but we also develop open resource pages, in which we for example provide guidance on common problems with spelling Norwegian words. We use quizzes. Globalskolen does not offer any exams, but the tutors grade the students based on their participation in the discussion forums and the assignments they submit. We also organize some comprehensive semester tests with help from the students' parents."

"Globalskolen provides a common discussion forum, which is open to all our students. In addition we have one discussion forum for each of the courses we teach. We do not usually organize any online chatting, because our students are situated around the globe, so the time difference inhibits effective use of chatting. However, some students do organize informal chatting in smaller groups. We have established a general chatting service. Through this, each student may invite other users to chat sessions. The teachers manage discussion forums."



“The school’s online journal is used as a pedagogical tool in the way that the students publish articles that are available for everyone on the Web. We perceive this as an inspiration for improved work, compared to traditional assignments that are only meant for the teacher. The journal and other resources are open and available to everybody, also students in traditional Norwegian schools. The workbook feature is elegant. It allows the tutor to follow the students’ progress and observe whenever a student contributes to a discussion forum or completes an assignment.”

A company owned by four municipalities in western Norway established Globalskolen in 1998. The school has received several project grants from the Ministry of Education, but the students must still pay a € 500 fee for three subjects. The external grants have been insecure sources of income, but so far they have covered the wages. The school needs to find more sustainable sources of income to secure future operations.

The Danish pilot project Netskolen (www.netskolen.dk) was in operation from March 1st to June 1st 2001. It included 4 teachers and 47 children in 24 countries. In the final report, the project group testified that both children and parents had shown great engagement and that the interest from the target group had been enormous. One of the project coordinators, Jytte Fromberg, states that Netskolen had a waiting list of 250 children living abroad who wanted to enroll. In spite of this, the Danish pilot project was not sustained, and the Danish Ministry of Education has not made any decision about continuation of the project.



Part Two

COMMERCIAL AND SELF-DEVELOPED LMS SYSTEMS

"Straitjackets!" a friend of mine hissed with malice in his voice, when I discussed [LMS systems] with him the other day. (Page 228)

...the Student Management System is the central, most important system for large-scale online education. For historical, legal, and financial reasons, the SMS system is the most important system for an educational institution. Hence, all other systems that offer online education services should rely on the SMS system as the master system with which they exchange data. (Page 28)

The analysis revealed few, if any, examples of institutions with substantial income from student fees. Likewise, there seem to be few institutions that can claim that provision of Web-based courses has been an economic success, if they disregard external research and development grants. (Page 139)

Evidence of the worldwide spread of e-learning in recent years is easy to obtain. In April 2003, no fewer than 66,000 fully online courses and 1,200 complete online programs were listed on the TeleCampus portal... (Page 152)

The institutions do not seem to be especially loyal to, or dependent on, one LMS system. The majority of the institutions had changed system, planned to change system, or operated secondary systems. (Page 167)

...the organisational and pedagogical concepts underpinning most modern LMS systems fit badly with Danish educational culture and with the way Danish educational institutions traditionally organise learner support and learner management. (Page 228)



Figure 10. The Troll with three heads: Learning, Management and System



...it is important to understand that LMS systems may be built on very different pedagogical methods and theories and that these underlying constraints may influence and limit the systems pedagogical use. (Page 31)

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International Web-based Education and Strategic Recommendations for Decision Makers

The results and discussions presented in this article³ are based on literature reviews, catalogue entries submitted by 130 institutions in 26 countries, and 72 interviews with key persons at these institutions. The catalogue data was collected from March 98 to February 99 and the interviews were conducted in the spring of 1999. The research was conducted within the Cisaer project (www.nettskolen.com/in_english/cisaer/index.html), which was supported by the European Leonardo da Vinci program.

Global Issues

The Cisaer catalogue includes entries from institutions in all continents. In addition to four transnational institutions, the catalogue includes entries from institutions in 26 countries. It is likely that there is an overrepresentation of institutions from countries that have English as an official language since the primary research language was English. Still, it would be quite easy to include many more entries from North America, since the listing from this area is intentionally partial. Among the 130 catalogue entries, 45.4% were from the English language countries: the USA, UK, Australia, Canada, and Ireland.

There is a steady growth of institutions that offer online courses to students in other countries, and the analysis presents many examples of international collaboration and thinking. However, most of the global initiatives seem to be experiments and ambitions rather than main priorities. Most institutions or consortia have not identified international markets as an initial priority.

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www.studymentor.com

³ This article presents an abstract of the major findings and recommendations from my report *Online Education – An International Analysis of Web-based Education and Strategic Recommendations for Decision Makers* (Paulsen 2000).



Competitiveness

The survey indicates that institutions in Europe (60.8%), North America (21.5%), and Australia with New Zealand (7.7%) overwhelmingly outnumber institutions in South America (3.1%), Asia (3.1%), and Africa (0.8%). Even though the researchers have a better knowledge of Europe, North America, and Australia than they have of the rest of the world, the survey testifies that these continents overwhelmingly dominate Web-based education.

North America dominates the world of online education. Some of the reasons for this dominance are the well-developed Internet infrastructure, the economic strength of the educational providers, the international dominance of the English language, the well-developed university systems, and the famous brand-name universities.

The linguistic diversity in Europe is problematic for global competitiveness. Hence, UK providers seem to have a more international approach than providers in other European countries. Different national systems of degrees, certificates, and grades also make it more difficult to compete globally. European harmonization of these systems will increase competitiveness. Further, unlike North America, higher education in Europe is largely state funded, and this could entail resistance to change and become a barrier to competitiveness. The most obvious example is that national regulations in countries such as Sweden and Germany prevent institutions from charging tuition fees.

The Australian institutions are among the largest and most advanced in this analysis. Since the courses are also provided in English, Australian institutions should be very competitive in the emerging global market.

Institutional Issues

A Canadian competitive analysis of online post-secondary education (Massey and Curry, 1999) reports that the biggest surprise was the lack of institutional strategy for online learning initiatives.

A large number of the Cisaer institutions offer few Web-courses. As many as 23.1% of the institutions report having only one Web-course, and 46.2% of them report offering less than 5 courses. Only four institutions reported having 100 courses or more. From this, one can infer that many of the activities are experimental and not pivotal for the institutions. The survey also showed that 29.3% of the institutions report that they have 100 or fewer students. Only four institutions reported having more than 5,000 students. The relatively low enrollment numbers also indicate that Web-based instruction is not pivotal to these institutions.

One may conclude that there is a dominance of Web-courses in the fields of computer and information science and by courses in education. Except for these two fields, web-courses cover a very broad range of subjects. The number of subject areas that were offered varied considerably between the institutions. Nearly half of the institutions offer courses in only one category and only five offered courses in five or more categories.

None of the institutions surveyed seem to provide enough online courses and support services so that this analysis would characterize them as real online or virtual universities.



The survey shows that 60.0% of the 130 institutions belong to the university and college sector, 10.0% to the traditional open university and distance education sector, and 9.2% were classified as companies or corporations.

Administrative Issues

An administrative system should be able to handle students, teachers, courses, and course material. An online college may have to handle thousands of students, hundreds of teachers, and a large number of courses with password restricted Web pages, discussion forums, distribution lists, class rosters, and student presentations. It may also have to provide administrative systems for the dispatch of textbooks, handling of tuition and examination fees, and organization of local examinations. These services constitute a major challenge for many traditional institutions.

Institutions that plan to offer large-scale and professional online education need an LMS system that is integrated with the Web. To accomplish this, institutions may follow several strategies. The simplest strategy is probably to collaborate with an institution that already has a functional administrative system. Another solution, which requires more technical competence, is to develop an in-house system based on common Internet services. The third option is to purchase a standard LMS system for online education. These standard systems are continually being improved, but they may still need much local adaptation. They may only meet some of the administrative needs, and they could place some pedagogical limitations on the courses.

A discouraging but important observation is that a number of institutions do not use the Web for administrative purposes. Outsourcing is an option that does not seem to be much used; only one instance was identified. Many institutions have developed in-house administrative solutions in combinations with standard Internet software. The standard LMS systems that were mentioned in the interviews were FirstClass, WebCT, and Lotus Notes.

Advertising and Financial Issues

It is implicit in many interviews that advertising of programs and courses is an important function of the Web services.

The tuition fees for Web courses seem to vary considerably among institutions and courses. Some courses are free and open to everyone, and others seem to have full or partial external funding. One may ask how many of these initiatives will continue when the external funding ceases. The institutions that operate with tuition fees seem to have fees that are the same or not very different from fees in traditional courses. The analysis revealed few, if any, examples of institutions with substantial income from student fees. Likewise, there seem to be few institutions that can claim that provision of Web-based courses has been an economic success, if they disregard external research and development grants.



Pedagogical Issues

The tutors seem to be both part-time teachers that are engaged just for the online courses and full-time teachers that also teach some online courses. It is also interesting to observe that remote experts and students take part in the tutoring.

An analysis of the interviews indicates that the tutors at least conduct the following functions, which are extracted from the statements below:

- Organizational functions: structure discussions, pacing, submitting initiatives
- Social functions: monitoring groups
- Intellectual functions: answering questions, guiding students on the Internet
- Assessment functions: giving feedback to assignments, correcting submissions

Human tutoring seems to be much more common than machine tutoring, but some institutions include machine tutoring in addition to human tutoring. Most institutions seem to combine individual tutoring with group tutoring. The focus between the two may however vary. Online teaching is in many courses supplemented by face-to-face meetings, video or audio conferences, or telephone contact.

Some institutions have course development teams; others use the tutor as the sole designer of a course. The different models probably have implications for both quality control and development time.

Accreditation

The interview analysis implies that accreditation of online courses and programs is very similar to the institutions' traditional accreditation schemes. Degrees, diplomas, certificates, and statements of completions are all widely used. The accreditation seems to be the same independently of whether the course or program is offered online or not. Many institutions basically state that accreditation is the same as for campus courses.

Accreditation may be an important competitive advantage and several strategies may be followed to achieve the necessary accreditation. Collaboration with institutions in other countries may result in bilateral accreditation.

Assessment

While summative assessment of online courses seems to be very traditional and often has a face-to-face component, formative assessment is more experimental and based on online activities.

Most of the institutions apply several assessment methods in a course or program. Tutor assessment is the most common form of assessment found in the interviews. The interviews reveal many examples of self-assessment, but they imply that computer assessment is relatively scarce. However, there are several examples of online quizzes, multiple-choice tests, and some examples of interactive exercises. The interview analysis implies that peer



assessment is relatively scarce. The interviews indicate that some courses have no assessment simply because they are self-study courses with no tutors.

Enrollment and Progress Flexibility

Both enrollment and progress can be more or less flexible. However, the two main models found in the interviews are group enrollment and progress and individual enrollment and progress. These models represent two different strategies that have important consequences for marketing strategies, administrative systems, and pedagogical approaches.

The interviews testify that group-based enrollment and progression is far more used than individual enrollment and progression. The analysis identified 46 institutions that used the group model and 12 that followed the individual model. In addition, 11 institutions offered both models.

The preponderance of the group model may come from conventional thinking that sustain the semester and term system in traditional educational systems. Another possible reason is that the institutions have a well-considered perception that teamwork and collaborative learning are hard to achieve with individual enrollment and progress. One can however argue that many students will prefer individual flexibility and that many institutions lack systems, structures, and competence concerning individual enrollment and progression. If so, one might hypothesize that open universities and distance teaching institutions should be more disposed toward individual flexibility than traditional universities and colleges. However, the analysis has not found evidence to support this hypothesis.

Future Development

The interest in online education is high, and it seems to be proliferating rapidly and globally. A Canadian analysis (Massey and Curry, 1999) shows that the primary expansion strategies are more diversified programs, international students, and new, niche markets such as corporate training. The Cisaer interviewees foresaw a future with more Web courses, additional online services, better quality in courses, enhanced focus on teacher training, further collaboration with other institutions, and additional organizational consequences.

Barriers

There are a number of barriers that must be overcome before online education can become a large-scale success. Among them are financial barriers, resistance to change, bandwidth limitations, access limitations, insufficient search facilities, copyright issues, and barriers to online assessment.

The financial barriers are important. The analysis showed that few institutions had substantial income from student fees. At the same time, the cost of development and maintenance could be high. In addition, national regulations in some countries deny institutions the opportunity to charge tuition fees.



The interviews testify that there are a number of barriers to effective use of online assessment. Among them are public and institutional regulations, traditions for physical attendance, technical limitations, student identification, and detection of plagiarized digital material.

Eight Strategic Online Education Recommendations

In conclusion, the report provides the eight recommendations for politicians, educational administrators, and online educators that are presented in List 5.

List 5. Eight strategic online education recommendations

1. *Promote national and international harmonization of degrees, certificates, credits, and grades to facilitate online mobility of students.* There is a steady growth of institutions that offer online courses to students in other countries, and the analysis presents many examples of international collaboration and thinking. However, most of the global initiatives seem to be experiments and ambitions rather than main priorities. One important barrier is the problems with acceptance of foreign degrees, certificates, credits, and grades as an integral part of education and professional development. International collaboration would benefit from harmonization of these important issues. North American universities may have a competitive advantage compared with Europe since they have a relatively long tradition of credit transfer. Accreditation could be an important competitive advantage and several strategies could be followed to achieve the necessary accreditation. Collaboration with institutions in other countries could result in bilateral accreditation.
2. *Oppose national regulations that inhibit institutions from charging tuition fees.* A country should allow its universities and colleges to charge tuition fees for Web-based courses. Countries that don't can hardly expect to be competitive in the emerging global educational marketplace. Tuition fees can stimulate change, facilitate collaboration between institutions, and be an incentive for export of courses. Examples from both Germany and Sweden show that these countries' restrictions are perceived as a barrier to online education.
3. *Focus on cost-effective online education.* The analysis indicates that there are few institutions that can claim that provision of Web-based courses has been an economic success, if they disregard external research and development grants. At the same time, most of the Webcourses have relatively low enrollment. The cost of development and maintenance may be high, and there are many examples of expensive pilot projects that experiment with high-cost, state-of-the-art technology. All this implies that it is necessary to focus much more on how online education could become more cost-effective. This includes a focus on how online courses could handle larger enrollment and prioritizing cost-effective technology and development schemes.



4. *Develop better systems for administration of online education.* Institutions that plan to offer large-scale, professional online education need an administrative system that is integrated with the web. A discouraging, but important observation is that a number of institutions do not use the web for administrative purposes. Many administrative solutions are primitive, and much could be done to improve most of the existing systems. The commercial LMS systems are continuously being improved, but they may still need much local adaptation. They may only meet some of the administrative needs, and they could place some pedagogical limitations on the courses.
5. *Support initiatives for training of online teachers, administrators, and instructional designers.* Online education is a new field with little research and practical experience. Practitioners need more knowledge and experience. Initiatives to disseminate existing research, examples of good practice, and training should be supported.
6. *Oppose regulations and attitudes that inhibit online assessment.* Assessment systems are strong indicators of how seriously course providers value their aims. One could argue that summative assessment is such an important issue for students, teachers, and course providers that experimentation with online assessment functions is risky and hard to find support for. Two obvious challenges for online assessment are authentication of student identification and detection of plagiarized digital material. Other barriers are public and institutional regulations, traditions for physical attendance, and technical limitations. These barriers to online assessment counteract the development of online education since they support face-to-face attendance and preserve traditional education. While summative assessment of online courses seems to be very traditional and often has a face-to-face component, formative assessment is more experimental and based on online activities.
7. *Support further research on online pedagogy and didactics.* There are several distinct features that characterize online teaching techniques (see page 53). These features provide teaching opportunities that can rarely be achieved in other educational environments. They could probably add a new dimension to familiar teaching techniques and also contribute to the development of a number of new, innovative teaching techniques.
8. *Develop and implement strategies to reduce teacher workload.* A major concern arising from the research was how to keep teacher workload at an acceptable level. Hence, it is important to develop and implement strategies to reduce the workload per student associated with large-scale enrollment. (See page 76)



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Anecdote 4. Online Education Obituaries

Successful online education should be sustainable. It is therefore of great concern that much of the online education that has been offered so far has been transient, unsuccessful and far from sustainable. A lot of it has been supported by external funding and ended when the external funding stopped. It is also disturbing to observe that there are many online education projects supported by Scandinavian councils and agencies (e.g. the Norwegian SOFF, ITU, NFR, the Swedish *Nätuniversitetet*, and the Danish CTU) that have come up with high quality products that are not used after the project period. Enormous amounts of money have more or less been wasted. It is therefore important to study initiatives that lack sustainability and understand some of the reasons for this. A first attempt is provided in this article, which discusses five types of online education ventures and points out some conspicuous, high-profile initiatives that hardly could be characterized as sustainable.

The reader should be aware that these issues are controversial and that the analyses may be characterized as subjective and one-dimensional. However, they introduce some very important issues that need to be discussed and analyzed in further details.

1. *Many governmental online education initiatives have not been sustainable.* These initiatives are often very visible and expensive. Some reasons for the problems might be inconsistent policy due to changing governments and political disagreements. Compromises and lack of market knowledge may also contribute to sub-optimal decisions as indicated in these examples:

Winix was an LMS system that the Norwegian Ministry of Education initiated in 1988. According to a 1994 article in *Computerworld Norway*⁴, the Office of the Auditor General (*Riksrevisjonen*) showed that the project spent more than € 10 million in the nineties. In 1992, it was clear that the project had failed. The software was not finished on time, and several companies that depended on *Winix* lost much money.

The Danish Ministries of Education and Research initiated a *Danish Virtual University* in a mission statement on March 27, 2000. The € 5 million budget for the period 2000-2003 was intended to support the development of Web-based courses and provide information about the courses. The next government shut down the initiative, partly as a result of lacking support from the affected institutions. The only remaining result seems to be a portal providing information about further and continuing education (www.unev.dk) that was initiated by the *Danish University Rectors' Conference* and scheduled to open in August 2003.

Distum (page 251) was established by the Swedish Ministry of Education in July 1999 with the aim of supporting the development and use of information technology in distance education. But it takes time to make an impact at national level, and the necessary political patience was not available. *Distum* was discontinued after three years when the Ministry decided to support a new political initiative named *Nätuniversitetet*.

⁴ www.oslo.net/historie/CW/utg/9427/cw942741.html



IT Fornebu Knowation (www.mml.no) was a result of the controversial political decision to establish a world-class research and development center for information and communication technology when the old Oslo International Airport was shut down in 1998. According to *Aftenposten*⁵, the project was the subject of continual political and bureaucratic quarreling. Some critics claimed that the project's main objective was to secure valuable real estate properties in an attractive area. The center needed educational enterprises and *IT Fornebu Knowation* was a key player to attract educational activity. A number of video-conference studios were located and planned around the country. The opponents of the project claimed that the selected technology and locations were chosen to get the necessary support from local members of parliament. According to *Hegnar Online*⁶ and *Digi*⁷, the company experienced a difficult economic situation, and has more or less disappeared after several reorganizations and a merger with *AjourIT*⁸ in 2001.

2. *Online education consortia are often not sustainable.* It is easy to find good reasons for collaboration between educational institutions, but in real life individuals and institutions usually are much more committed to themselves than to the consortium. In general, one may suspect that a consortium of prestigious institutions hardly can be whole-hearted. A relatively weak external consortium secretariat could easily be overlooked or opposed by powerful factions within the institutions. There is also a chance that individual institutes, departments, and even institutions could compete with the consortium in bids for external contracts. This is obviously not a viable environment for a consortium.

California Virtual University (CVU) was a high profile venture⁹ with a dismal history¹⁰. It was launched in April 1997 as a joint project of the University of California, California State University, California Community Colleges and the Association of Independent California Colleges and Universities. In April 1999, Stephen Downes wrote an interesting analysis¹¹ claiming that the CVU dream lay in ruins. In his analysis, he stated:

While on the one hand this is just another story of an unprofitable enterprise biting the dust, on the other hand it is a story of wider impact because CVU was seen in some quarters as a model for the future. The failure will affect online learning in general, and the reasons for the collapse attributed to weaknesses in the medium as a whole.

⁵ www.afenposten.no/nyheter/okonomi/d210445.htm

⁶ www.hegnar.no/hegnar/newsdet.asp?id=85490&cat=100

⁷ www.digi.no/php/art.php?id=53456

⁸ www.ajourit.no/Nyheter/nyheter_visartikkel.asp?NID=64

⁹ www.ucsf.edu/daybreak/1998/06/05_cvu.html

¹⁰ www.ucsc.edu/oncampus/currents/98-99/04-05/ucop.virtual.htm

¹¹ www.atl.ualberta.ca/downes/threads/column041499.htm



The three *Swedish distance education consortia* have received considerable governmental funding since 1993-94 (Hillefors et al, 22 and Ranebo 2001). At most, the three consortia offered 40-50 courses to 5,000-6,000 students per year (Hillefors et al., 26). After nearly ten years of operation, their funding was discontinued when the government decided to establish *Nätuniversitetet*. Apart from the lack of funding, Holmberg (page 251) pointed out that the consortia had difficulties in building the necessary fundament of knowledge to be efficient producers and deliverers of distance education.

Bedriftsuniversitetet (www.bedriftsuniversitetet.no) was a consortium established as a company in 2000 by four prestigious Norwegian institutions: the University of Oslo, Norwegian University of Science and Technology, Norwegian School of Management, and the SINTEF research institute. The aim was to offer online education to corporations and organizations. In April 2003, the general assembly decided to shut down the operation. A messages posted at *Bedriftsuniversitetet*'s homepage referred to a decreasing market for tailor-made competency building at college and university level, and stated that there was no basis for continuation of a company at the costs a consortium requires.

3. *Many commercial and investor-driven online education initiatives have failed.* E-learning was depicted as a lucrative investment during the dot-com period. Numerous speculative projects attracted investors with high expectations and most of these projects vanished when the dot-com bubble burst. Some persist, but are still struggling to survive. The dot-com initiatives initiated unrealistic hype of online education; unfortunately their demise resulted in an equally undeserved pessimism.

A disturbing number of e-learning companies in Scandinavia have disappeared through mergers and bankruptcies. According to Holmberg's discussion of Swedish commercial initiatives (page 247), many e-learning ventures started and ended between 1997 and 2002, but K-World was probably the most expensive experience for the Swedish e-learning market. Using the two keywords *e-learning* and *bankrupt* in a web search at www.idg.se also revealed articles¹² indicating that the e-learning companies Grade, M2S, and Doorways Education had experienced dire economic problems in Sweden.

Many universities have also failed in their commercial online education ventures. In a May 16, 2003, Times Higher Educational Supplement, Stephen Phillips wrote:

"In March, Columbia University cut its losses on Fathom.com, having run up a \$25 million (£15.5 million) investment tab on the online education portal. The New York-based venture was perhaps the last vestige of the brash 1990s when a slew of universities tried to cash in on their intellectual capital to corner the nascent e-learning market. The universities of New York, Cornell, Temple and the University of Maryland University College have folded commercial internet education arms or scaled back ambitions amid poor enrollment and tough economic conditions."

¹² Articles by Karin Lindstrom in *Computer Sweden*, June 24, 2002, and Ulrika Halvarsson in *Industry Standard*, January 30, 2001.



4. *Boardroom initiatives often fail.* These may be described as top-down initiatives with insufficient support in the operative units. Sometimes boardroom initiatives decide to establish completely new ventures that initially lack both competent employees and an established business concept.

In the US, the Western Governors University (www.wgu.edu/wgu/index.html) has often been mentioned as a prominent, expensive and unfortunate example that has endured many setbacks and shown few results. The initiative is however still in operation.¹³

NKN¹⁴ (www.nkn.no) was a commercial company established in August 2000. It was owned by the Confederation of Norwegian Business and Industry (www.nho.no), the Norwegian Confederation of Trade Unions (www.lo.no), and Telenor (www.telenor.no), which is the largest telecommunication company in Norway. The powerful owner institutions wanted to show their vigor and dedication to supporting further and continuing education in the workforce. The dot-com hype also helped the initiation of NKN. It was primarily a provider of LMS services to companies (customers) in collaboration with course and content providers (partners). But NKN was never able to cover its costs and the shareholders lost nearly € 10 million¹⁵. To avoid the bad publicity of a bankruptcy, the owners decided to pay off the creditors with about € 1 million and to sell NKN to the CEO for a symbolic sum in 2002.

5. *Several high profile international ventures have been discontinued because of an unhealthy economy.* Even though online education is gradually becoming more global, there have been many unsuccessful initiatives.

EuroPACE was a European industry-university consortium that delivered high-level training programs to professionals, managers and researchers in enterprises and higher education institutions via satellite and computer networks. According to Wim Van Petegam¹⁶, it was modeled on an American concept with collaboration between universities and industrial concerns after an initiative by British Telecom, Hewlett-Packard, Philips and Thomson. The development started in 1986, and between 1987 and 1992, EuroPACE broadcast several hours of video lectures every day. It primarily used instructional television, candid classroom, and talking heads. Important conceptual models were Stanford University and National Technological University. EuroPACE provided courses within cutting-edge research

¹³ www.edexcellence.net/SR2/1%20-%20Winter%202002/Higher%20Education%5CPlace.PDF

¹⁴ Information about NKN is available at:

(www.saba.com/english/news_events/2000/news_000815_norway_fa_q.htm)

(www.cw360.com/Article21659.htm)

(http://news.bbc.co.uk/2/hi/uk_news/education/881428.stm)

(www.tmag.co.uk/articles/Nov2000pg26.html)

(www.digi.no/digi98.nsf/pub/job20000816144142tkw24617532)

¹⁵ (<http://universitet.no/n.nsf/alt/5H32QL>)

¹⁶ www.publicservice.co.uk/pdf/europe/spring2003/EU5%20Wim%20Van%20Petegam%20ATL%20.pdf



and development areas. World-class researchers and experts from business and research organization were engaged as lecturers. The idea was to share limited expertise and resources. The courses were distributed via television satellites, and computer networks were used for feedback and interaction. About 1,200 hours of content was produced from 1989 until EuroPACE was shut down. However, EuroPACE did not succeed in becoming self-supporting, and in 1992 the main sponsors decided to end the financing.

EuroPACE was not sustainable. According to a former employee, the timing was right with regard to instructional television, but perhaps somewhat early for computer networks. But the American model was not easily transferred to Europe. EuroPACE did not cover the last mile into the corporations, and when companies had to reduce costs, EuroPACE spending was the first to be cut – as education often is.

The story has a prelude, though. In 1993, a new organization (www.europace.org) was established with the same name and similar objectives at the University of Leuven in Belgium.

In 1998, the British Open University (OU) established the *United States Open University* (USOU) as an independent US-based institution¹⁷. Ranked in the top ten among British universities for the quality of its teaching, the British OU sought to develop a sister institution in the US. The OU had achieved quality at scale, enrolling over 200,000 students in the UK and Europe. However the US market was more competitive and the OU brand identity little known in the US. USOU offered baccalaureate and master's degrees in business, computing and IT, and the liberal arts. It developed nationally recognized programs with community colleges and joint degree programs with major US universities. However, not all British aspects of the academic or business models worked successfully in the US. USOU evolved from producer-driven, largely undergraduate courses and systems derived from the UK to a US-market-led institution based on partnerships and graduate programs. Marketing shifted from students to institutions. Enrollments increased considerably every semester from fall 2000 to fall 2001, but revenues failed to grow fast enough. So, the British OU decided to terminate the project and shut down the activity. On February 5, 2002, Macleod wrote:

After nearly four years and a £9m investment, the United States Open University had signed up only 560 students and saw no short-term prospect of improvement in the current economic downturn. The USOU board announced the university would cease operations at the end of the semester in June.

(<http://education.guardian.co.uk/higher/news/story/0,9830,645198,00.html>)

¹⁷ www.distance-educator.com/dnews/modules.php?op=modload&name=News&file=article&sid=6209



Concluding Remark

The preceding examples show that there is an abundance of non-sustainable online education initiatives. This does not necessarily mean that the initiatives have been failures; they may have been useful in many ways to individuals, institutions, and society. However hopefully, the examples can help us avoid some future failures.

But the toughest question still remains to be answered: What online education initiatives might be sustainable? The answer is worth a research grant.

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European LMS Experiences

Abstract

This article¹⁸ presents an analysis of LMS systems, which was conducted in 2001 and 2002 for the European Web-edu project (www.nettskolen.com/in_english/webedusite/index.html). Data was collected from in-depth interviews with 113 European experts, usually the systems managers in the institutions, in 17 countries. The analyses of the interviews revealed as many as 52 different commercial and 35 self-developed LMS systems. The article presents the data from these interviews and includes a series of important findings from the study.

One conclusion is that there are a host of commercial and self-developed systems that seem to work satisfactorily in various educational institutions throughout Europe. The systems are not able to handle all the functions the institutions want, and they can be improved in many ways. But most systems encountered in the analyses seem to be good enough for handling online education successfully.

The analysis indicates that the North American systems BlackBoard, WebCT, FirstClass, and Lotus Learning Space are among the most used LMS systems in Europe. This is not surprising since these also are among the dominating systems on the international market. However, the European market is not dominated by the American LMS systems. In countries that do not use English as the first language, locally developed LMS systems have successfully ousted the American products.

A large number of the LMS systems used in Europe are commercial systems developed locally, or self-developed systems built by the institutions. The analysis indicates that the European systems TopClass, Classfrontier, Tutor2000, and Luvit are much used LMS systems, at least in some regions of Europe. It seems that these commercial systems may have a competitive advantage in their local markets since they often have a relatively good local representation and support of local languages.

There are also remarkably many European institutions that use self-developed LMS systems, and there may be many covert and vicarious reasons for choosing self-developed

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¹⁸ This article is based on my article Paulsen, M. F. Experiences with Learning Management Systems in 113 European Institutions. *Educational Technology & Society*, 6(4), available at http://ifets.ieee.org/periodical/6_4/index.html. The article is included in the book with permission from the Editor.



systems. But the analysis indicates that these institutions perceive the commercial systems as expensive and complex. The self-developed systems surmount linguistic problems and are regarded as supportive of special needs and target groups.

Introduction

Evidence of the worldwide spread of e-learning in recent years is easy to obtain. In April 2003, no fewer than 66,000 fully online courses and 1,200 complete online programs were listed on the TeleCampus portal from TeleEducation, New Brunswick, Canada (<http://courses.telecampus.edu>). It is also interesting to observe that 4,500 of the courses were listed as free. The portal includes information about a very broad range of courses with URLs for each course, making it easy for prospective students to study course summaries with a view to enrolling. In spite of the comprehensiveness of the TeleEducation database, up till now about 90% of the listed courses have been from the United States and Canada. Even though the courses represent 17 different languages, it is unlikely that the portal lists many of the courses provided by the 113 European institutions studied in this report.

Much of the success of e-learning can be attributed to the availability of Learning Management Systems (LMS), also known as Virtual Learning Environments (VLE) or learning platforms. An LMS enables an institution to develop electronic learning materials for students, to offer these courses electronically to students, to test and evaluate the students electronically, and to generate electronically student databases in which student results and progress can be charted.

Hall (2003) defines an LMS as: "software that automates the administration of training events. All Learning Management Systems manage the log-in of registered users, manage course catalogs, record data from learners, and provide reports to management."

In 2001 and 2002, the Web-edu project focused on the satisfaction, or lack of satisfaction, that European institutions have with the LMS systems that they have purchased or developed themselves. This is a timely analysis because in the English-speaking world the major American LMS providers dominate the e-learning industry. This is in spite of the fact that a number of these originated in Europe. WebCT, was developed by Murray Goldberg at the University of British Columbia in Vancouver, Canada and then sold to an American company in Pennsylvania. TopClass originated as a European project at University College Dublin, in Ireland, before becoming an Irish campus company and then migrating to the United States.

A number of important themes emerged during the analyses. These are especially discussed in the following:

- Penetration of Internet use and LMS systems
- Large-scale providers of online education
- Commercial LMS systems
- Regional preferences and market leaders



- Competitive issues
- Self-developed systems
- E-learning standards
- Course creation tools
- Student and tutor support tools
- Administrative systems
- Technology
- Economy issues

Interviews and Regional Analyses

This article represents a meta-analysis of six regional analyses conducted within the framework of the European Web-edu project. The regional analyses are listed in Table 6 and published on the project web site (www.nettskolen.com/in_english/webedusite/index.html). They are also available in printed English (Paulsen 2002) and Portuguese (Keegan et al 2002) versions.

Table 6. List of regional Web-edu analyses

Regions	References to regional analyses	Number of institutions
Northwestern Europe	Keegan (2002)	18
The Nordic Countries	Paulsen (2002)	20
Norwegian Universities and Colleges	Runnestø and Ristesund (2002)	24
Germany	Fritsch and Föllmer (2002)	17
Southern Europe	Dias, Dias, and Pimenta (2002)	20
The Czech Republic and Slovakia	Mičincová (2002)	14
Total		113

All regional analyses are based on in-depth interviews with systems managers or systems experts at the user institutions. The interviews were conducted in the fall of 2001 and spring of 2002 as face-to-face meetings, telephone interviews, or e-mail interviews. All interviews were based on a common interview guide, and many of them are available at the project's web site.

The researchers had no intentions of selecting interviewees that constituted a representative selection of European system managers. Data is provided for Norway, which virtually includes all the universities and colleges in that country, but it was not a goal of the project that every European country be included in the project or that every institution in a country could be covered. However, it is considered that the total of 113 institutions throughout 17



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European countries gives an adequate database for important findings on the satisfaction of European institutions with the LMS systems they have developed or purchased.

The researchers were encouraged to find interviewees in various types of institutions. However, in some countries and types of institutions, it proved hard work to find interviewees that were both competent and willing to take the necessary time to participate.

Table 7. Types of educational institutions

Type of institution	Northwestern Europe	The Nordic Countries	Southern Europe	The Czech Republic and Slovakia	Germany	Norwegian Universities and Colleges	Total
Universities	4	8	10	8	7	1	38
Colleges of higher and further education	7				2	20	29
Private companies		1	3	2	6		12
Distance education institutions		3		2	1	3	9
Nonprofit institutions (training)			6	1	1		8
Institutes of technology	5						5
Primary and secondary schools		3					3
University centers		1		1			2
Training organizations	1	1					2
Consortia		2					2
Government training agencies	1						1
Commercial providers of LMS-related services		1					1
Anonymous			1				1
Total	18	20	20	14	17	24	113

(The table is sorted by total number of institutions)

Table 7 lists the types of institutions in the study. A majority (67 out of 113) of the institutions are universities and colleges of higher and further education. Other types of institutions are more or less underrepresented. This reflects the willingness of systems managers in universities and colleges to cooperate in the study.



Internet Penetration and Use of LMS Systems

Table 8 shows that 113 institutions in 17 European countries were interviewed. It also gives the official languages, population, and Internet penetration in the countries. These factors influence the selection and use of LMS systems. The data presented has been compiled from various sources used in the regional analyses. The primary sources are CIA World Factbook 2002 and Eurostat 2002.

From this analysis we would like to emphasize the differences between the Internet use in northwestern and southeastern Europe. The Internet users range from 50% of the population in the Nordic countries to 33% in Northwestern Europe, 30% in Germany, 18% in Southern Europe, and 10% in the Czech Republic.

Table 8. List of countries, official languages, inhabitants, and Internet penetration

Country	Number of institutions interviewed	Language	Area in square km	Inhabitants in millions	Internet hosts per 100 inhabitants.	Internet users per 100 inhabitants.
Sweden	5	Swedish	449 964	8.9	7.0	56.4
Norway	28	Norwegian	324 220	4.5	11.2	52.7
Finland	4	Finnish	337 030	5.2	13.6	44.5
Denmark	5	Danish	43 094	5.3	13	43.0
Great Britain	6	English	227 480	57.6		33.5
Northern Ireland	4	English	14 120	1.6		33.5
Germany	17	German	357 021	82.2	2.3	29.6
Ireland	8	English	70 280	3.8	2.3	27.5
Italy	6	Italian	301 230	57.8	2.7	23.3
France	4	French	547 030	59.5	1.7	16.9
Switzerland	1	German	41 290	7.2	4.4	24.0
Spain	1	Spanish	504 782	39.5	1.4	13.9
Slovakia	4	Slovak	48 845	5.4	0.7	12.1
Portugal	8	Portuguese	92 391	10.2	1.2	10.0
Czech Republic	10	Czech	78 866	10.3	1.6	9.7
Greece	1	Greek	131 940	10.6	1.0	9.5
Iceland	1	Icelandic				
Total of 17 countries	113	Total of 14 languages				

(The table is sorted by Internet users per 100 inhabitants.)



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There are significant regional differences within Europe with regard to how far the institutions have come in their use of LMS systems. The differences seem to follow the regional statistics for Internet users, which means that southern Europe, the Czech Republic and Slovakia seem to be less developed with regard to use of LMS systems than the other regions.

The analyses for northwestern Europe and the Nordic countries show that these regions already have come far in their use of LMS systems. The systems seem to be widely used in Nordic higher, further, and continuing education. It is in fact not easy to find Nordic institutions without experiences with LMS systems. In the United Kingdom and Ireland there is a very extensive implementation of e-learning via LMS systems. This includes provision at degree and diploma level. It seems that very many universities and colleges have purchased an LMS, and many corporations too.

The analyses for southern Europe indicate that this region is less developed. It is, however, clear that the rising number of Internet users in southern Europe is expanding the e-learning market. There is a growing number of institutions with web presence and e-learning offerings, and the analyses show that southern European institutions are further developing their existing e-learning offerings. The pilot projects are no longer dominating the e-learning field in southern Europe. However the research still shows that 50% of the institutions analyzed have less than 15 courses online.

The analyses for the Czech Republic and Slovakia also indicate that these countries are less developed. E-learning is not widespread in these countries, and public opinion concerning online education is not always positive. Online education providers are often associated with curious educational experiments. In most cases online education is used as an addition to traditional face-to-face education. However, there are some fully online experiments. One institution would like to improve the LMS so that it could offer paid courses as lifelong education to the public. Of the 14 institutions interviewed, nine had used their LMS less than one year, but the results are nevertheless visible. Recently, a virtual university collaboration was started by three Czech universities.



Large-scale Providers of Online Education

It is interesting to distinguish between institutions that can be characterized as large-scale providers of e-learning and those in which provision is, as yet, on a smaller scale. The analysis shows that there is a clear trend towards large-scale online education in the Nordic countries. It shows that 12 of the 20 institutions offer at least 50 online courses. According to a 1998-99 analysis (Paulsen, 2000), only 3 of 22 Nordic institutions surveyed offered more than 50 online courses three years earlier. Further, the interviewees talk about LMS systems as large-scale systems capable of handling thousands of users.

A regional overview of large-scale providers, in which provision of 50 or more online courses is considered to represent large-scale provision, is presented in Table 9. It shows that 30 of the 89 institutions (34%) data is available from are large-scale providers. The table also shows that the trend towards large-scale online education has come further in the Nordic countries (60%) than in the other regions.

Table 9. Regional list of institutions with more than 50 online courses

Regions	References to regional analyses	Number of institutions that offer at least 50 online courses	Percentage of large-scale providers
The Nordic Countries	Paulsen (2002)	12 out of 20	60
Germany	Fritsch and Föllmer (2002)	7 out of 17	41
Northwestern Europe	Keegan (2002)	6 out of 18	33
Southern Europe	Dias, Dias, and Pimenta (2002)	5 out of 20	25
The Czech Republic and Slovakia	Mičincová (2002)	0 out of 14	0
Total		30 out of 89	34

(The table is sorted by percentage of large-scale providers)

Table 10 compares the number of online courses found in the Web-edu analysis with a previous international analysis of Web-based education conducted in the Cisaer-project (Paulsen, 2000). This comparison indicates that there is a clear trend that institutions offer more online courses today than they did three years ago. One may say that the trend goes from small-scale to large-scale online education.



Table 10. Distribution of institutions per number of courses

Number of courses	The Nordic Countries		Germany		Northwestern Europe		Southern Europe		The Czech Republic and Slovakia		Sum Web-edu analyses		Cisaer analysis (Paulsen, 2000)	
	%	#	%	#	%	#	%	#	%	#	%	#	%	#
1	0	0	0	0	6	1	10	2	7	1	4	4	23	30
2-4	5	1	18	3	11	2	10	2	14	2	11	10	23	30
5-15	10	2	24	4	22	4	33	7	21	3	22	20	22	28
16-99	35	7	35	6	17	3	38	8	36	5	32	29	22	28
100-	40	8	24	4	22	4	0	0	0	0	18	16	3	4
No Answer	10	2	0	0	22	4	10	2	21	3	12	11	8	10
Total	100	20	101	17	100	18	101	21	99	14	99	90	101	130

E-learning Standards

E-learning standards intend to make LMS systems and learning content less proprietary. The analyses show that there is an interest in standards and standardizations that may make it easier to exchange content and data between LMS systems and between LMS systems and other systems. Some of the interviewees spoke about the importance of standardization in general terms. Many were concerned with the possibility of using, importing, and exporting standardized course content and learning objects. Two German experts talked about the importance of XML and metatagging. And many references were made to standards specifications and initiatives such as SCORM, IMS, AICC and IEEE.

All the institutions analyzed in northwestern Europe are sensitive to the SCORM and IMS standards and they are considered almost as a norm. The Nordic interviewees are aware of the standards, and several claim to follow them. But few state that the standards are important to their institution, and e-learning standards do not seem to have had much impact on online education in the Nordic countries. The German analysis states that standardization will play an important role in the future.

In southern Europe there seems to be considerable ambivalence with regard to e-learning standards. Interviewees stressed the absence of both de facto and formal technical standards. One interviewee claimed that standardization would have a positive impact on internationalization of e-learning businesses. Another argued that since courses often are country-specific, standards are not yet relevant. But standards are welcomed for marketing reasons, for cost reduction, and for LMS migration.



Course Creation Tools

Even though many LMS systems provide internal course creation tools, the analyses showed that a broad range of external tools is used to develop the content before it is published in the LMS system. The interviews show that the LMS systems use text, multimedia, audio, html-pages, graphics, and tests that are developed with external software. The software tools for course creation referred to in the interviews are listed in Table 11.

Table 11. Software tools for course creation found in European analysis

Software tools	Type of content	URL
Word	Text	www.microsoft.com
PowerPoint	Text	www.microsoft.com
Authorware and Director	Multimedia	www.macromedia.com
Flash	Multimedia	www.macromedia.com
Windows Sound Recorder	Audio	www.microsoft.com
Wimba	Audio	www.wimba.com
FrontPage	HTML-pages	www.microsoft.com
DreamWeaver	HTML-pages	www.macromedia.com
Netscape Composer	HTML-pages	www.netscape.com
Viewlet	Graphics (Screenshots)	www.qarbon.com
Corel	Graphics	www.corel.com
PhotoShop	Graphics	www.adobe.com
PaintShop	Graphics	www.jasc.com
Autotest	Tests	
Webwinder	Tests	www.webwinder.com
Learner Interface	Tests	
Questionmark perception	Tests	www.questionmark.com
Hot potatoes	Tests	http://web.uvic.ca/hrd/hotpot
ToolBook	Tests	http://home.click2learn.com
Quia	Tests	www.quia.com
ReadyGo		www.readygo.com



The Nordic analyses show that LMS systems are usually not used for development of course content. According to some southern European interviewees, LMS systems are mainly used for support and sharing of information. Other institutions need to use external tools and specialist support for course production. In the majority of the German cases, there is no course creation with or inside either the commercial or the self-developed LMS systems. Finally, the analyses also indicate that there is a lack of available course content.

A few of the interviewees pointed out that they especially wanted more flexible solutions because they felt too dependent on the systems' intrinsic structure and design. One especially wanted better control of graphical design, logos, etc. Another would have liked to have access to the system's source code.

Student and Tutor Support Tools

There are a host of student and tutor support tools included in the LMS systems. However, the availability and quality of specific tools vary. Many interviewees were concerned about the need for better and more advanced communication and collaboration tools. Two simply stated that they wanted better communication possibilities and secure communication. Others requested better support and more tools for teamwork and collaboration. In addition, some especially focused on the need for better tools for synchronous communication and immediate feedback.

The analyses indicate that several LMS systems should improve their test and assignment tools. They could also be improved with regard to evaluation, e-portfolio, commenting on student presentations, knowledge management, assessment tools, and reports. The German analysis did not find one LMS system using an integrated examination procedure, and the northwestern European analysis found that the concept of quizzes and multiple-choice questioning, a feature of most American LMS systems, is not considered adequate for European academic evaluation.

The analyses in the Czech Republic and Slovakia pointed out that not all LMS systems have tools to track student progress and monitor their performance. Existing tools are not good enough. Student data are not available for tutors who have to contact the system administrator in order to get the data they need.

Administrative Systems

The need for sophisticated administrative systems increases with the administrative workload, and there is a general need for better administrative systems and tools. The analyses show that many systems could have better tools for administration of students, tutors, and content. The interviewees asked for better group management tools, student record systems, improved course management, and better password management facilities. Some interviewees more specifically want better services for student tracking and reporting functions.

The southern European analysis revealed that the administration facilities seem much more important for professional training institutions that usually provide short, repeated



courses in several versions, than for universities. The university model, with year-long courses, requires less frequent administration since it has a more stable association between course, teacher, and student.

With the introduction of large-scale online education, the need for integration between LMS systems and other online education support systems is increasing. The analyses revealed a general lack of such integration.

The Nordic analyses show that the LMS systems need to be integrated with a number of other systems in organizations that aim at providing efficient, large-scale, online education. Integration between the LMS systems and the student management systems seems to be relatively poor, and the integration between the LMS systems and the accounting systems seems to be very poor. In addition, several interviewees are concerned about the opportunities and challenges regarding integration with the administrative system that records student grades.

It is also interesting to see that the Nordic universities have standardized on a few national student management systems. The systems are LADOK (Sweden), MSTAS (Norway), FS (Norway), STADS (Denmark), INNA (Iceland) and to some extent Oodi (Finland). The high levels of national system coordination, or governmental coercion, in these countries may possibly result in more collaboration among the universities and a competitive advantage on the international market.

Some interesting integration efforts are in progress, but Runnestø and Ristesund (2002) confirmed that there is a general lack of integration between the LMS and the student management systems in Norway. Their analysis showed that some LMS systems have no possibility for integration, others have the possibility to import data from the student management system, but only one system (SESAM, a self-developed system by NKI Distance Education) has full integration both ways.

The analyses of the northwestern European countries showed that data produced by the LMS systems are not yet generally integrated into the institutions' administrative databases. Further, there are many German projects where university enrollment is the only prerequisite for access to the LMS system. But this does not mean that the LMS is integrated with the normal university enrollment procedures. On the contrary, in most cases they are completely separate. The German analyses also showed that record or test-databases are separate from the enrollment databases. Because of the privacy laws of data protection, it is not easy to change these procedures.

Technology

The analyses found three categories of server solutions, and all seem to work well. In the first category, the institutions have access to commercial service providers that host the LMS. In the second category, the institutions host the LMS for internal use. And in the third category, the institutions host the LMS for internal use and as a service for other institutions. The institutions that have access to service providers that host the LMS seem to be positive to the solution, but they experience some problems with limited access. Several institutions have



chosen to host the LMS internally. They are typically either the institutions that have self-developed systems or larger institutions with high internal ICT competence that can operate commercial LMS systems locally. The users of the commercial systems claim that the system are stable and reliable. The users of self-developed systems also experience few problems. Virus attacks and firewalls, however, are mentioned as serious problems. A few institutions that have self-developed systems host the LMS for internal use and as a service for other institutions.

The interviewees talk about LMS systems as large-scale systems capable of handling thousands of users. The interviewees are confident that the systems can handle a large number of users without special technological problems. The interviewees did not seem to be concerned with how the systems technically could organize the administration of large numbers of students, courses, and tutors. One mentioned, though, that large-scale operations could impose some pedagogical challenges.

Some comments point out that students have all kinds of connections to the Internet, ranging from low speed modems to broadband access. But the speed of the LMS system does not seem to be any problem. The bottleneck seems to be the network bandwidth and local lines. To handle this, the institutions adapt their bandwidth requirements to the users' equipment. Due to the bandwidth limitations, several of the institutions limit their use of high bandwidth content. At the same time, many interviewees expressed a wish for higher bandwidth to be able to provide more multimedia content and services. Several interviewees wanted to include video services such as streaming video, video-conferences, web-cameras, and moving pictures. Audio services such as voice communication and audio files were also requested. Some of the interviewees especially focused on multimedia tools such as video-conferencing and voice chat for better synchronous communication.

Economic Issues

E-learning is not cheap, and cost-effectiveness becomes more important as the institutions become large-scale providers of online education. Recent price rises, often quite considerable, have made the commercial LMS systems a fairly costly investment. Yearly prices in the range € 20,000 to € 50,000 are being quoted. The cost and pricing structure for the commercial systems vary from system to system. This could make it difficult to compare real costs.

The staff time for the development and maintenance of self-developed systems is proving to be a costly investment too. The German analysis shows that installing a complete system often includes buying a new server and database software, which may easily amount to some €100,000. But many respondents hide these costs behind the statement that it is self-developed, open source, or not available information.

Expenditure on LMS systems is only the first stage of spending. Hardware and software to run them is necessary too. The respondents list considerable sums for the staffing and maintenance of the system, and others add that the provision of content is at least as much again. Expenditure on staff and student training is, however, much less onerous.



The interviewees have only vague knowledge of the maintenance and operation costs. Many interviewees mentioned that economic aspects are hard to identify. The issue is perceived as complex and hard to estimate. Further, it seems they have little knowledge of how much time and money that is spent on training staff and students to use the LMS systems.

Commercial and Self-developed LMS Systems

The analysis of the interviews revealed as many as 52 different commercial and 35 self-developed LMS systems. It is however important to observe that only a few systems were used by several institutions. This probably means that many system providers may have a fragile economy. This is reflected in this statement:

The company [...] has had economic ups and downs. If the company for some reason should discontinue its services, we will probably not develop the system further. But we believe we can run our present [...] installation for a long time without any support from [the provider], even though we hope that this situation will never occur. [Anonymous]

It is important to understand that the statements presented in this article are just sample opinions and they by no means aspire to be representative of the opinions of individual systems. One might also suspect that some of the interviewees could be somewhat biased since they may have a vested interest in the chosen systems, having been involved in the selection process. However, altogether, the statements present an interesting overview of experiences with LMS systems used in Europe.

Commercial LMS Systems

Altogether, the 113 institutions had experiences with 52 different commercial systems. However, the analyses found only four European and four North American systems that five or more institutions had experiences with. So, the analyses indicate that these eight systems are among the most used commercial LMS systems in Europe:

European systems

- Classfrontier (16 institutions used it)
- TopClass (7 institutions used it)
- Luvit (5 institutions used it)
- Tutor2000 (5 institutions used it)



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North American systems

- WebCT (20 institutions used it)
- BlackBoard (14 institutions used it)
- FirstClass (7 institutions used it)
- Lotus Learning Space (6 institutions used it)

There seems to be an overall satisfaction with the most used LMS systems. The analyses in Northwestern Europe show a general satisfaction with WebCT as a user-friendly, competent product. Blackboard has given general satisfaction, but is less widely marketed than WebCT. The strong position of these two North American systems is not surprising, since they might be the two dominant systems on the international market:

Some higher education institutions continue to develop in-house systems or buy into open source alternatives, but an ever-larger majority is purchasing licenses for proprietary platforms. Indeed, two vendors, Blackboard and WebCT currently dominate the market, not only in their native North America, but internationally. Yet both have been trading for little more than five years. Market consolidation is also underway. (*Observatory on Borderless Higher Education, 2002*)

FirstClass is a Canadian system that seems to have a strong position in Scandinavia, and Lotus Learning Space is an IBM product that is also much used in Europe.

The analyses found that four European LMS systems seem to be significant competitors on the European market. TopClass may have a strong position in Europe since it originated in Ireland, and it is praised for its student and records database. Classfrontier is a Norwegian developed system that has a very dominant position in Norwegian universities and colleges. The system is available in a number of languages and sold to institutions in several countries. In Norway, there is great confidence among the users of Classfrontier with regard to the service offered by the contractor. Luvit originated at the University of Lund in Sweden, before it became a Swedish commercial company with reasonable success in Scandinavia and some other countries. Tutor2000 seems to be a successful LMS provider in the Czech Republic.

Table 12 lists the 52 commercial LMS systems identified in the study with their origin, URL and extent of usage.



Table 12. Alphabetical list of commercial LMS systems in the Web-edu analyses

Commercial LMS systems	Original nationality	URL of LMS	Number of institutions using it as		
			primary LMS	additional LMS	an LMS
Ascot CourseMaster	British	www.ascot-systems.co.uk	1	0	1
Aspen	American	www.click2learn.com	1	1	2
Aulanet			0	1	1
BettyCOM	Swedish		0	1	2
BlackBoard	American	www.blackboard.com	9	5	14
Centra	American	www.centra.com	1	0	1
Classfronter	Norwegian	www.fronter.com	16	0	16
Clix campus	German	http://campusonline.uni-freiburg.de:8181	1	0	1
COMC	Danish	www.comc.dk	0	1	1
Corporate learning	German	www.global-learning.de	1	0	1
CourseKeeper	Norwegian	www.coursekeeper.com	2	0	2
Decus System			0	1	1
Destinations			0	1	1
DLS from ETS	German	www.click2q-online.com	1	0	1
Docent	American	www.docent.com	1	3	4
EDWIN	Danish		0	1	1
FDL Learning Environment	British	http://le.reading-college.ac.uk	1	0	1
FirstClass	Canadian	www.firstclass.com	3	4	7
Fle3	Finnish	http://fle3.uiah.fi/	1	0	1
GLN – Global Learning Network	American	http://cisco.netacad.net	1	0	1
Granada Learnwise	British	www.oakwise.oakland.ac.uk	1	0	1
Imaker	Norwegian	www.imaker.no	0	1	1
Interwise-ecp	German	www.learnnetz-sh.de	1	0	1
Intralearn	American	www.intralearn.com	2	1	3
Intranets	American	www.intranets.com	1	1	2
IT Campus			1	0	1
It's Learning	Norwegian	www.itsolutions.no	1	0	1
Kark	Norwegian	http://kark.uib.no	1	0	1
LC Profiler	Finnish	www.lcprof.com	1	0	1
Learning solution	German		1	0	1
Learnlink evocye	American	www.learnlink.com	1	0	1
LEKTOR	Swedish		0	1	1
Lotus Learning Space	American	www.lotus.com	3	3	6
Luvit	Swedish	www.luvit.com	5	0	5
Nettutor			0	1	1
Ping Pong	Swedish	www.partitur.se	1	0	1
Plato			0	1	1
Proto			0	1	1
Response				1	1
Saba	American	www.saba.com	1	2	3
Simulnet			0	1	1
Skills Vantage			0	1	1



Commercial LMS systems	Original nationality	URL of LMS	Number of institutions using it as		
			primary LMS	additional LMS	an LMS
Solstra Hybrid			0	1	1
TeamWave				1	1
TopClass	Irish	www.wbtsystems.com	5	2	7
Tutor2000	Czech	www.kontis.cz	5	0	5
Verkkosalkku, Verkkopisto	Finnish		0	1	1
Virtual-U	Canadian	www.vlei.com	0	1	1
Visit			1	0	1
WebCT	Canadian	www.webct.com	16	4	20
Weblearn Plus			0	1	1
West			0	1	1

Regional Preferences and Market Leaders

In the countries that use English as the first language, the American LMS systems seem to dominate. The overall impression is the domination of the scene by the major American-based LMS systems, notably WebCT, Blackboard and TopClass. This is likely because of the use of English in the United Kingdom and Ireland. WebCT has pushed hard to become the market leader with extensive promotion and presence at e-learning conferences.

In Australia, another English-speaking country, WebCT seems to be the most widespread LMS system and Blackboard seems to be the first runner-up. A NCODE-FLA (<http://ncode.mq.edu.au>) LMS survey (NCODE-FLA, 2002) of 34 Australian institutions conducted by Sue McKnight shows 25 instances of WebCT, 12 instances of BlackBoard, and 7 instances of self-developed LMS systems. This is supported by a briefing on leading learning platforms (*The Observatory on Borderless Higher Education*, 2002) which claims that Australia is the country with the highest penetration of BlackBoard and WebCT licenses in the world since 76 percent of the country's 34 universities have such licenses.

In countries that do not use English as the first language, the American LMS have many user institutions. The research indicates that the Norwegian Classfrontier, and the North American WebCT, FirstClass, and BlackBoard seem to be the most used LMS systems in the Nordic countries. In the Czech Republic and Slovakia, five interviewees referred to the Czech TUTOR2000, three stated that they had self-developed systems, and the last six applied American commercial systems (BlackBoard, Click2learn, GLN, Intralearn, Learning Space and WebCT).

However the analyses show that locally developed systems have a strong position in the countries that do not use English as their first language. Nordic institutions seem to prefer LMS systems developed in the Nordic countries. Among the 25 different LMS systems that were identified in the Nordic analysis, 16 were of Nordic origin. All other systems were of American, Canadian, or Irish origin. According to Runnestø and Ristesund (2002),



Classfrontier is by far the market leader in Norwegian universities and colleges. Of those that offer online education, 65% used Classfrontier. In the Czech Republic and Slovakia, institutions are converting to the national LMS vendors as these commercialize their products, since their systems are provided in the national language. Language is an important issue also in southern European countries and LMS systems that are not translated into their national languages are disadvantaged.

Competitive Issues

There were some interesting findings which showed that customer loyalty, user-friendliness, cost-effectiveness, integration, openness, and adaptability could be of special interest to LMS providers that want to compete in the future market:

- Institutions do not seem to be especially loyal to, or dependent on, one LMS provider. The majority of the institutions had changed system, planned to change system, or operated additional systems.
- LMS systems may have reached a point where user-friendliness, cost-effectiveness, and integration with other systems are more important than new features.
- The open source strategy may have an impact on the future LMS market.
- Adaptability and management facilities on the level above individual courses are requested.

It should also be noted that many systems could be improved with regard to linguistic issues, assessment tools, pricing, content creation and management. The southern European analysis showed that the commercial systems can be very easy to start with, but they may have problems with linguistic issues, as well as with assessment tools, suitability for target groups, and pricing. Many systems seem to have problems with content creation and content management, student monitoring, and assessment tools. Online administration and integration with other systems and platforms were also insufficient.

Much Used European Commercial Systems

The analysis indicates that TopClass, Classfrontier, Tutor2000, and Luvit are much used LMS systems, at least in some regions of Europe. It seems that these systems may have a competitive advantage in their local markets since they often have a relatively good local representation and support of local languages.

TopClass

TopClass (www.wbtsystems.com) originated as a European Commission project at University College Dublin, in Ireland, before becoming an Irish campus company and then migrating to the United States. In this analysis, the overall comments indicate that TopClass is moving from the higher education market to the corporate market:



...Our contacts with the company were less than helpful. They are, unfortunately, more interested in corporate clients.... [Northwestern European Institute of technology #2]

We were quite satisfied with TopClass 3. It was a bit non-intuitive for developers and there are bugs in the authoring system...TopClass 5 is too pricey and runs on Oracle, which requires a very specialized expertise to configure and maintain..... [Northwestern European institute of technology #1]

We have been very satisfied with TopClass. The graphic layout is somewhat old-fashioned, but it provides most of the functionality we need. [Danish distance education center]

TopClass...needs some synchronous communication, including desktop conferencing...At the moment TopClass seems to be predominantly made to bring together simple "text and gif"-type pages, which don't take advantage of the unique ability of the Web to host highly rich media content and support all kinds of collaborative activity. [Northwestern European institute of technology #1]

Classfronter

Classfronter (www.fronter.com) is a Norwegian-developed system that has a very dominant position in Norwegian universities and colleges. The system is available in a number of languages and sold to institutions in several countries. An analysis conducted by Runnestø and Ristesund (2002) showed that Classfronter by far is the most used LMS in Norwegian universities and colleges. It further found that there was general satisfaction with Classfronter.

We tend to focus too much on technology. We need more focus on how we should organize and structure online education. We also need more attention on pedagogical issues and on training of online tutors. The content is much more important to us than the LMS. You may visualize the statement by saying that we must focus more on the textbooks than on the bookshelves. [Norwegian educational company using Classfronter and Course-Keeper]

In their summary of 15 respondents using Classfronter, Runnestø and Ristesund state:

With no exception, all respondents express general satisfaction with Classfronter. Nine of them point out positive sides of the system. Five point out core criteria for their choice of LMS. Four respondents said that language considerations were a significant contributor to the decision. Three respondents shared their views of improvement potentials for Classfronter. Twelve express desires for new functions. No one regretted the choice of LMS. [Runnestø and Ristesund 2002, page 147]

There is a large degree of confidence among the users of Classfronter with regard to the service offered by the contractor and the fast developing speed the program has had. The program has been updated with four new versions yearly, and many user requirements have been accommodated. The user reference group for Classfronter is unique in Norway. This group is the decisive reason why many institutions have selected Classfronter. (Runnestø and Ristesund 2002, page 14)



Tutor2000

Tutor2000 (www.kontis.cz) would seem to be a successful LMS provider in the Czech Republic. Several of the interviewees express satisfaction with Tutor2000 and the fact that it supports the Czech language:

The current system completely covers our requirements. Our main focus is on the creation of the electronic courses. The management of the whole process is governed by the LMS system. [Czech company]

Satisfactory. [Czech college]

The faculty is just starting with the Tutor 2000 system. At the moment we use the system as a support for the traditional direct form of education. We can already say that, from the point of view of distance education, the system is completely functional and perspectival. [Czech technical university department]

In connection with implementation of the LMS Tutor2000 we appreciated that the whole operation of the system is in the Czech language. Unfortunately we have found some system shortages in comparison to the LearningSpace system we have previously used. [Czech university]

However, other comments indicates that Tutor2000 had some significant weaknesses with regard to large-scale operation and commercial use:

For the current operation of the system in our education setup (approx. 100 students, 20 teachers) the system is usable. With higher numbers I predict some problems. The system has quite satisfactory tools for the management of the education program; it is more problematical with the tools for course creation. There are a number of problems. The database administration would be very demanding and ineffective with a higher number of students. The system does not solve the problem of the relations/connection between a student and an education institution at all. The whole communication is just focused on the course. Communication for example with the study department and the whole study agenda is led/solved in the IS Student program. The link between IS Student and Learning Space is not automated. [Czech university department]

The Tutor2000 system is an LMS, which is mainly for administration agenda. Because of the fact that Tutor2000 cannot create courses, ToolBook II is used as a component part of delivery. In my view the system has some problems concerning single installations for customers. In our case some functions are not working properly (statistical evaluation/assessment). The system does not have an authorized access function into the courses (they are opened in a new window and it is possible to obtain the address of the course). The system does not have its own means/tools for online communication. Considering all these facts I do not think that this system in its present phase is appropriate for commercial use. [Slovak university]



Luvit

Luvit (www.luvit.com) originated at the University of Lund in Sweden, before it became a Swedish commercial company with reasonable success in Scandinavia and some other countries.

The Luvit tools have not been especially developed for corporations like ours. They have been primarily developed for colleges and universities. However, Luvit makes it possible for us to provide courses to all our employees at the same time. This immediateness exceeds everything we have experienced earlier. Many of our employees are parents that cannot leave their children at home because they need to attend a course. These people need flexible training, which we can provide with Luvit. Luvit's major weakness is that it is not compatible with Word, PowerPoint, and other e-learning platforms and products. An annoying detail is that it is not possible to cut and paste material in Luvit. [Swedish company]

For us, it is important that Luvit is based on a Scandinavian pedagogical tradition. We cannot apply German or American systems because they are based on different pedagogical thinking. [Swedish company]

On the positive side, I think that an LMS system is absolutely necessary for teachers because they have to deal with a heavy workload. They work under increasing time constraints, and in these circumstances Luvit can help them save time and increase the quality of their teaching. [Swedish university]

I feel that the term LMS systems is misleading. The systems don't really manage learning. They are more suited for organizing students and content than for managing learning. [Swedish university]

The Swedish-developed LMS systems are not dominant in Swedish education. There is little national coordination in this field, the universities are very autonomous and the system choices are made locally. [Swedish university]

Most of the distance education courses we provide via Luvit are included in the national network university program (Nätuniversitet: www.netuniversity.se). Nätuniversitet allows the universities to apply their own online systems and models. In other words, the universities don't need to coordinate their systems or pedagogical models. This is probably good for the universities, but it could be confusing for students who want to follow courses from several universities. [Swedish university]

Much Used North American Commercial Systems

The analysis indicates that the BlackBoard, WebCT, FirstClass, and Lotus Learning Space are among the most used LMS systems in Europe. This is not surprising since these systems also are among the dominating systems on the international market. The analysis indicates that there would seem to be general satisfaction with these systems.



BlackBoard

In 1997, graduate students at Cornell University developed CourseInfo. Blackboard.com now owns CourseInfo, and changed the name of the product to BlackBoard (www.blackboard.com) with version 5.

From this analysis, there seems to be general satisfaction with BlackBoard. One institution, however, expressed regret that the system was not yet available in Italian:

The switch from COM-C to BlackBoard was partly due to a common e-learning strategy among the institutions that recently merged to form the University of Southern Denmark. It was also due to the fact that Blackboard is gaining market share in Denmark. The fact that we now have a system that we operate ourselves reduces the external costs, since the universities employees handle the operation. As I understand it, Blackboard is also easier to integrate with our student management system STADS. However, integration is still a real challenge. [Danish university]

Blackboard makes advances in Denmark. [Danish consortium]

Satisfied – plan to upgrade from Blackboard L1 to Blackboard Learning System. [Northwestern European further education college]

Blackboard was very simple and easy to use, would recommend it. [Northwestern European institute of technology]

Satisfied, we appreciate the ease of use. [Italian non-profit consortium]

We are very satisfied and hope that the Italian version will come on the market soon. [Italian university]

WebCT

In 1995, WebCT (www.webct.com) was developed by Murray Goldberg who was a faculty member at the University of British Columbia in Vancouver, Canada. In 1999, Universal Learning Technologies, an American company in Pennsylvania, purchased WebCT, and changed its company name to WebCT.

There seems to be general satisfaction with WebCT as a user-friendly, competent product. In a European perspective, it is interesting to observe that both a Portuguese and an Icelandic institution express a wish for better support of their national languages:

If I have to be critical, I feel that it might be hard to get the support we need for local adaptation from the American company. For example, we have not been able to get an Icelandic language version of version 3. [Icelandic vocational college with distance education department]

Good. There aren't major difficulties in pedagogical terms. It responds according to needs. The software is equipped with many tools, but it isn't adapted to the target public. The English language is another difficulty. The problem with personalizing questionnaires makes interaction more complicated. The course management tools, as well as the specifics of the tutor, should be personalized. At the



level of support tools for training management, these are not duly developed, thus don't respond effectively to the existing needs, regarding quality and quantity of the existing indicators. The help could be more developed. [Portuguese non-profit association]

It fulfils our requirements. [Czech college]

The system is applicable. It has its advantages as well as disadvantages, as any other software. [Czech technical university]

We have found WebCT ideally suited to our needs, efficient, and adaptable. We have had very few problems. [Northwestern European university college]

Excellent for us, although we recognize it is not perfect. [Northwestern European further education college]

WebCT offers all the basic tools for teaching and learning on the Net. The system is easy to use by the students, but demands a bit more work from teachers. The system should be user-friendlier from the point of view of a teacher (for example Quizzes are difficult to create and update). [Finnish university #1]

The platform works reasonably well and has been a moderately cost-effective solution. [Finnish university #2]

The most positive thing about WebCT is that it is easy to access it and to use it. You don't need any special client software. WebCT works all the time and is very stable. I'm very happy to use it. I haven't seen anything I really dislike. We will probably continue to use WebCT in the future. [Icelandic vocational college with distance education department]

WebCT was a good choice for us. It is very comprehensive and therefore also complex to master for inexperienced designers and tutors. The major advantage is that it supports quality in teaching. Everything is documented so that the tutors can build on their previous work whenever they start a new course. WebCT has also made me think about education in new ways. For example the fact that several tutors may collaborate and that a course could be designed by one tutor and taught by another tutor. Online communication also facilitates collaboration between institutions and provides new pedagogical dimensions. [Swedish university]

Global evaluation: satisfactory. Won't change (the system) as long as there are no reasons to; it will only change for reasons such as cost or appearance of other management solutions presented in new systems. People getting used to it is also a reason not to change. Negative references to the WebCT interface, there are no big differences between the systems. Its acquisition was decided upon consideration of the costs. [Portuguese public university]

Well, we are still at the beginning and although we had some difficulties at the start, there is no problem anymore and we are satisfied with it. [French university #1]



We are satisfied, we do not see any particular big problem that would not be possible to solve. [French university #2]

We have found WebCT to be an excellent tool for implementing e-learning across the institution. [Northern Irish university]

Very good, user-friendly so far. We are only in the initial stages of implementation. [Northwestern European institute of technology]

FirstClass

FirstClass (www.firstclass.com) is a Canadian system that seems to have a strong position in Scandinavia. To achieve full functionality, users need to install a FirstClass software client. Some institutions perceive this as a disadvantage:

We are very satisfied with the systems we have developed. FC is a simple, flexible, and well-working conferencing system with many features. It makes it easy to establish and organize teaching. In my opinion, however, it is not an LMS system. FC provides a nice visual overview. The users may enter personal presentations with pictures etc. They can also attach audio files. On the negative side, FC only works 70% without installation of the client software. The client software makes FC faster and better. So, we distribute the client software and recommend that the students install it. [Danish consortium]

The LMS systems are our primary tool for communication with our distance students. All courses except a very few completely rely on our LMS systems. We are very dependent on the systems, so they must be simple and reliable in use.

[Danish university center]

In my opinion, the three important LMS-functions are: publication, administration, and collaboration. In addition, the system should be easy to use. [Norwegian semi-private provider of primary education]

Lotus Learning Space

Lotus Learning Space (www.lotus.com) is an IBM product that is also much used in Europe. The few overall comments on the system provided in this analysis indicate that the user institutions are satisfied with the system:

Satisfactory. [French university]

Good. It's a stable and intuitive program. The assessment aspect is not as well constructed. [Portuguese non-profit private institution]



Other European Commercial Systems

The analysis revealed a number of other European commercial systems. The concluding remarks regarding overall evaluations of these systems are listed in the following. It is important to understand that these comments are just interesting sample opinions on individual systems and that they by no means attempt to offer representative opinions on the individual systems. The only conclusion, which is inferred from the statements about these systems, is that there are a number of interesting, commercial, European LMS systems that receive positive critique and may therefore have a future on the international market.

Ascot CourseMaster (www.ascot-systems.co.uk): One off system. [Northern Irish college of further and higher education]

Corporate Learning (www.global-learning.de): Decisive for this LMS was the client capability - several suppliers in this system, but still autarchic with respect to their clients. They use the general functions, but capsulated from the others. [German company]

CourseKeeper (www.coursekeeper.com): I recommend that one use standard systems wherever it is possible. Design the course content first, then choose the LMS. It would not have been wise, if we had chosen LMS two years ago. Much has happened with the standard systems during these two years. We have done much pioneer work, and there were few institutions we could get any advice from. [Norwegian private secondary school]

Fle3 (<http://fle3.uiah.fi/>): What we are developing and using is rather different than most of the LMSs. We have thought that it is better to have a good tool for different tasks than trying to have a Swiss army knife. [Finnish university]

Granada Learnwise (www.oakwise.oakland.ac.uk): Excellent. [Northwestern European further education college]

LC Profiler (www.lcprof.com): As a user (teacher/tutor) I think that Profiler is good for longer "academic style" studies for adult learners because of its pedagogical idea. (open and flexible learning/project phase learning"). Teachers must know (and accept) what is the basic idea for the course structure and after that Profiler supports work very well. If one uses Profiler very differently, there are some "unnecessary" functions that may confuse users. As it is offered as a service, starting a course is easy. As well as "building" a special course for a system. [Finnish university]

Ping Pong (www.partitur.se): The Ping Pong Academic User Group, PAUG, is important for us. PAUG consists of 2-4 persons from each university in Sweden that uses Ping Pong in education. We have physical and virtual meetings several times a year. The aim is to develop good new features in Ping Pong, and together buy these from Partitur. Another goal is to discuss questions about pedagogical aspects when using an LMS. PingPong's major strengths are the communicational and statistical features. Its weaknesses are related to limited student privileges. They cannot for example create their own web pages, establish forums or submit files. Using a metaphor, one may say that PingPong provides more opportunities for Ping than for Pong. [Swedish university]

Visit (www.visiteurosync.net): Our emphasis is on creating and providing courseware to corporate and individual clients. We are not LMS specialists but do consider a solid and



adaptable LMS as a key consideration in our corporate strategy. We find that our current LMS suits all our needs at this point in time. The previous LMS we used was inherited from Learn2 but we felt it didn't suit all our needs. Our current LMS is actually a suite of programs including Software Simulator Technology, the Custom Curriculum Development system, and the Course Management System. We feel this gives us a broader and more evolutionary system. [Northwestern European company]

Other Non-European, Commercial Systems

The analysis also found a number of other non-European commercial systems. The concluding remarks regarding overall evaluations of these systems are generally positive, so one may infer that there are many reasonably good LMS systems to choose from. But again, it is important to understand that these comments are just interesting sample opinions on individual systems and that they by no means attempt to offer representative opinions on the individual systems. The comments are listed in the following:

Aspen (www.click2learn.com): LMS is well suited to internal education in a large company where asynchronous and self-study methods are preferred. LMS integrates well online and with FTF courses with skills management requirements. [Czech company]

Docent (www.docent.com): We selected Docent after doing some benchmarking and do not regret our choice. We would appreciate an Italian version of the handbook. Furthermore the graphical impact of Docent is not very attractive when compared to our home-made one. I would say the interface is less intuitive. [Italian non-profit training organization using Greenteam and Docent]

GLN – Global Learning Network (<http://cisco.netacad.net>): The LMS is good, its interface for study as well as for administration is completely based on WWW, and it is worldwide and stable. [Czech technical university]

Intralearn (www.intralearn.com): The Intralearn platform is modern, constantly improving according to requests from firms, educational centers and commercial users (clients, students). Through course creation the system allows acceptance also of older, earlier developed materials in different formats. There is no special courseware, which would cost a lot of money, and also from the user's point of view it is very practical. It is not limited by any special requirements concerning hardware and software from final users. Administration and management have not yet been completely tested in our conditions, but we can base our conclusions on references of foreign firms (as well as universities), which use the system. [Slovak e-learning center].

It's a program of good quality and flexible. Better than Learning Space and Formare, but worse than Docent or SABA. [Portuguese private company using Intralearn and Centra]

Intranets (www.intranets.com): Generally, this system meets our needs. It is simple, unfussy, and easy to learn. In the long run, we would like something more sophisticated, but we found when we were looking for a system that providers wanted to give us greater functionality than we required and they wanted us to be champions within the university for



fully integrated campus systems, rather than provide something that would allow us to get on with our job. [Northwestern European university]

Learnlink evoye (www.learnlink.com): This system seems to be a perfect training system – the structure and functionality is only possible at the price mentioned, no hardware specialties on the part of the students; the cost structure heavily relies on – mostly – publicly funded student fees. Public labor administration gives most of the fees for re-training the workforce. [German company]

Saba (www.saba.com): We use the LMS differently than traditional course providers. We use it more like a management tool than like a course platform in which the courses are designed with the tools provided by the LMS. In addition, it is necessary to distinguish between the SABA system and our application of the system. Finally, it is important to understand how e-learning standards may influence your options and decisions. The standards provide both opportunities and restrictions. It is therefore important to find the right balance between standards and freedom. [Norwegian educational company]

European Self-developed Systems

It is interesting to observe that the analyses revealed as many as 35 self-developed LMS systems. They are all listed in Table 13. From this one may infer that there are remarkably many European institutions that use self-developed LMS systems. It is however not always easy to distinguish between commercial and self-developed LMS systems. Many systems have started as self-developed systems that after a while have been commercialized. Other self-developed systems are shared among several partners. So, some of the LMS systems listed here as self-developed systems, could probably be included on the list of commercial systems.

It is interesting to observe that most of the respondents expressed satisfaction with their self-developed systems. One must however be aware that the respondents may have vested interests in their systems and that there might be many covert or vicarious reasons for choosing self-developed LMS systems. The German analysis stated that there is a tradition saying that a high-quality computing center does not need to buy programs developed by others. The need to buy external programs would question the center's qualifications.

But the analyses also indicate that institutions with self-developed LMS systems perceive the commercial systems as expensive and complex. The self-developed systems avoid linguistic problems and they are regarded as supportive of local needs and target groups.

Several Nordic institutions prefer self-developed systems. They perceive the commercial systems as expensive and complex and want to develop systems to support their local needs. They want cost-effective systems with the ability to handle continuous enrollment and integration with student management systems and accounting systems.



Table 13. List of institutions with self-developed LMS systems

Name of institution	Nationality	Web address	Self-developed LMS systems
Czech-Swiss Institute	Czech		
Danmarks Netskole	Danish		
CNED	French		
Netzentwurf	German		
TU Chemnitz	German		
Akademie	German		
Virtus	German		ILIAS
Akademie	German		Lernen-im-netz
Virtuelle Universität	German		Planetux
Osnabrueck	German		VC Prolog Tutor
LVU	German		VU
Darmstadt	German		Wave learn
Aristoteles University of Thessaloniki	Greek		
Instituto Formazione Operatori Aziendali	Italian		Aula virtual
Anonymous	Italian	www.esperienze.net	Experienze
Sinform 1	Italian	www.greenteam.it/greenteam/education	Greenteam
University of Trento	Italian		Proprietary
Høgskolen i Narvik	Norwegian		
Høgskolen i Oslo	Norwegian		
Høgskolen i Sør-Trøndelag	Norwegian		
Høgskolen i Stord/Haugesund	Norwegian		
Handelshøgskolen BI	Norwegian		Apollon
Høgskolen i Vestfold	Norwegian		Ed-On-Web



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Norges Landbrukskøgskole	Norwegian		Kurs.nlh.no
Dronning Mauds Minne	Norwegian		MvForum
Globalskolen	Norwegian		PedIT
NKI Fjernundervisningen	Norwegian		SESAM
Associaçāo Empresarial de Portugal	Portuguese	www.e-cursos.com	e-cursos
Prodigio	Portuguese		Evolui
PT-Inovaçāo	Portuguese	www.formare.pt	Formare
Universidade Católica Portuguesa	Portuguese	www.mytw.net	TWT Teaching Web Toolkit
AINova	Slovak		
LCDE	Slovak		
University of Vigo	Spanish	www.elearning.uvigo.es	ELIAS
Statens skolor för vuxna	Swedish		SSVN2000

A Norwegian large-scale distance education institution using a self-developed LMS expressed it this way:

SESAM has been developed by NKI to support the services that are important to NKI. We have based the work on evolutionary systems development over a period of 15 years. As a result, we have a system that is very well adapted to our special needs. SESAM is excellent for handling continuous student enrollment 365 days a year. The major, additional advantages we have over the commercial systems, is the focus on costeffectiveness and the integration with our critical student management systems and accounting systems.

The southern European analysis found that self-developed systems might be simpler and directly adapted to the target groups; they avoid the linguistic problems of the commercial systems and are constantly updated, being able to improve their features in accordance with trainers, trainees and administration evolution. Besides the linguistic advantage, national marketing strategies together with competitive pricing contribute to the widespread use of those self-developed LMS systems.

Runnestø and Ristesund's (2002, page 157) survey of Norwegian universities and colleges concludes that all five respondents with self-developed LMS systems: "express general satisfaction" with their systems. Most of the other respondents also express satisfaction with their self-developed systems:



Very satisfied. [Greek university]

Satisfaction. 15/20. [Portuguese company using EvoluiTech]

We like the product although it is "home-made". [Italian non-profit training organization using Greenteam (www.greenteam.it/greenteam/education)]

The system meets already, after our own development, our needs/expectations. It is easy to use for teachers as well as for the students. [Czech independent institution]

At this moment the evaluation is very satisfactory, which is natural since it's an upgrade that began in early 2002. From the perspective of the relationship with the trainers it's very friendly, they use it with extreme facility, they enter all kinds of content, given that it's not necessary to enter content in any specific format. In the relationship with the students, the platform is satisfying. We don't use audio or video because the platform doesn't respond to it due to the technological deficiencies of the general technological network. In the administrative part we developed a set of outputs that we thought were necessary 2 months ago. In the relationship with the trainers we can possibly integrate some more facilities. [Portuguese private non-profit association using Aep e-cursos (www.e-cursos.com)]

Technically, it is a very good system. The experience is good in the Doctorate program and surpasses expectations. The most important thing is lacking; the institution dedicates very little to virtual education. The only thing that the University acknowledges is the dedication of the teacher, counting it as a school year activity and thus valid for curricular reasons. [Spanish university using Elias (www.elearning.uvigo.es)]

Formare is a national system, developed according to the practice and experience of e-learning. Perhaps that can be considered the secret of its user-friendliness and success in the increase of the number of clients in 2001 and 2002 (currently there are 17 institutions). [Portuguese private company using Formare (www.formare.pt)]

-portal very successful among students and professors of the University; -very high level of flexibility as to the choice of tools necessary due to proprietary platform; -well structured collaborative learning [Italian university]

The system is capable of offering courses to a smaller number of learners. For its marketability, certain features must still be improved but it does satisfy the needs it has been developed for. [Slovak association]

There are remarkably many institutions that use self-developed LMS systems, and there may be many reasons for choosing a self-developed system. Some of the reasons may be covert and vicarious reasons for choosing self-developed LMS-systems. But the analyses indicate that these institutions perceive the commercial systems as expensive and complex. The self-developed systems surmount linguistic problems and are regarded as supportive of special needs and target groups. This is supported by some of the respondents who explain why they prefer their self-developed systems to the commercial systems:



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We are developing our own because we were not satisfied with what's available on the market. A lot of people think I'm mad, maybe I am but I want to have a go. It looks like we will succeed. [Northwestern European governmental training center using TopClass]

SESAM has been developed by NKI to support the services that are important to NKI. We have based the work on evolutionary systems development over a period of 15 years. As a result of this, we have a system that is very well adapted to our special needs. SESAM is excellent for handling continuous student enrollment 365 days a year. The major, additional advantages we have over the standard systems, is the focus on cost-effectiveness and the integration with all our critical student management systems and accounting systems. [Norwegian distance education institution using SESAM]

We focus on distance education, which is not necessarily the same as Web-based education. [Swedish public distance education]

We have an economic advantage since we can split LMS costs between three collaborating partners. We are also able to offer more courses together, since we can offer certified courses from all three institutions. The partnership is working very well. This is partly due to the contract between the partners and to the binding economic model we have signed. It is important to decide whether the institution should buy a standard LMS system or develop an in-house system. Both choices will be expensive and include much work. I recommend that institutions collaborate to share resources and expenses. I also recommend that one makes it simple. Simple e-mail is often better than complex conferencing systems. I'm glad we chose to develop an in-house LMS-system. The commercial systems were expensive and complex. Now, we may develop the system further to support our special needs. [Danish consortium]

OK. Other than the limitations of the system, it's obviously other factors that limit the use of the LMS in the teaching/learning context. At this moment we have approximately 10 disciplines from graduate degrees using LMS, at different stages. In post-graduate degrees, we have 1 discipline with 2/3 years experience, and another more recent... There is no institutional strategy, it is a bottom-up initiative, but it would be useful if it were top-down... the initiative is facilitated and accepted, but there is no strategic dimension... [Portuguese private university using TWT – Teaching Web Toolkit (www.mytwf.net)]

The system is being built and the benefit/advantage is that its single parts can be used already at the present, which makes the work of involved/interested teachers easier and more visible. [Slovak distance education institution]

Important Findings

There are significant regional differences within Europe with regard to how far the institutions have come in their use of LMS systems. The differences seem to follow the regional



statistics for Internet users, which means that southern Europe, the Czech Republic and Slovakia seem to be less developed with regard to use of LMS systems than the other regions.

The analyses show that there is a clear trend toward institutions offering more online courses today than they did three years ago. One may say that the trend goes from small-scale experiments to large-scale operation of online education. If one characterizes institutions that offer at least 50 online courses as large-scale providers of online education, 30 of the 89 institutions (34%) we have data from could be characterized as large-scale providers. The analyses indicate that the trend towards large-scale online education has come further in the Nordic countries (60%) than in the other regions.

The analyses revealed as many as 52 different commercial and 35 self-developed LMS systems. One striking conclusion is that there are a host of commercial and self-developed systems that seem to work satisfactorily in various educational institutions throughout Europe. The systems are not able to handle all the functions the institutions want, and they could be improved in many ways. But most systems encountered in the analyses seem to be good enough for handling online education successfully. It is however important to observe that only a few systems were used by several institutions. This probably means that many system providers may have a fragile economy.

The analysis indicates that BlackBoard, WebCT, FirstClass, and Lotus Learning Space are among the most used LMS systems in Europe. This is not surprising since these North American systems also are among the dominating systems on the international market. The analysis indicates that there would seem to be general satisfaction with these systems.

But the general position that the market is dominated by the American LMS systems is not the norm throughout Europe. In the countries that do not use English as the first language, locally developed LMS systems have successfully ousted the American products. Remarkably, a large number of the LMS systems used in Europe are commercial systems developed locally or self-developed systems at the institutions. However, very few of these systems seem to have more than a few user institutions.

The analysis further indicates that TopClass, Classfrontier, Tutor2000, and Luvit are much used LMS systems, at least in some regions of Europe. It seems that these European systems may have a competitive advantage in their local markets since they often have relatively good local representation and support of local languages.

The analysis revealed a number of other European commercial systems. The only conclusion, which is inferred from the statements about these systems, is that there are a number of interesting, commercial, European LMS systems that receive positive critique and therefore may have a future on the international market.

The analysis also found a number of other non-European commercial systems. The concluding remarks regarding overall evaluations of these systems are generally positive, so one may infer that there are many reasonably good LMS systems to choose from.

There are a remarkable number of European institutions that use self-developed LMS systems, and there may be many covert and vicarious reasons for choosing self-developed LMS systems. But the analyses indicate that these institutions perceive the commercial systems as complex and expensive with escalating licensing costs. The self-developed



systems avoid linguistic problems and are regarded as flexible and supportive of local needs and target groups. One might also expect that a self-developed system is one reason for expertise to stay in-house.

The southern European analysis showed that in almost all cases, neither commercial nor self-developed systems were able to provide all the services institutions needed. Administrative aspects, integration with existing software and content management are some of the problems encountered in most of the LMS systems. The analysis in the Czech Republic and Slovakia also showed that there were cases in which certain facilities were not available (e.g. synchronous communication). However, it must be taken into consideration that the institutions choose their system according to their needs. So, in spite of the fact that a system seems to have a shortcoming, it is actually not the case, because the system is suitable and satisfactory for the institution.

With the introduction of large-scale online education, the need for integration between LMS systems and student management systems is increasing. The analyses revealed a general lack of such integration. It is however interesting to see that the Nordic universities have standardized a few national student management systems and that interesting integration efforts are in progress.

Cost-effectiveness becomes more important as the institutions become large-scale providers of online education. The interviewees have, however, only a vague knowledge of the system's maintenance and operation costs. The cost and pricing structure for the commercial systems varies from system to system. This can make it difficult to compare real costs. Some interviewees were concerned about high and increasing prices for the commercial LMS systems.

The analyses indicate that there is a need for increased focus on LMS knowledge, policy, and strategy in southern Europe. In particular university e-learning managers are concerned with the university policy in this field. Apparently they think that southern European universities are not dedicating enough importance and attention to this subject. The analyses further indicate that the introduction of LMS systems could be a source of conflict between administration and academia.

The analyses show that there is an interest for standards and standardization that could make it easier to exchange content and data between LMS systems and between LMS systems and other systems. The institutions in northwestern Europe are sensitive to e-learning standards and they are considered almost as a norm. The Nordic interviewees are aware of the standards, and several claim to follow them. But few state that the standards are important to their institution, and e-learning standards do not seem to have had much impact on online education in the Nordic countries. The German analysis states that standardization will play an important role in the future. In southern Europe there seems to be considerable ambivalence with regard to e-learning standards.



Six Strategic Recommendations from the Web-edu Project

In conclusion, the web-edu analyses provided the recommendations presented in List 6 for European politicians, educational administrators, and other decision-makers in the field of online educations.

List 6. Six strategic recommendations from the Web-edu project

1. Focus on improved integration of support systems for online education. As online education activities grow, it is important to reduce manual operation and to increase the quality and amount of online information and services. This requires automated services and integration between the student management system, the LMS system, and several other student support systems.
2. Require sustainability in online education. It should be of great concern that much of the online education that has been offered so far has not been sustainable. A lot of it has initially been supported by extraordinary internal or external funding and ended when the external funding has stopped. It is therefore important to study programs that demonstrate sustainability and understand what incentives promote sustainability.
3. Increase focus on cost-effectiveness as online education develops from small-scale experiments to large-scale regular operation. The current development towards large-scale operations entails that it is increasingly important to focus on cost-effectiveness on all levels. It is crucial to establish efficient and cost-effective infrastructures that support online education. This includes systems and routines for course development, customer relation management, course enrollment, student support, technical support, teacher training and support, examinations, payments, and logistics.
4. Realize that e-learning standards may have consequences for your online education and develop a strategy to deal with this situation. E-learning standards could have a positive effect on cost-effectiveness and spreading of online education because they support interchangeability and reusability in e-learning. On the other hand, adherence to the standards may not be sensible use of limited resources and their intrinsic pedagogical models are not necessarily consistent with an institution's pedagogical philosophy.
5. Consider supporting the best local LMS providers. There are a host of European LMS systems that seem to work well the way they are used. They are often praised for local presence and supportiveness of European languages and pedagogical traditions. But many of the companies behind the European systems may have a fragile economy and face tough competition from their North-American competitors.



6. Support virtual mobility of online students in Europe. There is a steady growth of institutions that offer online courses to students in other countries. This trend is most conspicuous in Australia, North America, and the UK. There is a clear and present danger that Europe will lag behind these regions in the emerging global online education market. To improve its competitiveness, Europe should support initiatives that promote and facilitate virtual mobility of online students in Europe.

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Anecdote 5. Fronter: The Story Behind a Dawning Norwegian LMS Success

On February 2, 2002, ComputerWorld Norge wrote that Fronter signed a large contract with Beijing Normal University, and that the company's ambition is to conquer the world with its LMS system. The article also stated that Morten Flate Paulsen rebuts that Fronter's ambitions are out of touch with reality. After this controversy in Computerworld, I have made these personal observations on Fronter and its reality¹⁹:

Fronter (www.fronter.com) is a Norwegian software company that was established in 1998 by Roger Larsen and Bjarne Hadland. They are still the major shareholders. According to Niklas Indrevær, Fronter has 17 employees in Norway and works through partner companies in other countries. All in all, more than 50 people make their living from developing, selling and implementing Fronter products. He further states that Fronter has created a flexible system that enables organizations of any size to administer users and courses with ease. Fronter has customers with 5 users and with 65,000 users, all administered through the same Web-based interface.

In August 2003, Fronter reported having sold more than 500,000 Classfronter licenses, about 50 percent of them in Norway. At the same time, Classfronter was available in 17 languages including Arabic, Russian, and Chinese. The major customers outside Norway are schools in Denmark and The Netherlands. The most important international users are the city of Hague in The Netherlands, Fyn County and Dupont Agri in Denmark, the Swedish Rescue Services Agency, Chalmers University of Technology of Gothenburg, and the IT University of Gothenburg in Sweden. According to Product Manager Ane Torvanger, Fronter is also launching a scaled-down LMS called MySchool for all schools in The Netherlands through the company's Dutch partners.

Classfronter is by far the most used LMS system in Norwegian universities and colleges. Initially, this was due to collaborative development with the University of Tromsø, which made the system well suited for use in Norwegian universities. In my opinion, the following factors have later contributed to Fronter's dawning success:

- Classfronter is a flexible and comprehensive LMS system with more than 50 optional tools that are well suited to meet the needs of universities and schools. Some of the most important tools in Classfronter are Discussions, Shared Documents, Tests, Whiteboard, Chat, Video, and Statistics.

¹⁹ The reader should be aware of the fact that on the one hand, I have worked with the development of SESAM, which could be viewed as a competing system. On the other hand, I'm on friendly terms with Fronter's key employees.



- Fronter chose an aggressive pricing policy to enter new markets and market segments. This made it possible to seize a leading position in selected market segments. The strategy was of course risky, from an economic point of view.
- Fronter understood early the importance of integrating Classfronter with FS and MSTAS, the two major student management systems used in Norwegian higher education. Their expertise in integrating Classfronter with student management systems may give Fronter a competitive advantage in some markets.
- Classfronter is based on open standards such as Linux, MySQL, XML, and IMS. The systems development is based on extreme programming with minor but frequent updates. A major new release of Classfronter is available every third month. All releases are readily available to all users, since they all access the same host computer.
- The University of Oslo hosts all Fronter installations, and the university is perceived as a competent and trustworthy partner in both the academic and commercial market.
- Fronter has developed a close working relationship with Norwegian universities and colleges. It has established and worked very seriously with a reference group consisting of 25 employees from Norwegian colleges and universities. The reference group meet three times a year to discuss the further development of Classfronter. The advice from the reference group constitutes important guidelines for each new release of Classfronter. Similar reference groups have also been established in Sweden and Denmark.

My two major concerns about Fronter are related to yearly deficits and a possibility of "anarchistic implementation". Teachers seem to appreciate that Classfronter provides a large number of optional tools and supports a broad variety of file formats. The teachers have a lot of individual freedom and flexibility in how they teach and organize online courses. However, from a system administrator and a school management point of view, there is a danger that the flexibility could evolve into "anarchy" that could be hard to manage in a large-scale system with hundreds of courses and teachers. This could be a real organizational challenge for many managers, even though the software provides useful functionality to facilitate overall administration.

Like many other European providers of LMS systems, Fronter's economy should be of concern for customers. The company's aggressive price policy has so far resulted in relatively low revenues and economic losses. But the company's economic situation is improving. According to Ane Torvanger, in 2001 Fronter roughly had revenue of € 1.0 million and a loss of € 0.6 million. In 2002 the revenue grew to about € 1.5 million and the loss lessened to € 0.15. The first six months of 2003 resulted in revenue of about € 1.25 million and for the first time a profit of about € 0.3 million. She also claims that the company has no debt.

I have followed Fronter closely after our controversy in ComputerWorld. I now regret claiming that their ambitions to conquer the world are out of touch with reality. After all, we need more online education companies in Scandinavia with international ambitions. I hope they will succeed, and wish them good luck in the future.



Part Three

GLOBAL E-LEARNING IN A NORDIC PERSPECTIVE

...the concept of online learning as a service industry may well be the most important lesson that Nordic providers of online education could take from their Canadian counterparts. (Page 332)

[Third Generation Distance Learning] was firmly rooted in a longstanding Danish tradition for learning through 'the living word' (as opposed to the printed word). (Page 219)

The development of a collaborative learning program is much faster and many factors less expensive than the development of a CBT course. (Page 221)

The Achilles' heel of Collaborative Learning is that it scales so badly. And the ability to scale in a controlled and manageable way is a substantial and timely requirement in Danish online learning right now...(Page 222)

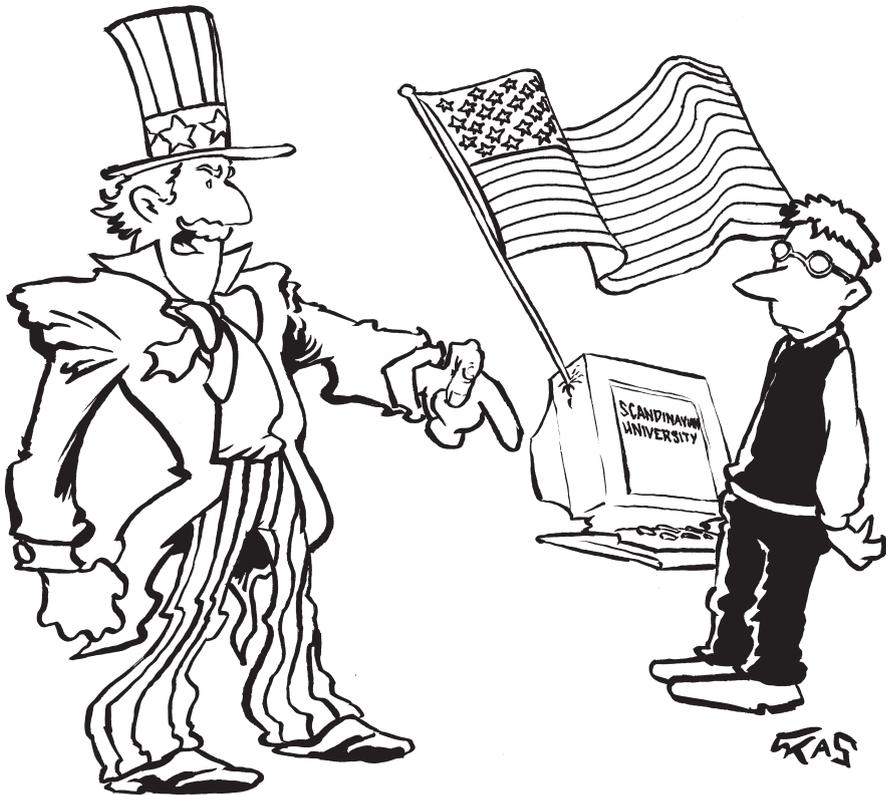
... the very concept of systems which manage learning is something strange to Danish educational thinking. Systems should be used to support learning. The management of learning activities and learning players is best left with people. (Page 226)

Is your lecture today SCORM compliant, Professor? (Page 227)

...the universities will need seamless and powerful integration of their online learning environments and their student management systems. [We] will see two worlds collide in this process: The world of the teaching staff and the world of the university administrations. (Page 226)



Figure 11. American educational imperialism



In the US, online educators tend to perceive the Internet as their home market. In the Nordic countries, educators regard it as an opportunity to study online courses from the United States. If these countries do not change their attitudes, they may soon experience a disturbing form of, American instructional imperialism. The Nordic countries are in several ways ahead of the US with regard to online education. Still, it is quite possible that American online tutors will dominate online education in the Nordic countries, just as American textbooks already dominate Nordic higher education. (Page 18)

© NKI Forlaget 2003, *Online Education and Learning Management Systems* by Morten Flate Paulsen. www.studymmentor.com



The Nordic Scene

The five Nordic countries are Denmark, Finland, Iceland, Norway, and Sweden. Sweden has a little more than 8 million inhabitants, Denmark and Finland a little more than 5 each, Norway 4.5 million and Iceland about 300,000 inhabitants. Together they have a total population of about 23 million. Each country is among the wealthiest nations in the world. The countries are also recognized as advanced users of computers and telecommunication technology. According to the key indicators presented in eEurope's Benchmarking program (http://europa.eu.int/information_society/eeurope/benchmarking/index_en.htm), all five Nordic countries are among the six EU countries that have the highest Internet access in households.

Sweden, Denmark, and Norway are often termed the Scandinavian countries. Many foreigners perceive Scandinavia as a unit, as one single market. It makes sense, since the countries have very similar languages, cultures, values, and political systems. In many international issues and arenas the countries have collaborated closely. This shows that there could be many reasons for Scandinavians to collaborate in the emerging global online education market. One might also argue that it would be sensible to stimulate initiatives to develop Scandinavia as a common online education market. Such a common market could provide more opportunities, higher quality, and better cost-effectiveness. It would further help to preserve Scandinavian pedagogical values and traditions and protect them from foreign online education imperialism.

Faith in Scandinavian online education collaboration was the foundation for the project *Nordisk Netthøgskole* from 1998-2001. The main project partners were NKI Distance Education in Norway, the University of Gothenburg in Sweden, and the Graphic Arts Institute of Denmark. The aim of the project was to establish online education collaboration across the Scandinavian borders and to reveal barriers against such collaboration. But the project had little success in establishing Scandinavian online education collaboration, and like many other externally funded projects, it was discontinued when the funding ended.

However, the project revealed many barriers, and the final project report discussed the nine barriers to Scandinavian online education collaboration that are presented in List 7.



List 7. Nine barriers to Scandinavian online education collaboration

1. There is a lack of funding to support Scandinavian online education projects. The project partners experienced that it seemed to be much easier to obtain funding for European projects and for national projects than it was to get funding for a Scandinavian project.
2. Governmental slowness and bureaucratic indecisiveness may make it difficult for formal programs to compete in a global, online education market in which timing and development time may be crucial. One of the project partners experienced that it took two years to obtain a formal accreditation for an online master's program from the Ministry of Education.
3. Even though Scandinavians have a mutual understanding of the Norwegian, Danish, and Swedish languages; they strongly prefer to use their own language. This could make it difficult to offer online education across the borders. Ironically, it may be less controversial to offer collaborative Scandinavian courses in English, since English textbooks are much used in Scandinavian higher education.
4. There are cultural and pedagogical differences between the countries that make it harder to collaborate. Just to mention a few, Denmark has a tradition of using face-to-face weekend seminars and a preference for oral communication and collaborative learning. Norway has a long history of supporting correspondence courses and distance education. Sweden does not allow colleges and universities to charge tuition fees from individual students.
5. There is ongoing harmonization of degrees, credits, and grades in Europe. But there is still a significant lack of educational harmonization even between the Scandinavian countries, which makes collaboration difficult.
6. A strong incentive for collaboration is the prospect of additional income. Norwegians and Danes seem to be much more open-minded than Swedes with regard to student fees for online education. Swedes expect that additional income should come from public funding. The incompatible financing structures make it hard to find financing models that support collaboration.
7. New educational programs need marketing, and there are few advertising and marketing channels that cover the Scandinavian market. One may argue that Scandinavia is three separate markets with regard to advertising.
8. Scandinavian collaboration could benefit from exemplary, formal agreements and collaboration models that clearly demonstrate win-win situations. Such exemplary models and agreements are scarce.
9. There is very little focus on online education as an export industry in the Scandinavian countries. Very few institutions have ambitions to offer courses abroad, not even across the Scandinavian borders.



In spite of all the barriers presented above, Scandinavian online educators have much in common. They can also benefit from common resources in all Scandinavian languages. Therefore some useful web-sites are listed in Table 14, just before the list of Scandinavian online education literature.

Table 14. Nordic Web-sites of interest to online educators

	Web site	Web address	Info in English
Norway	NKI Nettskolen	www.nettskolen.com	Yes
	NKI Distance Education	www.nki.no	Yes
	Nettverksuniversitetet	www.nvu.no	Yes
	BI Nettstudier	www.nettstudier.bi.no	
	NKS	www.nks.no	
	SOFF Sentralorganet for fleksibel læring i høgre utdanning	www.soff.uit.no	Yes
	www.utdanning.no	www.utdanning.no	
	ITU er det nasjonale forsknings- og kompetansenettverk for IT i utdanning.	www.itu.no	Yes
	Tunet Møteplass for voksenopplæring på Internett	www.tunet.net	Yes
	ADL Arbeidsgruppen for digitale læremidler	www.uio.no/adl	
Sweden	Nätuniversitetet	www.netuniversity.se	Yes
	Nationellt centrum för flexibelt lärande	www.cfl.se	Yes
	Högskoleverkets webbtjänst för studieinformation	www.studera.nu	Yes
	SNH -Samverkan för nätbaserad högskoleutbildning	www.mh.se/snh	
	SVERD Svenska Riksorganisationen för Distansutbildning	www.sverd.org	Yes
	KK-stiftelsen	www.kks.se	Yes
Denmark	Vidar	www.vidar.dk	Yes
	Elektronisk Mødested for Undervisningsverdenen (EMU): E-læring	www.emu.dk	
	Learning Lab Denmark	www.lld.dk	Yes
	Center for Teknologistøttet Uddannelse (CTU)	www.ctu.dk	Yes
	Foreningen for Flexibel Uddannelse i Danmark (FLUID)	www.fluid.dk	Yes
	Grundskole på nettet startet som et pilotprojeckt under Undervisningsministeriet og UNIC.	www.netskolen.dk	
	Danmarks Netskole	www.netskole.dk	
	UNI•C eLearning	www.uni-c.dk/produkter/elearning/index.html	
	Linqx	www.linqx.dk	
	e-learning.dk	www.e-learning.dk	
	IVUC	www.ivuc.dk	Yes
	AMU Centrene	www.amu.dk	Yes
	Danmarks Elektroniske Forskningsbibliotek	www.deff.dk	Yes
	Universiteternes efter- og videreuddannelse	www.unev.dk	
Finland	SUVI	www.avoinyliopisto.fi	Yes
	Finnish Virtual University	www.fvu.fi	Yes
	eLearnIT	www.e-learnit.fi	Yes



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Online Education and LMS Systems in the Nordic Countries

Abstract

This article²⁰ presents the results from an analysis of online education and LMS systems that are based on a literature review and in-depth interviews with 20 selected Nordic training managers in 2001. The analysis comprises a broad range of institutions from primary education, secondary education, higher education, distance education, and corporate training.

LMS systems seem to be widely used in Nordic education and there is a clear trend towards large-scale online education. The 20 institutions had experience of 25 different LMS systems and 12 of the institutions now have more than 50 online courses. Higher education institutions have standardized a few national student management systems, and they prefer LMS-systems developed in the Nordic countries. Among the 25 different LMS systems that were identified in the analysis, 16 were of Nordic origin. All other systems were of American, Canadian, or Irish origin. The research indicates that Classfrontier, WebCT, First-Class, and BlackBoard seem to be the most used LMS systems. E-learning standards do not seem to have had much impact on online education in the Nordic countries.

LMS systems may have reached a point where user-friendliness, cost-effectiveness, and integration with other systems are more important than new features. Some interviewees want to integrate the LMS with existing systems and other services such as student management systems, marketing catalogues, online payment, tracking of textbook shipments, registration of examinations, and multimedia tools.

The institutions do not seem to be especially loyal to, or dependent on, one provider of LMS systems. Several institutions prefer self-developed systems. They perceive the commercial systems as expensive and complex and want to develop the systems to support their special needs. They wanted cost-effective systems with the ability to handle continuous enrollment and integration with student management systems and accounting systems. In the future, the open source strategy may have an impact on the LMS market.

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www.studymontor.com

²⁰ This article is based on the article [An Analysis of Online Education and Learning Management Systems in the Nordic Countries](#), which was published in the *Online Journal of Distance Learning Administration*, Volume V, Number III, Fall 2002.



Introduction

This article presents the results from an analysis conducted in 2001 of online education and LMS systems in the Nordic countries. The analysis is an integral part of the European Web-edu project (www.nettskolen.com/in_english/webedusite/index.html) that provides similar analyses from other regions in Europe. The Nordic analysis is based on literature review and in-depth, qualitative telephone and e-mail interviews with 20 selected Nordic training managers who have comprehensive experience using LMS systems. The interviews were conducted from October 2001 to May 2002 according to an interview guide developed by the Web-edu project team. The interview guide identified the following focal points, which are discussed in this article:

- The institutions and their LMS systems
- Course development tools
- Student support tools
- Tutor support tools
- Administrative systems
- Technology
- Economic issues
- Overall evaluation
- Features in future LMS systems

The following paragraphs present an overview of the situation regarding national initiatives on online universities, student management systems, and LMS systems in each of the five Nordic countries.

Denmark

According to Ranebo (2001), the Danish Ministries of Education and Research initiated a Danish Virtual University in a mission statement on March 27, 2000. The DKr 40 million budget for the period 2000-2003 was to be used to support the development of high-quality, higher education, Web-based courses and provide information about the courses. As one of the interviewees pointed out, this was obviously not a success:

The universities have autonomous responsibility for their e-learning strategies. A national initiative to establish a Danish Virtual University broke down as a result of disagreement between the partners involved. The only result seems to be a planned portal providing information on e-learning initiatives.

STADS is the dominant student management system in Danish Universities and colleges. All Danish universities except for the universities of Copenhagen and Aarhus use it. The system was developed by WM-Data in collaboration with the universities.

Scandinavia is an important market for FirstClass and some of its largest customers are



in Denmark. Skolkom has more than 200,000 FirstClass users in Denmark. COM-C and Blackboard also seem to be important players in the Danish market according to two interviewees:

Blackboard is making advances in Denmark.

Blackboard seems to be growing in the Danish market. COM-C and FirstClass are two alternative, major players.

Finland

According to Ranebo (2001), the 20 Finnish universities have formed the Finnish Virtual University (www.virtuaaliyliopisto.fi) as a consortium:

The Virtual University of Finland is a development project that was initiated by the Finnish Ministry of Education during the year 2000. The project is a step in the realization of the overall strategies that the Ministry of Education presented in 1999 in its Knowledge Strategy for Education and Research 2000-2004.

The aim is for a virtual university, which offers Web-based high standard courses also at international level, to be set up by the year 2004. Through co-operation involving universities, colleges of higher education, research centers and private alternatives, the quality and flexibility of training will be reinforced, and research networks will also be reinforced.

The 20 universities in Finland will form the foundation of the activities and so, in January 2001, they established a consortium. Students who study on a full or part-time basis at the virtual university must be officially accepted at a physical university if they want to get a degree. University students do not have to pay for their studies in accordance with Finnish legislation. However, the universities can also sell courses and commission courses on the open market and thus provide courses with tuition fees for the international market, for example. (Ranebo 2001)

Oodi seems to be the dominant student management system in Finnish universities. But it does not seem to have such a dominant position as the SMS systems in the other Nordic countries. One interviewee states:

There are 21 universities in Finland and there are 11 different LMS systems. 8 of the 21 universities use the so-called "Oodi" SMS system, but only 5 of them have Oodi in real use. Oodi is based on Windows and Oracle (+Uniface + Weblogic). You can find more about Oodi at the following address, but unfortunately it's available only in Finnish! www.oodi.fi.

The researcher later found an Oodi manual in English via a Google search at http://atk.hkkk.fi/english/manuals/oodiohje_eng.htm



Iceland

According to Ranebo (2001), Iceland has not made any decision to establish a national virtual university:

In Iceland, no overall decision has been taken by the state to assemble all the higher education efforts in the area of distance learning under a national development programme for Virtual University or Web University. This particular area in higher education is relatively broad in Iceland, and distance learning, as a development area, is a matter of top priority politically. Due to the size of Iceland, it is fairly easy to gain a fairly good insight into what is on offer nationally when it comes to distance courses. This might be one reason why there has not been a need to create a national comprehensive organization. (Ranebo 2001)

The Ministry of Education requires schools to apply a student management system named INNA. One interviewee states:

Up till now, we have used a student management system named AXEL, which was developed in Iceland. Every school had individual installation of the same system. Now, the Ministry of Education requires that all schools use a central Web-based system called INNA (www.inna.is). A company called SKYRR (www.skyrr.is) has developed INNA for the Ministry of Education. Neither AXEL, nor INNA has any integration with WebCT and I cannot see that WebCT will be integrated with INNA in the future either.

Norway

There is no national online university in Norway, but a number of public initiatives that support and fund online education in existing institutions.

In Norwegian higher education, the dominant LMS-system is the Norwegian-developed Classfrontier (www.fronter.com). Some colleges use standard commercial systems, and some institutions have developed their systems in-house. Runnestø and Ristesund (2002, 36) surveyed 54 of Norway's universities and colleges. Out of these, 32 institutions claimed that they offered online education. Several of them had used more than one system as shown in Table 15.

Table 15. Instances of LMS systems in 54 Norwegian institutions of higher education

LMS	Number of instances	URL
Classfrontier	21	www.fronter.com
In-house developed	9	
Luvit	6	www.luvit.com



LMS	Number of instances	URL
IT's Learning	4	www.itsolutions.no
First Class	3	www.firstclass.com
Kark	3	http://kark.uib.no
WebCT	3	www.webct.com
BlackBoard	2	www.blackboard.com
TopClass	1	www.wbtsystems.com
Lotus Learning Space	1	www.lotus.com
TeamWave	1	
Response	1	

(Source: Runnestø and Ristesund, 2002)

In Norway, two student management systems totally dominate in higher education. The Norwegian universities and some colleges use FS (Felles System) (www.fs.usit.uio.no) and most of the Norwegian colleges use MSTAS (www.enef.no). The two largest private colleges have chosen alternative solutions. The Norwegian School of Management BI has experience of using Banner and NKI has developed an in-house system called STAS.

Sweden

In Sweden, no LMS-systems seem to be dominant, but a number of standard commercial systems are used. Two of the comments made by the interviewees support this:

The Swedish-developed LMS systems are not dominant in Swedish education. There is little national coordination in this field, the universities are very autonomous and the system choices are made locally.

Most of the distance education courses we provide via Luvit are included in the national network university program, Nätuniversitet (www.netuniversity.se). It allows the universities to apply their own online systems and models. In other words, the universities don't need to coordinate their systems or pedagogical models. This is probably good for the universities, but it could be confusing for students who want to follow courses from several universities.

According to personal e-mail communication with Fredrik Rexhammar (March 18, 2002), one of Sweden's leading experts on LMS-systems, Luvit (www.luvit.com), Lecando, Infinity, Grade, Platon, and Web Academy are Swedish providers of LMS systems. In the same e-mail he states that WebCT and Blackboard are the most used foreign LMS systems at



Swedish universities and colleges. In addition, the author has found that the Swedish-developed system PingPong (www.parititur.se) is used by some institutions. An overview of the market for LMS systems conducted in Sweden is available at www.ssv.gov.se/avit/pform2.htm. It lists the following systems: Luvit, Mentor, Telia Instant Education, Maestro, FirstClass, Comenius online, Lecando, Librix, Marratech, PingPong, Surfa och lär, and WebCat.

The three Swedish distance education consortia have received considerable governmental funding since 1993-94. (Hillefors et al, 22 and Ranebo 2001). At most, the three consortia provided 40-50 courses to 5,000-6,000 students (Hillefors et al, 26). After nearly ten years of operation, their results are not impressive and their funding will be discontinued. Instead, the government has recently established Nätuniversitetet (www.netuniversity.se) as a new national body to fund and coordinate activities. In 2002, Nätuniversitetet will provide financial funding for the equivalent of 2,350 full-time students at 30 Swedish higher education institutions.

All Swedish universities use the student management system LADOK or LADOK NOVAU owned by a consortium of 37 institutions in higher education in Sweden. The LADOK consortium (www.ladok.umu.se) provides the following information at its web site:

LADOK is a computer based student admission and documentation system for a university or university college. It focuses on administration of undergraduate and graduate students. The system is locally deployed and managed by the institutions.... The LADOK-system consists of two major parts: the admission system and the documentation system. They are integrated and share data, e.g. name, address and other facts about applicants and students.... The system files contain information for student identification, general eligibility for university studies, admission to courses and study programs, registration on courses per semester, course data, credit points from courses, degrees awarded and international studies.... Data from LADOK are exported to the Ministry of Education and other agencies for follow-up purposes. An important objective of LADOK is to prepare the annual invoice to the government for studies at undergraduate level at an institution.... (www.ladok.umu.se/opendok/LADOK_short.html)

Overview of the Institutions and their LMS Systems

The analysis comprises a broad range of institutions from primary education, secondary education, higher education, distance education, and corporate training. But about half of the institutions are characterized as public universities. It includes public and private institutions as well as both providers of LMS services and customers of LMS services.

Table 16 shows that the analysis includes 20 institutions from all Nordic countries. Five of them are Danish, four Finnish, one Icelandic, five Norwegian, and five Swedish.



Table 16. Nordic institutions sorted by country

Name of Institution	URL of Institution	Country	Type of Institution
Danmarks Netskole	www.netskole.dk	Denmark	Consortium of public technical colleges
Center for Fjernundervisning	www.cfu.dk	Denmark	Distance education center at business college
The Centre for the Interdisciplinary Study of Learning, Aalborg University	www.vcl.auc.dk/default-engelsk.htm	Denmark	University centre
Ventures	www.ventures.dk	Denmark	Consortium
University of Southern Denmark	www.sdu.dk/indexE.html	Denmark	Public university
University of Oulu	www.oulu.fi/english/	Finland	Public university
University of Art and Design Helsinki	www.uiah.fi/english.shtml	Finland	Public university
University of Kuopio	www.uku.fi/english	Finland	Public university
University of Tampere	www.uta.fi/english/index.html	Finland	Public university
Comprehensive College in Akureyri	www.vma.is	Iceland	Vocational college with a distance education department
The Competence Network	www.nkn.no	Norway	Commercial provider of LMS-related services
Nettskolen	www.nettskolen.no	Norway	Commercial provider of courses
Nettgymnas	www.nettgymnas.no	Norway	Private secondary school
Globalskolen	www.globalaskolen.no	Norway	Semiprivate provider of primary education for children abroad
NKI Fjernundervisningen	www.nettskolen.com	Norway	Private distance education institution
Midthögskolan	www.mh.se	Sweden	Public university
Statens skolor för vuxna	www.norrk.ssv.se	Sweden	Public distance education institution
Skandia	www.skandia.com	Sweden	Global savings company
University of Uppsala	www.uu.se	Sweden	Public university
University of Lund	www.lu.se	Sweden	Public university



ONLINE EDUCATION AND LMS SYSTEMS

Among the 25 identified LMS systems, 11 are listed as “other LMS”. This means that it is not the primary LMS system used at the institution at the moment. It could be a system that has been used in the past, a system that is being tested for future use, or just a secondary system used for special purposes. It is interesting to observe that Table 17 shows that 11 of the 20 institutions have utilized one or more “other systems”. This indicates that the institutions are not especially dependent on, or loyal to, their providers. This situation is both a result of local autonomy and historical development.

Table 17 shows that there are large variations among the institutions with regard to the number of online courses, tutors, and students.

The number of online courses ranges from 850 [NKN] to 4 [Skandia]. The high number of courses listed by NKN is explained by the fact that it includes courses from 50-60 course providers. There are however eight institutions that claim to offer more than 100 online courses.

The number of online tutors ranges from 10 or less [Nettgymnas and Globalskolen] to hundreds. Four institutions claim to have more than 100 online tutors. [NKN, NKI Fjernundervisning, Midthögskolan, and Aalborg]

The number of online students ranges from a few hundred to several thousand. Even though the numbers regarding online courses, tutors, and students are not necessarily comparable and reliable, one may conclude that most of the institutions offer online education on a large scale. If one characterizes institutions that offer at least 50 online courses as large-scale providers of online education, 12 of the 20 institutions are characterized as large-scale providers of online education. In a previous international analysis of Web-based education (Paulsen 2000) only 3 of the 22 Nordic institutions surveyed in 1998–99 offered more than 50 online courses. The analysis indicates that there is a clear trend towards large-scale online education in the Nordic countries.

Table 17 also shows that there are substantial variations in the number of years in use and course duration. The number of years in use ranges from less than one year to 15 years [NKI Fjernundervisningen]. Eight institutions claim to have up to 2 years’ experience. Only six institutions have five or more years of experience.

The typical course duration seems to be several months. This is not surprising since most of the institutions in the analysis are educational institutions that traditionally offer longer educational programs to students, not shorter courses to companies.



Table 17. Information about surveyed institutions sorted by LMS

Name of Institution	Primary LMS	Additional LMS	Number of Online Courses	Number of Online Tutors	Number of Online Students	Number of Years in Use	Typical Course Duration
University of Southern Denmark	BlackBoard	BettyCom, EDWIN, FirstClass, COM-C	110	50-60	240 in the department, 15,000 at the university	7	
Nettskolen	Classfrontier, CourseKeeper		10	15	150+150	2	2-3 months
Nettgymsnas	CourseKeeper		6	6		<1	1 school year
Globalskolen	FirstClass	PedIT & Iratraker	28	10	180+150	1	1 school year
Centre for Interdisciplinary Study of Learning, Aalborg University	FirstClass	VirtualU	11 programs	120	880	8	1 semester
Ventures	FirstClass	None	A number of programs	50	3,000	5	Typically one semester, also individual enrollment
University of Art and Design Helsinki	Fie3 - learning Environment	WebCT	20			4	4-16 weeks
University of Oulu	LC Profiler		41	???	2,500 users		Several weeks or months
Skandia	luvit	None	4	???	650	2	6 months
University of Lund	luvit	Lotus Learning Space	250		6,000 of 23,000 students are Luvit users	5	
University of Uppsala	Ping Pong	FirstClass	50	50	20,000 accounts, 2,000 real users	1.5	0.25-0.5 school year
NKN	Saba	WebLearn Plus	850	hundreds		1	3 hours – 6 months
Danmarks Netzkole	Selfdeveloped		40	30	7,000 enrollments	<1	16 weeks
NKI Fjernundervisningen	SESAM (Self-developed)		250	125	3,300	15	6 months
SSVN	SSVN2000 (Self-developed)	LEKTOR	50	20-25	500-1,000	1	Few weeks – several years
CFU	TopClass	BlackBoard	20	Equivalent of 4 full-time positions	500	4	1-4 months
Midthögskolan	WebCT	FirstClass, West	200	Between 100 and 200	23,000. 40% at a distance, 60% on campus	5	0.5 – 4 semesters
University of Kuopio	WebCT	Verkkosalkku, Verkko-opisto	200		4,500	3	40-160 hours
University of Tampere	WebCT		140		3,700	3	
Comprehensive College in Aukureyri	WebCT	None	180 courses, 10-20 apply WebCT	95	750	4	1 semester



ONLINE EDUCATION AND LMS SYSTEMS

Table 18 shows that the 20 institutions had utilized 25 different LMS systems. It is interesting to observe that the majority (16 of 25) of the LMS systems are of Nordic origin. All other systems were of American, Canadian, or Irish origin.

The analysis further shows that 3 institutions (Danmarks Nettskole, NKI Fjernundervisning, and SSVN) have chosen to use self-developed LMS systems. One additional institution (Globalskolen) states that it will convert to a self-developed system.

The commercial LMS systems that are most widely used among the institutions in this analysis are FirstClass and WebCT. The strong position of WebCT is not surprising, since WebCT and BlackBoard presently are the two dominant LMS systems on the international market (Observatory on Borderless Higher Education, 2002). FirstClass' European headquarters is located in Sweden. Scandinavia is an important market for FirstClass and some of its largest customers are in Denmark. Skol-kom has more than 200,000 FirstClass users in Denmark. It is also important to know that a comprehensive analysis (Runnestø and Ristesund, 2002) shows that the Norwegian system Classfronter is very dominant in Norwegian higher education.

The commercial LMS systems are available in several languages, but Nordic institutions prefer to use their national languages. This is a special problem for Iceland, since few providers find it interesting to develop a version for the Icelandic population of less than 300,000 inhabitants. There are also examples of Nordic Institutions that choose to use the English language version, since new versions are first released in English.

Two of the LMS systems in this analysis, Virtual-U and Fle3, are referred to as open source systems. The interviewees who point this out are very positive to this, and it will be interesting to see if the open source strategy will be able to compete with the other commercial systems.



Table 18. LMS systems sorted by original nationality

LMS systems	Original Nationality	Language of LMS	URL of LMS	Institutions using LMS	Institutions using Other LMS
Weblearn Plus		English			NKN
West					Mithögskolan
BlackBoard	American	English, Danish	www.blackboard.com	Southern Denmark	CFU
Lotus Learning Space	American		www.lotus.com		lund
Saba	American	English, Norwegian	www.saba.com	NKN	
FirstClass	Canadian	Norwegian, Danish, Others	www.firstclass.com	Globalskolen, Ventures, Aalborg	Mithögskolan, Southern Denmark, Uppsala
VirtualU	Canadian		www.vlei.com		Aalborg
WebCT	Canadian	English, Swedish, Not available in Icelandic	www.webct.com	Mithögskolan, Kuopio, Tampere, Akureyri	UIAH
BettyCOM	Danish				Southern Denmark
COM-C	Danish				Southern Denmark
EDWIN	Danish				Southern Denmark
Self-developed	Danish	Danish		Danmarks Net skole	
Fle3	Finnish	Finnish, Swedish, English, Spanish, French	http://fle3.uiah.fi/	UIAH	
IC Profiler	Finnish	Finnish, English	www.icprof.com	University of Oulu	Kuopio
Verkkosalikko, Verkkooopisto	Finnish				
TopClass	Irish	English, Danish	www.wbysystems.com	CFU	
Classfrontier	Norwegian	Norwegian, English	www.frontier.com	Net skolen	
CourseKeeper	Norwegian	Norwegian, English	www.coursekeeper.com	Net skolen, Nettgymnas	
Imaker	Norwegian		www.imaker.no		Globalskolen
Self-developed: PedIT	Norwegian	Norwegian			Globalskolen
Self-developed: SESAM	Norwegian	Norwegian		NKI Fjernundervisningen	
LEKTOR	Swedish	Swedish			SSVN
Luvit	Swedish	English, German, French, Chinese, Swedish, Danish, Norwegian	www.luvit.com		Skandica, Lund
Ping Pong	Swedish	Swedish, English, German, French	www.parity.se		Uppsala
Self-developed: SSVN2000	Swedish	Swedish			SSVN



Course Creation Tools

The interviewees have different views on how satisfactory the systems are for course creation. However the LMS systems are usually not used for development of course content. A broad range of external tools is used to develop content before it is published in the LMS system. A number of such tools are listed at the Higher Education and New Technologies web site in Switzerland (www.edutech.ch/edutech/tools/tools_e.asp). The interviews show that the LMS systems use text, multimedia, sound, html-pages, graphics, and tests that are developed with external software. The software tools for course creation referred to in the interviews are listed in Table 19.

Table 19. Software tools for course creation found in Nordic analysis

Software tool	Type of content	URL
Word	Text	www.microsoft.com
PowerPoint	Text	www.microsoft.com
Authorware and Director	Multimedia	www.macromedia.com
Flash	Multimedia	www.macromedia.com
Windows Sound Recorder	Audio	www.microsoft.com
Wimba	Audio	www.wimba.com
FrontPage	HTML-pages	www.microsoft.com
DreamWeaver	HTML-pages	www.macromedia.com
Netscape Composer	HTML-pages	www.netscape.com
Viewlet	Graphics (Screenshots)	www.qarbon.com
Corel	Graphics	www.corel.com
PhotoShop	Graphics	www.adobe.com
ReadyGo		www.readygo.com
ToolBook		http://home.click2learn.com
Autotest	Tests	
Webwinder	Tests	www.webwinder.com

Development of course content is not trivial, and teachers rarely develop course content without support from others. They seem to use content developed by others, collaborate, or



work in teams. Some teachers participate in development courses, have support by web-designers, or support staff.

Reusability and sharing of content may be useful. Export features, archive functions, and standards might make this easier. Several comments indicate that the systems are perceived as flexible and open to differing didactic possibilities. But a few comments indicate that some systems could be perceived as inflexible with regard to didactic possibilities. To make course development easier or to increase productivity, some institutions provide or require that the content must adhere to special structures or templates. However, institutions that do not use the commercial systems maintain that their systems are especially designed and used to support their chosen didactics.

In some cases, individual teachers design the content. In other cases, the teachers do not develop course content themselves. However, it seems to be common that teachers collaborate or work together with other specialists to develop course content. Some claim that their system is easy to use by teachers and course developers. But obviously some support and training for teachers is useful. This could include contact with experienced tutors, teacher training, dedicated discussion forums, and support services.

Generally the interviewees confirm that the LMS systems support a wide range of media types. Most institutions seem to utilize some multimedia. However, several interviewees are cautious about too much use of multimedia due to bandwidth limitations or lack of development tools. And other institutions seem to be even more cautious about including online video.

Assignment and assessment is a complex topic that should be applied in a pedagogical framework. The most frequently mentioned type of online test is multiple-choice questions. Among the other types of assignment and assessment mentioned are interactive assignments, quizzes, portfolio assessment, and surveys. Some of the interviewees are skeptical about computer-based assessment since it does not correspond to their pedagogical model or teaching tradition. Some of the systems have no built-in tools for assignments or assessment. However, there are external tools that could be used to design assignments. The interviewees especially mentioned Autotest and Webwinder. WebCT seems to provide a range of useful tools. Luvit, PingPong, Saba, and SSVN2000 also seem to provide useful tools for assignment and assessment.

Student Support Tools

There are user groups, such as sales people that work together in one company, that do not ask for online communication. However, the LMS systems seem to provide a lot of opportunities for student interaction through e-mail, distribution lists, discussion forums, chatting, bulletin boards, whiteboards etc. Discussion forums seem to be the most important tool for group communication. The institutions often organize a number of forums for various user groups and purposes. However, use of e-mail is also important, especially for institutions with individual course progression. Chatting requires discipline and could be improved technically, but it has several interesting applications such as to reduce costs



related to international communication. Among the other features that were mentioned for improving student interaction were tracking, integrated FAQ-services, personal presentations, pictures, and class lists. Finally, some comments reflected on students' opportunities to interact with the course material, the environment, and other students.

Many, but not all LMS systems, offer tools for both synchronous and asynchronous communication. Some institutions add external communication tools to offer additional communication services such as chatting, audio chatting, audio conferencing, and sharing of documents. Asynchronous communication via discussion forums and e-mail seem to be the preferred services for student-to-student communication. Several of the systems seem to provide some form of chatting as a tool for synchronous communication. Experiences with chatting are varying. It may be useful for social purposes and for informal communication in smaller groups. But several institutions limit the use of chatting since it is inflexible in time. Chatting may however be useful for formal project meetings.

Technical and administrative support is a challenge that requires varying resources. Both the numbers of support staff and support hours differ. Support is not available 24 hours a day, but some institutions offer support after normal office hours. Communication with tutors is handled both via e-mail and discussion forums. One institution claims that it guarantees students a response from tutors in less than 48 hours.

In general, the systems seem to have limited use of library resources. The most common services are links to existing internal and external Internet resources. Some institutions provide special services such as online journals, articles, library services, and bookshops for their online students.

Some comments indicate that the LMS systems need improved functionality with regard to feedback on work assignments. And tutors seem to be pivotal with regard to feedback on work and assignments. It is interesting to observe that some systems provide special mailboxes for submission of assignments, opportunities for online registration and presentation of grades, and real-time accounts for individual teacher remuneration.

Tutor Support Tools

Some institutions do not express a need for automatic tracking of student progression since their performance is measured by tutors or work competence. Tracking of students may, however, be useful for administrators, tutors, and students. However one should be aware that some students are apprehensive about being monitored. Most systems seem to have some tracking of what students have done and when they did it. This may include which assignments they have completed, which web pages they have opened, and which tests they have taken. WebCT seems to provide tracking services that the users are satisfied with. They include tracking of quiz scores, log-ins, pages accessed, and comments written. A few interviewees focus on the systems' ability to provide advanced administrative reports on enrollments, course activity etc. The self-developed SSVN2000 tracking system is especially interesting since it provides excellent tracking of students with individual progress plans.



Group management includes tasks such as entering information about students, classes and the services they should have access to. This is easy to handle with few students, but could be much work in a large-scale system. Many systems allow teachers to form groups and establish discussion forums. Other systems rely more on system administrators for group management. In some systems, students may establish services such as chatting sessions and group calendars.

Some comments express lack of functionality and tools for grading and examination results. Other comments indicate that there are many options and tools available for online assignments and that course designers should utilize the special pedagogical opportunities that are available online.

Some interviewees focus on the ability of teachers or students to follow the students' activity and progress. Other interviewees describe the administrative challenges of tracking students with individual progress plans.

Some comments express a need for improved administrative systems between tutor and institution. The contact between tutors and the institution could be supported by special contracts, separate discussion forums, support services, face-to-face seminars, and training.

Administration

Some institutions have no need for integration between the LMS system and the accounting system because they do not charge any tuition fees. WebCT does not seem to offer any support for payment of fees. NKI has developed the SESAM LMS system, which is fully integrated with the accounting system. Most of the institutions have separate accounting systems with little integration with the LMS. Some do, however, express ambitions and needs for such integration. Online payment via credit cards and special counters for calculation of variable fees could be implemented. NKN has special needs since it also handles online enrollment on face-to-face courses.

Most of the institutions provide students with individual passwords. There are, however, examples of simple solutions in which many students share one password and advanced solutions that allow individual students to have just one password to all university systems. Most institutions seem to be pleased with their password systems. But there are diverging opinions on the workload generated by students who forget their passwords. User management may represent a heavy workload, which could be organized and automated in several ways. It is necessary to have a strategy for terminating passwords. Distribution of virus could be reduced if the discussion forums are designed properly and encryption could be used to provide secure connections.

The interviews indicate that LMS systems are not especially successful in storing and retrieving student records. One institution has established a project to integrate the LMS with the student management systems; another sees this work as a major challenge. Other institutions have developed separate databases for information that is not handled by the LMS. Several institutions comment on the needs and efforts to integrate LMS systems with national student management systems in Sweden (LADOK) and Denmark (STADS). The users



of SESAM, CourseKeeper, and Saba claim to have LMS systems that are well integrated with the student records databases.

Some systems do not include examination and certification records. Other systems provide online information about grades. Several of the interviewees are concerned about the opportunities and challenges regarding integration with the administrative system that records student grades. One interviewee from Denmark was concerned about privacy issues and how much information systems should handle with regard to examination and certification records. Finally, one of the interviewees stated that exams should be larger and more project oriented to become more supportive of online education.

Some interviewees provide positive statements about the tools for administration of courses, classes and tutors. Other statements are more negative. It is especially interesting to observe that several systems seem to lack facilities and services on the level above individual courses.

Technology

There are some free LMS systems that follow the open source policy, and the two users of open source systems were positive to open standards. There seem to be three categories of server solutions, and all seem to work well. In the first category, the institutions have access to commercial service providers that host the LMS. In the second category, the institutions host the LMS for internal use. And in the third category, the institutions host the LMS for internal use and as a service to other institutions. The institutions that have access to a service provider that hosts the LMS seem to be positive to the solution, but they experience some problems with limited access. Several institutions have chosen to host the LMS internally. They are typically either the institutions that have self-developed systems or larger institutions with high internal ICT competence that can operate commercial LMS systems locally. The users of the commercial systems claim that the systems are stable and reliable. The users of self-developed systems also experience few problems. Virus attacks and firewalls, however, are mentioned as serious problems. A few institution that have self-developed systems host the LMS for internal use and as a service to other institutions. One benefit of this is cost sharing.

FirstClass depends more on client software than other LMS systems. Other comments point out that there is no need for any special client software. However, problems with firewalls may be difficult to solve. The institutions seem to differ on how much they rely on necessary client software for special courses. Several institutions seem to minimize the need for additional client software. But some special courses and subjects, for example concerning statistics, require additional client software. And other systems and courses rely with more or less success on additional client software such as special plugins or Microsoft Office products.

LMS systems could be perceived as flexible, since both course content and system services can be updated regularly. Technology and templates limit the flexibility of the didactics, but may increase productivity. The interviewees are aware of the e-learning



standards specifications, and several claim that their system follows the standards. But few claim that the standards are important to their institution.

The interviewees talk about LMS systems as large-scale systems capable of handling thousands of users. The interviewees are confident that the systems can handle a large number of users without special technological problems. The interviewees did not seem to be concerned about how the systems technically could organize the administration of large numbers of students, courses, and tutors. One mentioned, though, that large-scale operation might impose some pedagogical challenges.

Some comments express the fact that students have all kinds of connections to the Internet ranging from low-speed modems to broadband access. But the speed of the LMS system does not seem to be any problem. The bottleneck seems to be network bandwidth and local lines. To handle this, the institutions adapt their bandwidth requirements to the users' equipment. Due to the bandwidth limitations, several of the institutions limit their use of high bandwidth content.

Economic Issues

Some of the interviewees view the cost of the LMS as confidential information. Others say that it is hard to estimate or that they don't know. The main costs reported on self-developed systems are related to a few positions in a development team and to server hardware and software. The costs and pricing structure of commercial systems vary from system to system. This may make it difficult to compare the real prices. The costs mentioned range from under € 5,000 to over € 100,000 per year. None of the interviewees expressed sincere concern about high prices.

One obvious advantage of self-developed systems is that the institutions pay no annual fees. Commercial systems have various pricing structures and prices for annual fees. The fees may depend on the number of user licenses, the number of years the contract is signed for, or just for actual upgrades.

The Swedish and Finnish institutions report that they have no tuition fees. Institutions in Denmark, Norway, and Iceland do report that they charge tuition fees, although many of them also receive additional funding from the state. The research did not find any examples of institutions that had implemented online invoicing.

As the number of users in an LMS system grows, it seems necessary to divide the management and maintenance responsibilities among a number of people. It seems as if the interviewees have only a vague knowledge of the systems' maintenance and operation costs. The issue is perceived as complex and hard to estimate. Costs may be funded externally and they seem to include part-time work for from one to six internal people, but they may also constitute a fee per student to the ICT-department.

It would seem that the interviewees have little knowledge of how much time and money is spent on training staff and students to use LMS systems. External costs may be low, since training primarily seems to be handled by internal staff.



Overall Evaluation

There were several positive comments about the Nordic commercial systems. They were characterized as immediate, flexible, and open. The interviewees focused on the ability to save time and increase quality of learning, as well as the strong communicational and statistical features. It is especially interesting to observe that the interviewees' value systems support Nordic pedagogical traditions and national, academic user groups. The negative comments about the Nordic commercial systems were related to incompatibility with other platforms and products, limited student privileges, and the provider's uncertain financial situation.

The comments on overall evaluation on WebCT were predominantly positive. The interviewees used phrases such as: a good choice, provides all basic tools, works reasonably well, moderately cost-effective, and easy to use. However, it might be hard to get support for local adaptations in Iceland. For example, WebCT version 3 was not available in Icelandic.

The positive comments made about other commercial systems used terms such as simple, flexible, well-working, many features, very satisfied, and provides most of the functionality we need. The most noteworthy negative comment about the other commercial systems was related to FirstClass' use of client software.

The users of self-developed systems are also satisfied with their systems. Some of the reasons for their choice are that they perceive the commercial systems as expensive and complex and that they can develop their systems to support their special needs. Among the advantages that were mentioned were the ability to handle continuous enrollment, cost-effectiveness, and integration with student management systems and accounting systems.

Features in Future LMS Systems

LMS systems could have reached a point where user-friendliness, cost-effectiveness, and integration with other systems are more important than new features. Some interviewees want to integrate the LMS with existing systems and other services such as student management systems, marketing catalogues, online payment, tracking of textbook shipments, registration of examinations, and multimedia tools. Others would like to have more flexible systems and tools. Several would like more use of multimedia, especially with regard to audio and video services. Some topics and languages need better representation of characters, symbols and user-interfaces. Other features the interviewees would like to see in the future were alternative ways to organize and visualize the learning process, better tools for synchronous communication, better ways to personalize design elements, and more national and international collaboration.

Important Nordic LMS Findings

The analysis resulted in several important findings that are listed in the following and sorted according to Nordic issues, integration issues, economic issues, and issues of special interest to providers of LMS systems. The findings presented in List 8 are especially related to Nordic issues:



List 8. Six important LMS findings related to Nordic issues

1. LMS systems seem to be widely used in Nordic higher, further, and continuing education. It is not easy to find such Nordic institutions without experience of LMS systems.
2. The analysis indicates that there is a clear trend towards large-scale online education in the Nordic countries. It shows that 12 of the 20 institutions offer at least 50 online courses. According to the 1998-99 Cisaer analysis, (Paulsen 2000) only 3 of 22 Nordic institutions surveyed offered more than 50 online courses three years ago. Further, the interviewees talk about LMS systems as large-scale systems capable of handling thousands of users.
3. The Nordic universities have standardized a few national student management systems. The systems are LADOK (Sweden), MSTAS (Norway), FS (Norway), STADS (Denmark), INNA (Iceland) and to some extent Oodi (Finland).
4. Nordic institutions seem to prefer LMS-systems developed in the Nordic countries. Among the 25 different LMS systems that were identified in the analysis, 16 were of Nordic origin. All other systems were of American, Canadian, or Irish origin.
5. The research indicates that Classfrontier, WebCT, FirstClass, and BlackBoard seem to be the most used LMS systems in the Nordic countries.
6. The interviewees are aware of the e-learning standards, and several claim that their systems follow the standards. But few state that the standards are important to their institution, and e-learning standards do not seem to have had much impact on online education in the Nordic countries.

Other important findings are related to the increasing need for integration between LMS systems and other online education support systems:

1. LMS systems need to be integrated with a number of other systems in an organization that aims at providing efficient, large-scale, online education.
2. Integration between LMS systems and student management systems seems to be relatively poor.
3. Integration between LMS-systems and accounting systems seems to be very poor.
4. Several of the interviewees are concerned about the opportunities and challenges regarding integration with the administrative system that records student grades.

Cost-effectiveness becomes more important as institutions become large-scale providers of online education, and the following findings are related to economic issues:

1. The costs and pricing structure for commercial systems varies from system to system. This could make it difficult to compare the real costs.



2. The interviewees have only vague knowledge of the systems' maintenance and operating costs. The issue is perceived as complex and hard to estimate. Further, it seems they have little knowledge about how much time and money is spent on training staff and students to use LMS systems.

Finally, these findings should be of special interest to providers of LMS systems who want to compete in the future market:

1. The institutions do not seem to be especially loyal to, or dependent on, one provider of LMS systems. The majority of the institutions had changed system, planned to change system, or operated secondary systems.
2. LMS systems may have reached a point where user-friendliness, cost-effectiveness, and integration with other systems is more important than new features.
3. The open source strategy may have an impact on the future LMS market.
4. LMS systems are usually not used for development of course content. A broad range of external tools is used to develop the content before it is published in the LMS system.
5. It is especially interesting to observe that several systems seem to lack facilities and services on the level above individual courses.
6. Several institutions prefer self-developed systems. They perceive the commercial systems as expensive and complex and want to develop systems to support their special needs. They wanted cost-effective systems with the ability to handle continuous enrollment and integration with student management systems and accounting systems.

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Online Learning in Denmark: A Personal Account

By Søren Nipper



Søren Nipper is Head of Department at UNI•C – The Danish IT Centre for Education and Research. He has worked with distance learning and online learning since 1982, in Denmark as well as abroad. In the early 1980s he was involved in setting up Jutland Open University and its first distance learning programs. From 1988 till 1993 he worked for EuroPACE, a European industry-university consortium that delivered high-level training programs to professionals, managers and researchers via satellite and computer networks. From 1995 to 2000 he worked for the European Commission in Brussels and the European Training Foundation in Turin. His assignments included the establishment of a network of 50 distance education study centers in Central and Eastern Europe. He joined UNI•C in 2000.

Online learning was introduced in Denmark in 1982. The following 16 years it led a quiet, modest and rather secluded life as a mostly experimental and, in the bigger picture of Danish education and training, marginal phenomenon. However, in 1998, it became Very Big Business. Almost overnight.

The Big Bang, Big Business and Big Bucks of 1998

Within a few months in 1998 tens of thousands of adults enrolled on online courses, and many institutions, mostly business and technical colleges, made Really Big Bucks providing courses via the Internet, primarily the ECDL course (European Computer Driving Licence®). Three factors helped catapult online learning in general, and the ECDL course in particular, into being a business opportunity:

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ONLINE EDUCATION AND LMS SYSTEMS

- Business and government *suddenly* realised that Denmark was in desperate need of an IT-literate workforce. The government initiated a scheme of tax reduction incentives aimed at companies willing to invest in IT-equipment for its staff and employees willing to spend time on IT-training outside working hours²¹. Blue-collar and white-collar employees *suddenly* realised that IT-competences would be an important career asset and job security parameter, even in the short term.
- The required technology and infrastructure *suddenly* had been distributed to a sufficiently large part of Danish society in order to ensure the critical mass required for business-driven development and delivery of online learning. In 1998 PCs and Internet access were available in more than 50% of Danish households and in virtually every public and private organisation.
- The average Dane *suddenly* had acquired the basic IT-literacy required in order to connect to and make use of an online learning resource.

The 1998 Big Bang (well, big in Denmark, probably modest on an international scale) once again demonstrated that distance education and technology-based learning evolves at the crossing point of three converging paths:

- the emergence of new competence needs;
- the availability and affordability of a media and technology infrastructure;
- the literacy of the learners.

It was the same type of convergence that paved the way for the correspondence schools in the middle of the 19th century, as well as for the large-scale open universities with their use of radio, television and printed course material in the 1960s and 1970s. But that's an entirely different story. Or is it?

Anyway, you are probably asking yourself how on earth it was possible to sustain – educationally as well as organisationally - a business increase from next-to-nothing to a multi-million EUR/USD/DKK turnover within one year? The answer is that it was not. Today many of the online learning programmes that emerged during 1998-1999 have been closed down or have levelled off with a significantly lower turnover of students and revenues. There are several reasons for this. The government's decision to discontinue the tax incentive scheme had an immediate and damaging (some would claim healing) impact. The deflation of the dot-com bubble further worsened the climate for online learning. Which is a paradox, incidentally. The needs remained, and the technology still was there. Again, that's an entirely different story. Or is it?

In my view, however, the most important factor was that these entrepreneurial initiatives rather quickly got quite a bad reputation for being of poor pedagogical quality.

²¹ Actually the government's incentive package also included healthy financial support to vocational colleges, which offered the ECDL course. The volume of support-eligible courses turned out to be much bigger than forecast and for budget management reasons the government subsequently reduced its support by 50% only six months after it's coming into force.



Most of the colleges and course providers that profited from the explosive surge in IT-literacy courses were badly prepared. They had no or very little prior experience of online education. Their teaching staff had no or little experience of developing online learning material or of teaching online. Their administration and support organisations were not geared toward managing a cohort of thousands of online students. Their IT departments had no or little experience of setting up and operating Web-based learning systems. Quality management systems were not in place.²² Dropout rates were very high.

Was it all just bad, then? Certainly not, and I'll come back to that later. But first, let's have a quick look further backwards at what happened during the 16 years leading up to the Big Bang, Big Business, and Big Bucks in 1998.

Years of Experiments: The Emergence of Collaborative Learning and CBT

There are two main philosophies or schools in distance learning:

- One, which puts emphasis on the learning *material*, and which considers teaching and learning to be a highly structured activity in which the learner is guided by and interacts with the learning material, and through this process acquires new knowledge.
- Another, which puts emphasis on the learning *process* and which considers teaching and learning to be an organic, or chaotic, process in which the learner constructs new knowledge through his/her task-oriented work with the material, and is guided by interpersonal interaction with tutors and fellow learners.

For the sake of simplicity – and well aware of my crude oversimplification – I'll put the label *Instructional Design*²³ on the former and the label *Collaborative Learning* on the latter. For a number of reasons – tradition, culture, costs, demography, amongst others – the latter dominated Danish online learning initially for many years.

With a few, admittedly outstanding, exceptions, online learning in Denmark throughout the 1980s and the 1990s was dominated by 'projects', i.e. small-scale pilots with a lifetime limited to the duration of the grant on which they were based, on average between 1 and 3 years. Funding typically would come from EU R&D programmes such as the DELTA and Telematics programmes, and from national innovation programmes. In a few cases, large IT vendors, such as IBM, sponsored projects.

On the one hand the pilot approach and the development experiments helped build up considerable experience of both technical and pedagogical aspects of online learning. On

²² The Danish Ministry of Education in collaboration with a number of business colleges three years later, in 2001, developed a quality framework for e-learning within further adult education. The report is available (in Danish) at www.ventures.dk/files/q_materiale/kval-udv-e-learn.pdf.

²³ The philosophy of Instructional Design can be found in many different types of distance learning, including correspondence teaching, CBT/WBT, and, to a certain degree, in the 'package model' of the large distance teaching universities.



the other hand, as is often the case with 'projects', there would rarely be the organisational mechanisms or awareness required in order to ensure that the innovative ideas and enthusiasm, the accumulated know-how and experience, would be captured and exploited further at either operational or strategic levels in institutions. Experience would be confined to the individual pioneers who had initiated the projects and who raised the funding. Know-how and experience of techniques and methods would vaporise once the project had been completed, or it would survive as a small and discrete island in the bigger sea of conventional education and training.

Only a few institutions and training organisations took the full step to build in online learning as an integral part of their mainstream operations and business strategies, and it was not until 1995 that we, with the establishment of the Danish National Centre for Technology Supported Learning²⁴, got a national forum and community for exchange and dissemination of experience and information on online learning.

Why did it take more than ten years for online learning to reach a level of operational and business maturity beyond the pilot scheme in Denmark? Again, it's a rhetorical question, the answer to which applies not only to Denmark, but ... well, at least, to most European countries.

Above I pointed to the three converging paths leading to new paradigms in distance education: competence needs, infrastructure development, and learner literacy. The simple answer to my rhetorical question is, obviously, that convergence had not been established sufficiently firmly for the decision- and policy-makers, or sufficiently clearly for the learners, for online learning to take off on a larger scale when the concept was introduced in Denmark in 1982.

Visionary academics and industrialists with untiring enthusiasm did point out the potentials of the emerging information and communication technologies, i.e. the networked computer. They also realised that new paradigms of adult education – today known as *Lifelong Learning* - had to be developed. But the working organisations, public as well as private, were still too traditional and inflexible in their strategic thinking about 'competence development' to be able to cope with innovative ways to acquire new knowledge and new skills. The infrastructure was there, in principle. But the technology was still unstable and more often than not a pain in the neck to cope with for ordinary people without a fairly strong IT-background. In those days it really did require a fair amount of enthusiastic patience with technology in order just 'to connect'. So, convergence was still far away.

CMC and Collaborative Learning

Nevertheless, my personal timestamp for the introduction of online learning in Denmark is 1982 and the launch of Jutland Open University's first distance study programmes. I would like to explain why: Jutland Open University was the first Danish initiative to adopt the models of online learning which later developed internationally into a theoretical and methodological framework: *Collaborative Learning*. Morten Flate Paulsen provides an in-depth discussion of this framework in Part One of this book.

²⁴ See www.ctu.dk. In 2000 CTU was merged with Learning Lab Denmark (see www.lld.dk).



Jutland Open University did not invent the idea of applying Computer-Mediated Communication (CMC) to distance education. It was introduced in 1981 by the pioneering and legendary but now defunct School of Management and Strategic Studies at the Western Behavioral Sciences Institute (WBSI) in the USA.

Actually, the first Danish online courses did not happen until 1984, but Jutland Open University developed the concept of 3rd Generation Distance Learning. The core of this concept is the perception of the learning process as a social process, i.e. a process that is carried by the cognitive, task-oriented and social interaction among the participants. In short, communication and dialogue. Although heavily influenced by the group- and project-oriented approach to learning developed at Danish universities in the 1970s, the concept was firmly rooted in a longstanding Danish tradition of learning through 'the living word' (as opposed to the printed word). 3rd Generation Distance Learning fitted badly into the print and one-way media dependent models and methods that were developed initially by the correspondence schools (1st Generation) and later, during the second half on the 20th century, enhanced technologically and logistically by the large-scale open universities of South Africa, the United Kingdom and Germany (2nd Generation). Further, Denmark is a small country and does not offer the economies of scale required for the operation of 1st and 2nd Generation Distance Learning.

Jutland Open University therefore from day one looked around for flexible and inexpensive models for course development and delivery, and for media and technologies that would facilitate and support human-human interaction and communication. It found the media solution to this organisational and pedagogical problem in CMC, more specifically in computer conferencing.

The collaborative learning concept gained foothold in Denmark. It became and still is an influential paradigm for online learning, in particular within, albeit not limited to, the tertiary education sector. As a matter of fact, the collaborative online learning initiatives that were launched during the 1980s and 1990s covered a wide variety of public and private organisations, target groups and types of education and training programmes, from multi-annual university degree programmes, to short training modules aimed at trade union representatives. Examples of collaborative online learning at tertiary level would be the successful and still running Master of Health Informatics programme, run by Aalborg University since 1993, and the equally successful and still running Bachelor of Commerce program which has been developed and delivered by a consortium, called *Fleksibel Merkonom* or *Merkoflex* for short, of 18 business colleges since 1995. Another pioneering institution is the Nørre Nissum Teacher Training College, which started out with full curricular programmes online in the late 1980s. It is still running and being further developed. Nørre Nissum Teacher Training College was one of the first (and is still one of the few) Danish educational institutions, which early on demonstrated the foresight and audacity to integrate online learning into its organisational strategy. One outstanding example of collaborative online learning within the area of informal training is the Danish Trade Union of Public Employees (mostly organising unskilled service personnel), which since 1994 has operated a unique online distance education programme for thousands of its local trade union repre-



sentatives - with records of extraordinarily low dropout rates and extraordinarily high learning outcome scores.

The strong emphasis on social and collaborative processes influenced the technology and media strategies. Up to a few years ago the focus has been almost exclusively on communication. Group-oriented asynchronous CMC technologies such as computer conferencing and bulletin boards subsequently have played and still play a pivotal role in online learning in Denmark. Throughout the 1980s the choice of system was confined very much to the family of 1st generation computer conferencing systems such as PortaCOM, EIES, COSY and CONFER. In particular PortaCOM got a fairly wide distribution within Danish online learning, in spite of its line-oriented and command-driven interface, which most users hated. The advent of client-server technology and graphical user interfaces in the early 1990s paved the way for 2nd generation asynchronous CMC systems. The Danish EdWin system was developed as a rather simple, but successful graphical offline front-end to PortaCOM. Today FirstClass has established itself as a popular CMC application within tertiary, secondary and primary education.

Synchronous Communication

In an educational culture so stubbornly obsessed with, well, almost religiously dedicated to, 'the living word', one would assume that the synchronous one-to-many or many-to-many communication technologies that emerged in the late 1980s would be of particular interest and relevance. However, neither video nor audio conferencing, nor hybrid technologies such as audio graphics, have been adapted to any significant degree in Danish education and training.

The concept and much of the technology had been developed and matured by American initiatives such as the Stanford Instructional Television Network (SITN, since 1995 an integral part of the Web-based Stanford Online) and the National Technological University (NTU), and it was adapted in a number of satellite-based industrial and academic training programmes in Europe. The growing availability of ISDN helped to boost the educational use of video conferencing in other Nordic countries, in particular Finland and Norway, but it still remains a rather exotic phenomenon in Danish online learning.

Video conferencing was applied in a few cases in academic degree programmes within Jutland Open University in the early 1990s and by one or two companies for in-house staff training programmes. During the last couple of years there has been a growing interest in and awareness of the potential of synchronous communication, video conferencing and live video streaming in universities as well as in business. The Danish Research Network in 2001 launched a 3-year project on the use of video conferences in university teaching. Most Danish universities are participating in pilot tests.

However, we can see how chat as a near-synchronous form of CMC is getting quite popular among online learners, and it might be that the Anglo-Saxon LMS systems with their audio and video conferencing add-on modules will help promote the use of synchronous many-to-many communication in online learning.



CBT and Instructional Design

CBT – Computer Based Training – and Instructional Design concepts did evolve in parallel with Collaborative Learning during the late 1980s and 1990s, but almost exclusively within the corporate and business related training environments and, up to the emergence of the World Wide Web, almost exclusively on stand-alone media such as the laserdisc and the CD-ROM. The finance industry in particular and large corporations and organisations such as the Danish State Railway (DSB) were some of the early adopters of CBT and Instructional Design concepts.

Today Instructional Design methods are being adopted by a growing number of Danish companies and organisations, e.g. trade unions, with large target groups and/or time-critical training programmes, e.g. application training or sales staff training²⁵. Web Based Training – different media, but basically the same as CBT – seems to respond to the companies' search for more cost-and time-effective training methods. Interestingly enough, certain elements of Instructional Design methods and Instructional Design technologies, in particular LMS systems, are popping up in educational environments which traditionally would be sanctuaries for the philosophy of Collaborative Learning, e.g. the universities. What is it that LMS systems offer?

Why Collaborative Learning and why not Instructional Design?

Leaving out the basic conceptual and pedagogical differences, there is another important reason why Collaborative Learning 'won' over Instructional Design during the first 10 to 15 years of development and experimentation in Danish online learning: cost.

The development of a Collaborative Learning programme is much faster and many times less expensive than the development of a CBT/WBT course. Lead time, up-front investment, and amortisation period (return on investment) are very, very different parameters in Collaborative Learning as compared to Instructional Design, which still is a very costly design methodology. It was the small-scale economy of Collaborative Learning that enabled Danish institutions to adapt online learning in the first place, and it was the large-scale economy of Instructional Design that left CBT out of mainstream online learning in Denmark for several years.

Asynchronous CMC still is a cornerstone of Danish online learning, and is one of the main reasons why it was so difficult for the large Anglo-Saxon LMS systems of the 1980s and 1990s, such as PLATO, TopClass and Lotus LearningSpace to find a market in Denmark. However, as indicated, that too is changing.

The apparent problem with the technology and media strategy of Collaborative Learning is that the CMC technology is not designed for learning purposes or for the management of learning organisations. It was and is designed for communication. It is not designed for managing online organisations and it does not embed tools for production of

²⁵ According to a market survey undertaken by Institut for Konjunktur-Analyse in Spring 2003, as many as 62% of larger Danish companies plan to increase their use of e-learning. The survey included interviews with 300 private and public companies that already are users of e-learning. See www.ifka.dk.



learning material – learning objects as the jargon goes nowadays. This is no problem as long as the dominating type of learning material is text, which is delivered by the teacher to the learners as attachments to mail or conference messages. Word processors are completely adequate tools for the production of text-based learning material. And it is no problem as long as the online learning offering is a low-volume activity with a few hundred students that can be managed by a relatively small proportion of the teaching and administrative staff.

But as the number of online students increases, as the learning material grows in media complexity and volume, as online assessments become a part of the learning activity, as a larger proportion of the teaching staff get involved in online teaching tasks, and as the administration has to put a large volume of learner progress data on record – well, then, new tools are needed which can help to streamline the management of this business organisation.

The Achilles' heel of Collaborative Learning is that it scales so badly. And the ability to scale in a controlled and manageable way is a substantial and timely requirement in Danish online learning right now, after the many happy years of small experiments and the totally unprepared Big Bang of 1998. LMS systems respond to this need. With their integration of tools for content production, automated content delivery, learner monitoring, testing and progress tracking and, not least, integration with proprietary student and HR administrative systems, LMS systems spring from the very root of Instructional Design. And if there is one thing that Instructional Design does extremely well, then it is ...to scale. Automated learning by its very nature has no upper limit as to the size of sustainable and manageable learner groups. Collaborative Learning, on the contrary, operates only acceptably at almost the same student-teacher ratio as conventional face-to-face teaching²⁶.

The question, therefore, is whether Instructional Design will seize the future of online learning and whether Collaborative Design will loose momentum and gradually be confined to a small cosy, privileged academic corner at the periphery of e-learning?

The Point of Convergence and the Coming of Age in Danish Online Learning

During the second half of the 1990s the dot-com hysteria in general, and a series of highly profiled, frequently quoted and totally unsolicited market forecast analyses in particular, created a fertile and mushrooming environment for e-learning ventures. The explosive surge in online IT-literacy courses described above was just one example. Many other new training providers and vendors of e-learning systems surfaced during this breathless *gründer* period –

²⁶ Professor Greville Rumble, one of the leading researchers on the costs and economics of distance education, has provided a crisp analysis of the financial complexity of CMC and Asynchronous Learning Networks (ALN) in his excellent and provocative paper *Just How Relevant is E-education?* (in *Open Learning*, Volume 16 Number 3, 2001).



and disappeared again, leaving behind in its maelstrom a somewhat sceptical and disillusioned attitude to e-learning.

From Project Organisation to Business Organisation

But we *have* reached the point of convergence of the needs, the infrastructure and the literacy, and I am firmly convinced that online learning within a very short span of time will diffuse into all sectors of education and training in Danish society. From being based in small and disconnected project organisations, online learning will become, therefore, increasingly dependent on effective business organisations - in the wider, both commercial and non-commercial, sense of 'business organisation'.

And this is where the need for new tools for the management of online learning emerges. I would like to exemplify this with a snapshot of a Danish e-learning programme: The Pedagogical ICT Licence.

The Pedagogical ICT Licence

The Pedagogical ICT Licence (*Pædagogisk ITkørekort*®) is the brand name of a series of online in-service teacher training programmes for the pedagogical use of ICT in education²⁷. The programmes are fundamentally different from ECDL® in that they focus on the pedagogical techniques and methods rather than on the technology in itself. The Pedagogical ICT Licence was launched in 1999 and there are currently eight programmes, each targeted at and designed individually for different sectors and teacher groups within primary education, general and vocational upper secondary education, and tertiary and further education (excluding higher education). All stakeholders, including the Ministry of Education, municipal and county authorities, and teachers' trade unions, underwrite the programmes and guarantee their relevance and quality. The programmes are designed as 'collaborative blended learning', and the participants are organised in either school-based or virtual teams, and collaborate online as well as in physical groups whenever possible. A programme typically consists of 7 to 8 modules, some of which are compulsory and some optional. For the optional modules participants can pick and mix from pools of modules (from 3 to 30, depending on the specific programme) according to their own personal interests and training priorities.

In principle, therefore, each participant can design his own, individual course. It should be noted that the modules are *not* designed as programmed, automated WBT/CBT material with built-in tests. The courses are designed as team-oriented and tutor-led study programmes and each participant has his/her own personal tutor/mentor. From an administrative and co-ordination point of view this is a dramatic variable, which puts strong requirements on the course management tools and navigation tools that should be available to all players: the course providers, the tutors and the course participants. Now, put the personalised course structure into the following statistical matrix (as of July 2003):

²⁷ See www.school-it.org



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- 58,000 participants have enrolled since the start.
- 35,000 participants have completed their courses and obtained the Pedagogical ICT Licence.
- There are 170 regional and local course providers.
- There are 800 certified tutors, who have to participate in annual tutoring-skill upgrading sessions in order to retain their certification.
- The course material includes printed set books for each of the 8 programmes, more than 6,300 web pages (self-contained web documents), and over 1,000 articles (in Word or PDF formats). Most of the articles are available in several versions – depending on the target group.
- Over 100 course editors and course writers maintain the online and printed course material and ensure its currency.

The operation of a high-volume, content rich and continuously updated course programme such as the Pedagogical ICT Licence, within a highly decentralised organisation of providers, tutors, editors and participants, requires powerful and flexible learning management tools.

Take the Campus Online – Sure, But How?

The LMS systems used in the Pedagogical ICT Licence are purpose-built; however the large commercial systems, mainly the Anglo-Saxon products, are slowly finding a market within both corporate/government training and public education in Denmark.

A case in point is the universities, which are confronted with a very real and tangible need to innovate their teaching practices and to turn their 800-year old organisational structure upside down. It is a dramatic paradigm shift, which eventually will go to the very core of the academic teaching culture, and it is much too complex for me to discuss in detail in this short chapter²⁸. It is sort of summarised by the American-Austrian economist Peter Drucker, who in an interview with Forbes Magazine (March 1997) in his trademark no-nonsense style claimed that

“Thirty years from now the big university campuses will be relics. Universities won’t survive. It’s as large a change as when we first got the printed book. [...] Already we are beginning to deliver more lectures and classes off campus via satellite or two-way video at a fraction of the cost [of classical university teaching]. The col-

²⁸ The literature, however, is rich. The issue was introduced by Diana Laurillard in 1993 in her momentous book *Rethinking University Teaching* (Routledge, London and New York, 1993 and later editions). Tony Bates in 2000 took the analysis further in his book *Managing Technological Change* (Jossey-Bass Publishers, San Francisco 2000). For a summary of his analysis, see his paper *Distance Education in Dual Mode Higher Education Institutions: Challenges and Changes* (SOFF 2000, available at <http://bates.cstudies.ubc.ca/>). *Dancing With the Devil – Information Technology and the New Competition in Higher Education* (Jossey-Bass Publishers, San Francisco 1999), edited by Richard N. Katz, provides an instructive insight into the business-oriented approach to the paradigm shift at American universities.



lege won't survive as a residential institution. Today's buildings are hopelessly unsuited and totally unseeded."

The changes in university teaching of course have sparked vitriolic opposition from within the academic community, initially in North America where the development has started earlier and is much more fast-paced than in Europe²⁹.

Basically what is happening is what Tony Bates calls the convergence between traditional on-campus teaching and distance learning. The convergence is happening in response to a number of factors, notably the need for time- and place-flexible learning modes created by demographic changes within the student population and the emergence of Lifelong Learning, the transformation of the university from an elitist Alma Mater to a mass-education provider, and, not to be forgotten, the expectations and demands of more and more technology-savvy students. Add to that the internationalisation of higher education, and you've got a sketchy picture of the developments that are pushing the traditional universities online.

And pushing seems to be needed. Of the 11 Danish universities only two or three have developed a pro-active institutional strategy for the development of online learning. To my knowledge there are no surveys and quantitative analyses of the uptake of online learning in European higher education³⁰, but my guess is that the general European picture is pretty much identical to the particular Danish situation – with the United Kingdom and its very business-oriented universities as the exception. In comparison, a Sloan Consortium study of online learning in American higher education shows that 97.6% of all public higher education institutions in the USA offer online learning degree programmes and courses, either as fully online programmes or as hybrid (blended) formats³¹. But even if most European and Scandinavian universities are dragging their feet, online learning will eventually be pushed onto the classical campuses by their student constituencies and the hard-hearted forces of the higher education market.

With large cohorts of students online and with a considerable portion of degree programmes and for-credit courses converted partly or fully into online formats, the universities will need seamless and powerful integration of their online learning environments and their

²⁹ David F. Noble's 1997 essay *Digital Diploma Mills: The Automation of Higher Education* is one of the widest spread and most quoted examples of the traditionalist criticism of the use of technology in higher education. Prof. Noble's essay was first published in the peer-reviewed internet journal First Monday and is available at www.firstmonday.dk/issues/issue3_1/noble/index.html.

³⁰ There actually is! The European Commission Directorate General for Education and Culture recently commissioned a large and comprehensive study of Virtual Models of European Universities. The Commission expects the report to be published during fall 2003 or Winter 2004. The European Schoolnet project in January 2003 published a survey of "Virtual Learning Environments for European Schools", however as the title indicates with a focus on primary and secondary education (see <http://insight.eun.org>).

³¹ The study was conducted during March-June 2003. Preliminary conclusions available at www.sloan-c.org/publications/view/v2n4/datav2n4.htm.



student management systems. My guess is that we over a (short) period of years will see two worlds collide in this process: The world of the teaching staff and the world of the university administration. I see this reflected in two different approaches to LMS systems at Danish universities: the bottom-up, departmental approach versus the top-down, corporate approach.

The bottom-up, consensus-driven approach is solidly rooted in the 800-year-old university culture of departmental and academic autonomy: No one is going to decide for me what system I'm going to use in my online teaching! Basta! In some universities we therefore find, within the same campus, in some cases even within the same faculty, what I prefer to call a rich variety of different LMS systems, CMC systems and document management systems used in online learning. Some are commercially available products, some are homemade by small teams of faculty members or individual faculty members. Some of the systems are integrated with the central student administration system, however, most are not.

In the top-down, business-driven corporate approach the university's central IT Planning Commission is given the mandate to select one system for the entire campus, i.e. all faculties and departments, all faculty members, all students and all administrative units. To my knowledge so far four Danish universities have procured LMS systems based on a top-down decision to adopt one system.

At the time of writing of this chapter I know of the following systems in Danish universities: FirstClass, SiteScape, CampusNet, Blackboard, QuickPlace, VirtualU, BSCW and LUMIT plus, as said, a fair number of homemade systems. And I am pretty sure that my list is not exhaustive.

Considering the traditional European university culture and the still prevailing management structures in higher education, I appreciate the virtues and qualities of the bottom-up approach, however, I am sceptical as to whether it will be sustainable in the longer term. The migration of student progress data into the central student administration system is no trivial pursuit and the integration of online learning systems with administrative systems is enormously costly and technically complex. No university can afford to integrate five or six different departmental online learning systems into the central administration system.

How will the universities handle the clash between, on the one hand, business rationale and, on the other, pedagogical autonomy and flexibility?

Learning, Management and Systems - A Ménage à Trois?

It will be interesting to see how the LMS systems, with their strong roots in Instructional Design and their powerful tools for the automated monitoring, management and recording of learning and teaching activities, will merge with Danish educational culture and its fundamentalist belief in the teacher's indisputable and unlimited pedagogical-methodological freedom. The very concept of *systems* which *manage* learning is something foreign to Danish educational thinking. Systems should be used to *support* learning. The management of learning activities and learning actors is best left with people.

On the other side, to be an excellent professional, one needs excellent working tools, and the growing interest in LMS systems, also within public education, indicates to me that



the one-dimensional CMC strategy of Collaborative Learning is a cul-de-sac, and fails in delivering these tools to the learners, teachers and administrators in online learning. LMS systems and Learning Content Management Systems as we know them today may not provide the final solution, but they do address at least three emerging requirements³²:

- tools for production, delivery and management of digital learning material;
- tools for monitoring learner activities and progress;
- tools for the management of learner data and the integration between online learning systems and proprietary student management systems and HR systems.

Research on the new teacher role in online learning has focused much on the mentor role and the online tutoring skills of the teacher. I am convinced that the teacher will retain his/her pivotal role as both mentor, didactic guide and subject matter expert in the learner-centered world of online education, and I appreciate the importance of further research into this. However, on top of moving his/her classical teaching competences from the lecture theatre to the online environment, and on top of transforming ex cathedra lectures into an interactive online dialogue (asynchronous or synchronous), the online teacher will have to perform a new role, for which he/she is totally unprepared. He/she is to a growing extent going to be a designer, producer and distributor of online learning material. He/she will need to develop skills in the (pedagogical) design and technical production of digital and even multimedia learning material. We are talking about changing a more than 800-year-old form of academic discourse into a fundamentally new format. It is learning a completely new language and, believe me, that is no trivial pursuit. And that is not all: the teacher must be able to *manage* the material that he/she designs and produces, i.e. to publish it in an accessible and readable format on a website, to revise it and to keep track of revisions, to copy it from a fall course to a spring course, to control access if access is restricted, to ensure that his copyrights and intellectual rights are not violated and that he does not himself infringe the rights of third parties, and so on. Add to this the emerging complex standards – technical as well as procedural – that are being developed for e-learning in general and for e-learning material, learning objects, in particular. Is your lecture today SCORM-compliant, Professor?³³

³² I am grateful to my colleague Kurt Nikolajsen, Head of Department at UNI•C – The Danish IT Centre for Education and Research, for having pointed out to me why and how these requirements emerge.

³³ In his paper *Distance Learning: Promise or Threat* (1999), one of the fathers of Collaborative Learning, Professor Andrew Feenberg, San Diego State University, has produced a provocative and excellent analysis of how the new role of the teacher as a producer and administrator of digital content will make the classical, dialogue-based teaching competences obsolete. His point is that the shift in online learning from discursive media (such as computer conferencing and video conferencing) to automated teaching through Content Management Systems will “deskill” university teachers. Available at www.rohan.sdsu.edu/faculty/feenberg/TELE3.HTM



It is easy to understand that an institution or training provider looks for ways to ease the pain caused by this transformation of teacher roles and teacher competences. Painless it will never be, but more and more institutions are looking at LMS systems and Learning Content Management Systems as a means to shortcut the transformation process.

And basically most LMS systems of today are *Content Management Systems*. In this sense they refer back to the philosophy or school of distance learning that emphasises the authoritative role of the learning material as the didactical and cognitive guide of the learning process. Will LMS systems be the renaissance of correspondence teaching?

Keeping track of the learners, assessing their progress, supporting and advising them, when they need it, is another key teaching skill which gets new dimensions and new formats in online learning. Again, Collaborative Learning in my view has not produced effective learner monitoring tools to make it easy for the teacher to monitor progress. And again the new generation of LMS systems present themselves with a suite of powerful tools for automated skills (knowledge) analysis, assessment, testing and recording of progress, which seem to respond to the needs of teachers and which integrate online learning with the student/personnel administrative procedures of institutions and corporations.

What is the flip-side of the glossy Learning (Content) Management Systems of modern days? Pedagogical uniformity and a Big Brother Control Machine keeping an eye on the learners' (and the teachers'!) every little movement on a 24/7 basis? "Straitjackets!" a friend of mine hissed with malice in his voice, when I discussed this with him the other day. And he isn't even Danish.

I guess it would be fair to all parties involved to say that the organisational and pedagogical concepts underpinning most modern LMS systems fit badly with Danish educational culture and with the way Danish educational institutions traditionally organise learner support and learner management. Or vice versa. The world is moving and Danish educational culture should not be considered a holy cow. It may be just timely to try out some new ways of thinking. It will be interesting to see what will change, the systems or the users. But it is still very early days and there is, to my knowledge, no independent research available on the pedagogical and organisational impact of LMS systems.

In any event, we are in a peculiar situation. The methodological and pedagogical innovation of distance learning during the last 20 years or so has come from the school of Collaborative Learning. But the technical solution to the organisational and managerial challenges we are facing, now that distance learning is maturing and coming of age, now that competence needs, infrastructure and learner literacy finally converge, is coming from the old school of Instructional Design. Have we moved one step forward and two steps backwards in the process?

Nothing New Under the Sun

Love makes you blind. My first encounter with an LMS system was some 20 years ago, in 1983 or 1984. A colleague at the then RECAU, the regional computing centre at the University of Aarhus, had invited me over to his office to have a look at the PLATO IV system.



What I saw that sunny afternoon was a technologically highly sophisticated environment with touch-sensitive plasma screen. I saw a rich educational resource with thousands of interactive learning programmes in all sorts of subject fields, from music to COBOL programming. I saw community-facilitating communication tools and features such as e-mail, chat rooms, instant messaging and bulletin boards. I saw personalised content management and publishing tools. I saw tools for interactive storytelling and multiplayer games. I saw online tests seamlessly integrated with student tracking and administration tools. I saw tools enabling teachers to monitor student activities in real-time, synchronous mode.

I saw a system which was a product of the 1960s mainframe approach to the world, a system which had the *Zeitgeist* of the early days of CBT embedded in its very name: *Programmed Logic for Automatic Teaching Operations*. But basically, what I saw was an LMS system which was light-years ahead of its own time, and which had all the features associated with a system designed for collaborative learning³⁴. But I was blind to that. At that time I had just thrown myself head over heels into an affair with a computer conferencing system. My relationship with computer conferencing took me onto a long journey into the world of online collaborative learning. Now I've come to a crossroads and need to find out where to go from here. Exciting!

³⁴ See Brian Dear: *Lessons Learned: Interacting with the PLATO System*. Lecture given at Stanford University in May 2003, available at <http://hci.stanford.edu/cs547/abstracts/02-03/030509-dear.html>.



Anecdote 6. Nordic Virtual Universities

**The Finnish Virtual University
FVU is a project organization
for promoting and
developing networking
in universities.**



Many institutions around the world use the terms virtual and online universities. Among them are the Nordic governmental initiatives: *Nätuniversitetet*, *Norgesuniversitetet*, the unfortunate *Danish Virtual University*, and the *Finnish Virtual University*. In my opinion, very few institutions live up to such an ambitious name – and none of them are located in the Nordic countries. I regard the Nordic virtual universities as governmental initiatives that are established to support and promote online education. They work well as portals for higher education as described in the Danish evaluation report *Nordiske portaler for uddannelse* (www.unev.dk/docs/nordiske_portaler.pdf). In addition the Swedish and Finnish initiatives provide substantial public funding for development of online courses.

The Nordic countries have chosen different strategies regarding public virtual universities. Iceland has not made any decision to establish a national virtual university. Norway decided not to have one, but to establish a portal (www.norgesuniversitetet.no) with information about courses provided by the universities and colleges. The Danish Ministries of Education and Research initiated a Danish Virtual University in a mission statement on March 27, 2000. The Dkr 40 million budget (€ 5,4 million) for the period 2000-2003 was intended to support the development of Web-based courses and provide information about the courses. The initiative was shut down by the next government, partly as a result of lacking support from the affected institutions. The only result seems to be a portal providing information about further and continuing education (www.unev.dk). The portal was initiated by the *Danish University Rectors' Conference* and opened late 2003. In Sweden, *Nätuniversitetet* (www.netuniversity.se) was established in 2002 as a national body to fund and coordinate the activities.

FVU - The Finnish Virtual University (www.virtualuniversity.fi) is a project organization that develops and promotes networking activities among Finnish universities. It was founded in January 2001 as a consortium of Finnish universities, business enterprises, and research institutes. The initiative was a result of the governmental information strategy for education and research for 2000-2004. FVU is not a new university. It was set up as a service organization for the 21 existing universities. Hence, the virtual university does not provide courses itself, or award degrees. The courses offered by the virtual university consist of online courses provided by universities, aimed mainly at students of undergraduate, graduate or post-graduate degrees. The virtual university provides more flexible opportuni-



ties to study online. Students can participate in courses provided by their own university, other universities, or developed jointly by different universities.

Other means of achieving the objectives are guidance, training and networking projects, together with the virtual university development unit, whose task is to advance the use of new methods, tools, materials and services.

The Ministry of Education's Information Society strategy for 2000 – 2004 includes the founding of the Finnish Virtual University. A development unit was set up and a number of development projects were initiated. The consortium agreement was signed and projects commenced at the beginning of 2001. Based on the trial, best practices will be established and taken into broader use, stage by stage, so that the university will be fully functional by the end of the strategy period.

FVU provides university students, teachers, researchers and other staff with a virtual campus through a common portal. The portal provides online services in Finnish, Swedish, and English. The interface can be customised and personalised to suit users' needs. The portal will provide access to all that is necessary for online education: course information, enrollment, counselling, advisory, and information services, as well as discussion forums, LMS systems, support services and evaluation tools for teachers and producers of online courses. The basic portal was launched in the autumn of 2001. The complete system will be operational by the end of 2004.

A strategic goal for the FVU is to promote standardization. According to Director Pekka Kess, the FVU is developing support services for Finnish educators to evaluate LMS systems in order to make an educated selection (when there are options available - which is the case in many universities). So far the member universities have not given the authority to the FVU to make any selection concerning LMS systems, which means that support comes from sources within individual universities. It is also up to each university to choose a student management system. Oodi is gaining ground. Still, less than half of the universities are using it, but Oodi already serves more than half of all Finnish students. The FVU is working to make the integration of each separate system possible. This means process modelling, data modelling, and piloting.

"We have over 200 courses offered to our students," Pekka Kess states, "but no enrollment figures since each institution carries out student management. This is done either at the course, department or university level. FVU is still very much in the development phase and the real results can be expected from 2005 onwards. This is a national initiative – making changes in all member universities in their cultures, strategies, services and technologies applied. The measurement might be: how significant change has been achieved. We would like to help the universities to provide cost-effective and sustainable online education. But this could be hard, since the technology freaks do not care about costs. The FVU will build services for the great majority and only those products can be cost-effective and sustainable.

Until the end of 2003, the Finnish government will provide all funding for the Virtual University. The students pay no fees. The Ministry of Education finances the project with approximately € 9 million a year, and The European Social Fund provides additional



funding. The portal receives about € 0.7 million; the rest is used to support online education projects at individual universities and collaborative projects among the universities.

The Swedish *Nätuniversitetet* is in many ways similar to the Finnish Virtual University. Both have been important initiatives to support and promote online education in their home countries. But one may question if this is achieved in a cost-effective way, and only the future will show how sustainable these initiatives are.



On the Move Towards Online Education in Sweden

By Carl Holmberg



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Preamble

It is a very warm Sunday morning, the first one in August 2003. The time is approaching 10 o'clock and already there are 15,224 persons connected to one of the popular web sites for young people. What did they do last night? Before this Sunday ends there will be something like 300,000 visitors on that site. That is out of a population of only 8,952,605 people³⁵. The Net generation is growing up and choosing new ways for interaction. Also the population as a whole is maturing in their relationship to the Internet. In Sweden it is more than three years since half of the population between 12 and 79 years were surfing

© NKI Forlaget 2003, *Online Education and Learning Management Systems* by Morten Flate Paulsen.
www.studymmentor.com

³⁵ Statistics Sweden May 31, 2003. www.scb.se/indexeng.asp



on the net³⁶. How many it is today we don't have valid statistics for, but it is most probably much closer to 100 than to 50%. Visiting Sweden, you are in a country where the infrastructure allows a lot of activities using the Internet, and the Swedes are online. The question then is "Is the Internet used for Online Education"?

The examples given above will be elaborated a little further in a later section. They will all show intense use of the Internet for various purposes, not least in the educational sphere. But the very large expectations concerning the Internet as a carrier for education have not been fulfilled – yet. If Online Education is defined as a phenomenon close to Distance Education but fully based on the use of the Internet, as it is in this book, we have reached that to a very limited extent.

Looking into policy documents on education matters from the Swedish Government one will find similar visions and goals as in many other Western European countries. Simplified, Sweden wants to be best in the world, as most other countries and in compliance with the visions presented by the European Union. For more than 50 years the route ahead towards those visions has included the use of the latest information technology. The ways of implementing policy and introducing technology have varied over the years but successively and slowly the education systems are changing. We have seen no revolutionary changes in them in this country, but evolution towards more technology supported teaching and learning, education more based on pedagogical theories and a distinct power-shift in the systems. Ambitions to decentralise have moved focus and decisive power from central authorities to students, teachers, and local bodies at all educational levels.

This chapter will give a brief overview over these developments in Sweden. Before elaborating on that, an important comment on the societal context for these changes: Over the years almost all education in Sweden³⁷ has been a free asset to the citizens. Private institutions exist but they are scarce. Thus, this is also the case for adult education. Popular education at folk high schools and community colleges (municipal adult education) is free of charge. That is also the case for tertiary education at universities and university colleges. For personal costs students at all levels can get financial support and favourable loans from the state. This situation has of course adapted people's minds to thinking that education is something demanding you need to invest time and effort in, but it is nothing you pay for.

I will start this storytelling by giving a few examples from the policy and praxis levels in the Swedish scenario. In a following section the ideas and directions on the policy level will be further elaborated, thereafter a more structured description of how policy has been implemented and online education realised. As a last step I will discuss successes and failures in Swedish online education.

³⁶ Teknisk Framsyn www.tekniskframsyn.nu

³⁷ For an overview of the education systems in Sweden the reader is recommended to go to:

- Basic education www.skolverket.se/english/system/index.shtml
- Tertiary education www.sweden.se/templates/SISCommonPage___4970.asp
- Various forms of adult education www.skolverket.se/english/system/adult.shtml



A Country Online

Becoming a Frontrunner

As in other countries investments in information technology have been relatively high over the decades. The use of radio, television, video, and computers in education and training has been investigated and discussed by state commissions one after another, many of them having had money to feed into the education systems for development work³⁸. Looking in the rear mirror one can say that they have tried to solve problems in education and training with a top-down perspective, most of them have tried to push the use of technology. Of course these different initiatives have had effects. They probably prepared the systems for later changes by making students, parents, teachers, and administrators successively more aware of the possibilities in technology and as eye-openers for the differences between different technologies. The expected outcomes of the different initiatives though were seldom reached. Ambitious goals of dramatic changes in education systems were not fulfilled, e.g. centralised production of televised lectures and similar learning material proved to be unrealistic in the Swedish context and local innovative projects implementing changes turned out to give only temporary changes. After the project periods one could most often notice a return to old solutions.³⁹ Apart from the increased awareness, another very important effect of the decades with committees and development work was of course the investments made in technology infrastructure. A large variety of technical equipment and fast communication networks were successively installed.

A turning point came in the mid 90s. Some of the main factors behind it were

- very strong demonstration of official policy on the introduction of IT
- setting-up of agents for change supporting development of education systems
- pushes and pulls - more space for local initiatives.

Carl Bildt, who was Prime Minister of Sweden, gave in February 1994 a speech⁴⁰ setting a new political agenda for the transformation of Sweden into a nation drawing upon the resources of information technology. He formed an IT Commission where he himself was chair and many of the other ministers of his government were delegates. Included in the commissions were also researchers and representatives of business and industry. The idea was of course to initiate, promote and get IT-related transformations in all sectors of society and the main task for the commission was to highlight the possibilities of IT, to identify limitations and pave the way for the introduction of it.

³⁸ An early example could be SOU 1973: 19 TRU:s försöksverksamhet 1967–1972. (The Committee for Television and Radio in Education. Experimental activities 1967–1972. Stockholm: Kommittén för television och radio i utbildningen.

³⁹ Holmberg, C. (1998) *På distans. Utbildning, undervisning och lärande*. (SOU 1998:83) Stockholm: Nordstedts tryckeri.

⁴⁰ www.bildt.net/index.asp?artid=354



From 1994 onwards the idea was to invest approximately one billion Swedish crowns (€110 million) per year in research and development work. Up till now, in 2003, that most probably also has been the case. All together development programmes, foundations, research schemes, national agencies and authorities, and municipalities have some years spent more than that.

Of high importance was the fact that the government itself tried to demonstrate good practice, to be a spearhead in the introduction of IT. Already early 1994 the Swedish government together with the White House in the USA was linked to the Internet and an open information source for the citizens. A more spectacular event was that Carl Bildt February 4, 1994, sent the first e-mail ever between heads of government to Bill Clinton.⁴¹ By doing that and all the publicity he attracted, over night a large majority of the Swedes learnt what an e-mail is and knew about its possibilities.

Other traits in the reform processes were the recognition of a power-shift between central authorities and local systems. An already started decentralisation process was increased and the education systems on all levels became highly decentralised. Local context and knowledge could be mirrored in educational programmes and organisational solutions. Later on in the 1990s central authorities were replaced with national bodies working as agents for change in the education systems. This will be demonstrated in a later section of this chapter.

Online Services, Online Authorities^{42 43}

In line with the discussions in many countries all over the world the Swedish government has stressed the importance of using the new technologies to increase the service level to citizens.⁴⁴ In a Government bill 1999⁴⁵ they made it clear that every ministry and central authority should serve as a model for the use of information technology in its internal activities as well as in its interplay with business, industry and citizens. The ambition should be to be available 24 hours as an information source and open to business enterprises. Implementing technology for these purposes should not exclude older forms of interaction between authorities and citizens; it should be possible to approach the authorities via a large variety of channels. Pluralism might be the keyword.

The Swedish Agency for Public Management (Statskontoret)⁴⁶ got the task to stimulate and support the changes towards "24-hour authorities". In a recent study presented by the agency it reported that the ideas in the government bill have been highly accepted and work as a driving force towards an increased customer orientation. With few exceptions the authorities now are established on the Internet with a growing variety of services.

⁴¹ www.bildt.net/index.asp?artid=263

⁴² <http://finans.regeringen.se/fragor/forvaltningspolitik/handlingsprogram/atgarder.htm>

⁴³ www.statens-e-forum.nu/artiklar/98.shtml

⁴⁴ Government bill 1997/98:136

⁴⁵ Government bill 1999/2000:86

⁴⁶ www.statskontoret.se/english/index.htm



A large part of the population is today relying to a large extent on the Internet for most of their interaction with the authorities.

The Net Generation in Action at Lunarstorm

With the new millennium Lunarstorm also was born. At 00:00 2000 you could surf into its web site and from that moment it has grown to be the most frequently visited among Swedish youth. The person behind the idea, a fellow named Richard Ericsson, from Varberg, Sweden, had for a long time dreamt of creating a digital meeting-spot welcoming everyone. His ideas were well received and an early version of the web site started to grow out of control. A group of young people then started a company⁴⁷ to create, organise and run the work around what became Lunarstorm⁴⁸. An important aspect was of course also to get a financially sound platform for the work with the site. Advertising on the web creates one source of income; another is to sell information gathered from the web site visitors.

The statistics are impressive. In the age group between 12 to 24 years 80% (1,092,000) have joined as "lunare". In the same target group, 74% are reached by the youth-oriented TV channels (i.e. MTV, ZTV), which means that Lunarstorm draws more attention from this age group than the TV medium. Data presented April 2003 shows that each member spent more than 40 minutes per day on the web site. The number of unique visitors per day was 323,553 and of unique visitors for the month was 2,497,115⁴⁹.

With this success it is of course one of the largest Internet sites in Sweden and definitely the largest meeting-place for Swedish youth. For more than one million young Swedes it gives a framework for their social network and instead of exchanging telephone numbers or e-mail addresses they give each other their nicknames on Lunarstorm.

A central aspect when building systems for online education is to develop tools for interaction. Many solutions exist and experiences from them differ. Still, I assume that many of us working with transformation of the education systems eagerly have been waiting to see the outburst of intensive interaction on the web. How will the web sites attracting large groups of people be constructed? How will they be designed? Lunarstorm is not an educational tool but gives the majority of all Swedish students at all levels, a café and a locker-room, a playground and a disco where they discuss everything from moral issues and ethics to computer games and the last musical hit. As a "lunare" you are visible on the Web and can get advice from others on complex matters and be comforted when life challenges you. ... and if you look into the discussions going on, the instruction and advice they are giving each other, a lot of it could very well be characterised as teaching and learning sessions.

⁴⁷ www.lunarworks.se The company started 1999, main office for Lunarworks is in Varberg, Sweden and the company employs 26 persons.

⁴⁸ www.lunarstorm.se

⁴⁹ Källa: TNS/Gallup, Red Measure, april 2003



The American author Don Tapscot introduced the term Net Generation in one of his books⁵⁰. Among other things he has made forecasts about what will happen with the children growing up with digital media. In one chapter he discusses "The Culture of Interaction" and many of the ideas about the future he has put forward are richly demonstrated at Lunarstorm. Tapscot writes:

"A new youth culture is emerging ... defined as the socially transmitted and shared patterns of behavior, customs, attitudes, and tacit codes, beliefs and values, arts, knowledge and social forms. This new culture is rooted in the experience of being young ... But most importantly, it is a culture that is stemming from the N-Gen use of interactive digital media. We should pay attention because the culture which flows from their experiences in cyberspace foreshadows the culture they will create as the leaders of tomorrow in workplace and society." (p 55).

This culture already so well anchored in Swedish society will of course affect people when they take on the role of students. The education systems and the different designs the systems will develop for teaching and learning have to take this growing culture into account. It is a new and complex element in the societal context where the education systems and their different programmes have to function.

75,000 School Staff Skilled Online Users

The fourth and last example to demonstrate how Sweden is maturing as a country online will be taken from the school sector and an extensive programme for further education of teachers. The project was called "IT in School" and its acronym was ITiS. It was 1999 - 2002 the most massive national investment for development of Swedish schools when the Government allocated 1.8 billion SEK (approximately € 200 million) for that four-year period. Decades of investments in technology infrastructure and development projects had preceded this project. It was time for the next step. In brief the idea this time was to get the teachers to implement their pedagogical knowledge and methodological skills in the use of computers and networks.

The basic document behind the project was "Tools for Learning – A National Programme for ICT in Schools"⁵¹ One of the key messages in that was: "The new technology should contribute to a new focus on pupils' learning – the focus should not be on the technology itself". The ITiS-project was not only aiming to enforce those aspects but also to support change in the schools working and study methods – towards more real life and constructive tasks, more teamwork between teachers and pupils and more student involvement. Other aims were in general terms a) to prepare teachers and students for the new type of working life b) to use IT as a pedagogical tool for change c) to support equality between

⁵⁰ Tapscott, D. (1998) *Growing up digital. The Rise of the Net Generation*. New York: McGraw-Hill.

⁵¹ *Tools for Learning – A National Programme for ICT in Schools*. Ministry of Education and Science, Sweden. 1998



schools in the country in the change process d) to change attitudes and promote new pedagogical approaches e) via IT in school to create new possibilities to interact with society outside school and in particular to stimulate international contacts. Very important was also to provide every teacher with a computer – the primary IT working tool⁵².

From an initial focus on teachers and their development, competence and role, the project widened the target group to “pedagogical personnel”. The experiences in the beginning of the project were, that to be effective the project should include more educational professionals with other backgrounds and roles than just teachers. Most important of course were head teachers.

The initiative involved a wide range of different types of schools at different school levels. During the projects “lifetime” the school types involved expanded to also include municipal adult education and, during 2002, also folk high schools. The project was truly national; all 289 municipalities in Sweden participated by applying to be part of the project. It turned out that more than 50 % of all professionals in Swedish schools participated and more than 60% of the teachers in the country. Thus more than 75,000 people were voluntarily and actively involved.

There is agreement between employers and teacher’s unions that teachers’ working hours are not synonymous with teaching hours. This means it’s possible to organise work in the school in a variety of different ways. For instance, there may be teachers in a work team who are not teaching pupils but who are involved in other forms of pedagogical work. A full-time teacher has 35 hours of pedagogical work per week in school and 10 hours work based in the home. Out of these hours 104 should be used for in-service training per school year. This structure and time resources were necessary for the project and made it possible to integrate the project in the ordinary work.

Teachers who participated had a computer at their disposal. The computers were intended to be located in homes, also after the project had been completed. The idea behind this was that if teachers had their computers at home they would more likely use it as a professional and pedagogical tool. In this way teachers would improve their computer literacy. The ministry negotiated prices with a number of computer manufacturers and they delivered computers supplied with pre-installed software all according to local choices (municipalities/teachers). 80% of the computers chosen were portables.

Schools could apply for participation in ITiS with their own local projects and their organised local teams of pedagogical staff. Thus the base unit in the project was not individuals but teams. A support organisation was created in order to co-ordinate activities

⁵² More elaborated, the goals on a macro level were: Equivalent standards between schools and quality for pupils, School development, Supplementing and reinforcing programmes planned and already completed by municipalities, Increasing the schools’ access to the Internet and e-mail. These were specified in goals for the Action program: In-service training for 75,000 teachers in teams, A computer for participating teachers, State grants to improve the schools, Access to the Internet, E-mail addresses for all teachers and pupils, Support for developing Swedish and European School net, Measures for pupils with special needs, Awards for excellent pedagogical contributions.



on national and regional levels and to assist municipalities involved. Facilitators were at hand on local levels.

ITiS used a “bottom-up” and “top-down” approach simultaneously. Strong local self direction and decision making at school level regarding content and type of local projects catered for a bottom-up approach. A strong national steering group provided the overall goals, support structures, the necessary resources and collected and disseminated results.

ITiS has had a very large impact on school systems and it is locally very well known. Many not directly affected by the project are eager to be followers. The increased awareness and more skilled usage of IT tools in schools are of course in the long run of high importance for the whole of society and for preparing teachers and students for different forms of Web-based learning.

Societal Ambitions and Commercial Hopes

The Prosperous Future of E-learning

Sweden has been no exception to other countries when it comes to expectations concerning the e-learning market. If anything, commercial hopes have been higher than in other countries. A flood of books and articles, and thousands of visionary and missionary meetings appeared between 1995 and 2002. The use of IT in education was believed to be a real money-maker. Reports⁵³ giving the market prognoses of the future of e-learning stated that the market should increase by 27% per year. The commercial value of it was estimated at 2,5 billion SEK (€ 275 million) by the year 2006 and the largest part of the market was to be Web-based learning, a concept used as a synonym for online learning.

Entrepreneurs had wide-open ears and very many businesses were started producing Learning Management Systems, online courses, different types of learning material using the Web and also large-scale activities combining different media.

Also these expectations, though more elaborate and moderate, influenced the national agenda. A long series of documents arriving from the government pledged a more intense use of the possibilities the new digital tools were offering.

Government Policy

Education systems are looked upon as potent instruments in the change processes in society. That is a trait in most Western countries and has been a dominant feature of Swedish society for the last 160 years. *Governments* in Sweden have very actively worked with the agendas for the education systems. Societal goals should be reached through schooling in educational structures adapted to these goals. During the last few decades expectations concerning the systems for adult education have been extremely high from the policy makers. Through flexibility they shall meet needs of people with short educational histories and

⁵³ Swedish Corporate eLearning Market, 2001 – 2006.



compensate them for what they missed during their early years. By cooperating with the work sector they shall *adapt the human capital* to close the gap between needs and supply in the labour market. Being a companion throughout life the education systems shall be present during an individual's life cycle providing sources of fast-increasing knowledge, furnish the individual with new tools and explaining the changing conditions in society, creating the possibility of *life-long learning*.

As they were formed during centuries, education systems are solid constructions and the majority of them are organised to meet other demands than the three dimensions mentioned above. In the Swedish case decisions have been taken since the 70s pointing in one direction. The different institutions of education shall be successively reconstructed. They shall move from being suppliers of education in one format to being suppliers of education in multi-formats. They shall provide students with campus training, distance education and blended learning. When an open university of the British type was discussed in Sweden decisions were taken not to organise such an institution, but to give the traditional universities the task to also supply distance learners. State-financed single-mode institutions (working solely with distance education) on the upper secondary level⁵⁴ were given new tasks through a decision of the Parliament (2001). Instead municipal adult education institutions are supposed to work with multi-formats; that is, they should cater both for the student physically present and the distant learner who is on line.

Apart from the three goals mentioned above, the expected outcomes of the evolution of the systems are to engage 50% of each age group in higher education. This is of course an advanced goal and demands dramatic changes in education systems. In the year 1900, out of each age group 1% (700 students) passed upper secondary level; today the equivalent is 85%. In the year 1960 32,000 students studied at the Swedish universities. In the autumn semester 2002 there were 329,000 students at tertiary institutions. That was an increase of 9% from the year before. Still, the system is far away from delivering the political goals. Present statistics show that 32% of the population have some kind of higher education and 17% have an education demanding three years or more of university studies.

To reach the ambitious goal of 50% of each age cohort going through higher education, education systems on all levels have to be organised to suit all kinds of learners throughout their whole life cycle. Not only universities and university colleges have to adjust to new ways of working but also upper secondary schools and the different types of institutions for adult education.

The Swedish politicians have so far seen educational policies as a national domain. Thus the Swedish attitude has been to – “first develop domestically and then create international networks and have an international outlook”. Reluctantly the globalisation of education is acknowledged and the political control of the increasingly international and money-driven Internet-based education could not be ignored. But there are still few signs in policy documents of a changed agenda in this aspect.

⁵⁴ Statens Skolor för Vuxna placed in Norrköping founded during the 1950s and Statens Skolor för Vuxna placed in Härnösand founded during the 1960s.



The *IT commission* already mentioned in the introduction has had as its main task to advise the government on issues related to IT-policy. It was created in 1994 with nineteen delegates, chaired by the prime minister and six of his other ministers joined the work of the commission. No one argued the need for an IT policy and in a short time they also developed one. Three commissions have followed the first one, successively with less involvement of the top politicians. After nine years the last commission ended its work.⁵⁵ In their last documents you can perceive a certain degree of irritation over the situation. IT, which was a top priority in the mid 90s, now is competing with other policy fields and presently the idea has been to integrate questions related to IT as a part of other political fields. Still the need for political leadership is stressed and clear visions about how to prosper from the possibilities inherent in information technology at large. The commission argues that we are in the beginning of an era with large changes. Technology has the maturity to support these changes but further political initiatives are needed.

The relevance of IT in the education sector has been discussed during the past nine years. In their last series of advice to the government they underline that IT is not just a tool for increased access to education and for introducing new forms of interaction. The use of IT in education puts demands on new policies in relation to production and distribution of learning material. In that way the commission begs for increased support for online education. The rapid development of the technologies and the integration of them in all societal sectors could create a competence crisis. Presently there are not enough skilled people available to cater for this development. Thus another strong piece of advice to the government was to further invest on all education levels in educational programmes covering a variety of aspects of IT.

Another commission with a great impact on the development of online learning worked during the end of the 90s. It was given the task to enlighten distance education methods for adult education. During the beginning of the 2000s a series of other commissions dealt with for example recruitment, new conditions for learning, pluralism and questions around the openness of education systems, primarily at tertiary level.

The Minister of Education and Science appointed the *Commission on Distance Methods within Education*⁵⁶ during 1995 with the task of outlining strategies for distance education policy⁵⁷. The task involved all systems for adult education and was also to take into account possible alterations in the role of the Educational Broadcasting Company. The work within the Commission was heavily based on empirical data and therefore it had large financial resources. The use of IT was to be a paramount issue in the work. The

⁵⁵ All reports from the four commissions can be found at (many of them are produced both in Swedish and English):

www.itkommissionen.se/dynamaster/file_archive/030306/6ab139523a910d750c54fd7473b609a8/Total%20rapportlista%20030109.doc

⁵⁶ DUKOM, Distansutbildningskommittén (U95:07): Strategi för distansutbildning

⁵⁷ Dir 1995:69, Directives of a Commission: Distance Methods within Education. Decision at Cabinet meeting May 4th 1995. Swedish Ministry of Education and Science.



Commission launched 100 development projects spread over different levels in the educational systems and over the whole country. The projects tested different forms of teaching and different ways of organizing learning, ways of implementing new educational tools, clashes if any between regulations in traditional educational systems and distance education, etc. The Commission reported⁵⁸ to the Minister in June 1998. The major suggestion by the Commission was to set up a new co-ordinating body for distance education, the Swedish Agency for Distance Education. That institution was to have resources to sponsor development work and research. It was to organise a national web site with tools for Distance Teaching and Distance Studies. It was also to inform about research in the field of distance education.

The many commissions dealing with different aspects of higher education in the new century resulted in a government bill to the parliament. Directly translated from Swedish the title was The Opening of Higher Education but the formal document in English is called Reforms in Higher Education – a more open system⁵⁹. It was really an important document including not just major reforms of higher education but also as a consequence drawing up a new agenda for other sectors of adult education. Some of the proposals were of high importance for this presentation of Swedish policy. They were all accepted by the parliament.

The major idea was that distance learning via the webs of universities and university colleges should be coordinated into a Swedish Net University. The ambition behind that was to widen access to higher education and to encourage lifelong learning. All providers of education at tertiary level who were legally authorised to issue degrees could take part in the activity. A new authority was to support and promote the activities, The Agency for The Swedish Net University⁶⁰. The Net University with the Internet as the major means of distributing academic courses started during 2002.

On the same occasion the decision was made to close the Swedish Agency for Distance Education (Distum), which meant it had been in action barely three years. The responsibilities of Distum were to support change in the organisation of education and in teaching and learning in popular education and in higher education. The decision to establish a Net university moved some of the responsibilities of Distum to the universities themselves and to the new agency. For all adult education systems apart from higher education the parliament decided to set up a new authority, the Swedish Agency for Flexible Learning⁶¹.

The major task for the Swedish Agency for Flexible Learning (CFL) became to promote the development and utilisation of flexible learning in municipal adult education and liberal adult education (folk high schools, study associations). Apart from serving the systems for

⁵⁸ Distansutbildningskommitteen. Flexibel utbildning på distans (SOU 1998:84)

⁵⁹ Government bill 2001/02:15

⁶⁰ www.netuniversity.se/Default.asp?c=63

⁶¹ www.cfl.se



formal adult education it thus covers what in Sweden is called «folkbildning», which is the popular non-formal and voluntary educational system for all ages. There are eleven different study associations, which conduct around 350,000 study circles every year, with about three million participants altogether. They also arrange more than 200,000 cultural events with about 1.5 million participants or visitors. There are 147 folk high schools scattered around the country. Each semester they have around 100,000 participants in short courses. In formal adult education there were in 2002 332.000 students.

Other Policy Making Bodies and Their Policies

Several other organisations have been active as policy makers in the field of online learning. To briefly describe just a few therefore is complicated and the selection has to be a very personal one. Of course one could mention some of the large magazines⁶² and newspapers⁶³ or forums for debate, but my selection includes just three of the important players who have had a more direct possibility to both formulate and implement policy.

The Knowledge Foundation

As one of the consequences of the more active policy-making during the mid 90s, foundations were organised as governmental initiatives, all with aims connected to information technology introduction in various fields of society. One with tasks close to the theme of this book is the Knowledge Foundation⁶⁴. The Knowledge Foundation was established in 1994. The foundation promotes broad use of IT in society, and supports research at Sweden's university colleges and new universities. As one of their tools they support exchange of knowledge between universities, other institutes of higher education, industrial research institutes and the business community. Documents from the foundation state that their challenge at the beginning of the 21st century can be summarised in one concept: Upgrade Sweden. The foundation had a starting capital of 3.6 billion SEK (approximately € 400 million) and it has been very successful in handling the capital, so in spite of very large investments in development projects and research programmes, most of the starting capital is left as a basis for future activities. One of the very important lines of action has been to promote opportunities for school pupils to get to grips with the new information technology. One billion SEK was spent on 27 very large lighthouse projects in schools and to facilitate the spread of information technology on a broad base. One of the themes was to find new ways of thinking about how pupils learn that reduce the dependence on teachers, increase pupils' commitment and get them really involved in the learning process. There were four major elements in this large investment in school development. A variety of school development projects, Investment in teaching aids, Research programmes into learning and IT, and Information campaigns to ensure that other schools benefited from the experience and results gained. Having a possibility to invest all this money of course had a

⁶² <http://computersweden.idg.se>

⁶³ www.idg.se

⁶⁴ www.kks.se/aboutus/



large impact in schools and on the attitudes of students, teachers and parents. The Knowledge Foundation summarises some of the experiences and effects in the following bullet points:

- Pupils at project schools are more involved than in the past – they own the learning process.
- Endeavours to create pupil-owned learning and the right tools have resulted in a new concept: learning to learn.
- Schools must have an ongoing educational discussion on the skills and tools that pupils need.
- Schools use IT more selectively.
- The technical approach of the mid-1990s has disappeared – the spotlight is now on learning.
- The gap in IT skills is narrowing between schools.
- The Knowledge Foundation showed that it is possible to push ahead, to use new and unconventional methods – even in schools.
- Enthusiasts were easy to find and bring on board, and it was these people who came to dominate the school projects.
- The projects highlighted the importance of the head teacher – if the head teacher drops out, then the entire school drops out too.

IT-Företagen

IT-Företagen⁶⁵ is a top organisation for IT companies and its main task is to assist and develop that industry. Swedish IT industry has for years been a dominant factor in the economy of the country spearheaded by Ericsson⁶⁶. The association has an important role to serve as a forum, lobby decision-makers and to help develop the industry as a whole. Visibility of the industry, promoting positive attitudes and adapting education systems to the various needs of the IT industry have of course been of high importance. Together with the Confederation of Swedish Enterprises⁶⁷ they have run massive information campaigns around IT professions, IT use and the like directed towards Swedish youth. The priorities for the Confederation are spelled out in the following way

- To promote continued infrastructure initiatives which give users in Sweden access to efficient and stable communication networks and create solid conditions for developing and using IT and communication services,
- To promote applicable legislation which is predictable and facilitating competition on equal terms,

⁶⁵ www.ifforetagen.se

⁶⁶ www.ericsson.com

⁶⁷ www.svensktnaringsliv.se/index_english.asp



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- To promote increased skills for users and an expansion of the use of IT and electronic communication services,
- To promote Sweden maintaining its position as leading IT nation and a leading nation as regards new advanced services, and
- To promote IT and electronic infrastructure being used to secure sustainable social development and solid growth in Sweden.

It is easy to realise that these two organisations, if they are successful when they work towards these goals, will also have an important societal effect.

Teknisk framsyn

The third and last example of policy producers outside the traditional political sphere is called "Teknisk framsyn"⁶⁸ which could be translated into "The Far-sighted Role of Technology" but also "The Technological Outlook". The resources to realise this were put up as a joint effort by a group of stakeholders⁶⁹ with an organisation, also with responsibilities in supporting societal change in relation to new technologies, called VINNOVA as the coordinator. "Teknisk framsyn" is a national project aiming at drawing up a future scenario for the technological development. The perspectives are long-term visions and to promote the interplay between technology and organisational and social processes. Presently they are working with questions like: What are the guiding principles behind people's choice of technology? and What are the driving forces when large shifts in technology use appear? "Teknisk framsyn" influences decision makers mainly at national level by publishing their work and through inviting people to seminars.

What Has Become of All the Initiatives?

Mechanisms to Realise Policy

Policy production has been intense in Sweden; that must be quite clear after the presentation above. A few other things are probably also obvious; the investment of money has been extensive, development projects have played important roles and agents have been set up to ease the implementation of policies. In this section the results of these initiatives will be further elaborated.

⁶⁸ www.tekniskframsyn.nu.

⁶⁹ The earlier mentioned Knowledge Foundation and IT-företagen, but also IVA (www.iva.se/eng/index.asp), The Swedish Research Council (www.vr.se/english/index.asp), Swedish Business Development Agency (www.nutek.se/sb/d/112), Confederation of Swedish Enterprises (www.svensktnaringsliv.se/index_english.asp) and The Swedish Trade Union Confederation (www.lo.se/english/index.htm).



The Commercial Initiatives

The number of entrepreneurs who started different businesses was large and they had no difficulty in finding people interested in investing money in a variety of projects. One firm after another was born; they started businesses with the major focus of exploiting the possibilities of the new technologies in education. Few of them are today still in the market. Using their names when searching the Web you will find four to five-year-old articles describing grand openings, but also newer articles reporting big losses and closing down of business.

K-World

One of the more spectacular companies was K-World. The name should be translated into "a world of knowledge". The background for K-World was typical for the era of the early e-learning companies. The founders very much looked into the situation in the U.S. where they saw large investments going into e-learning. Furthermore they believed that the e-learning companies would cover 40% of all of the education market in the year 2003 in Sweden. As the reader easily can realise from the following information, K-World succeeded in raising very large funds for its activities and also created alliances with other important players within Sweden.

K-World was founded in 1998. The company consisted of a learning solutions department, a television channel and a website (kworld.se). The website was launched on October 31st, 1999, along with the television channel. They presented themselves in the following way:

kworld.se is an intelligent market place for people who want to learn more. The training and education market (kunskapsmarknaden) provides access to over 4500 training courses from 160 education companies. The market place is supported by an inspiring editorial section that gives the visitor guidelines and motivation to study. This also includes free mini-courses that cover a wide range of subjects. The Company has a TV channel and on kworld.se extra material and mini-courses related to the TV-programs are found. kworld.se has received more active users than expected. In February the site had more than 30 000 visits and the number of members today exceeds 3000. The training and education market consists of more than 4500 courses and several companies are waiting to enter.

K-World had the ambition to start a "knowledge revolution", first in Sweden then moving into the rest of Europe. They foresaw an enormous growth in the need for higher education and of further education in different professions. K-World would respond to that need. They planned to have both individuals and business and industry as customers. At the same time K-World had ambitions to be an important player in the field of liberal adult education. Of course these assumptions about a knowledge revolution were correct. The Swedish government had deliberated about that since the 70s and successively constructed education systems to meet those plans.



All kinds of teaching and learning were to be included in the two major ways for distribution and communication: the TV-channel and the Web portal. The TV-channel would also attract students and function as an opener to other activities. The company produced some learning material themselves but also bought from abroad. They also formed alliances with international players. Still they had an enormous task to fulfil supporting needs of a large variety of target groups in very different education systems and with staff with limited experiences from more than the 100 years of trials in distance education or from the relevant fields of research. The complexity of the education task was probably not fully realised.

The initiative did not just attract funds and co-players but was also very successful in attracting a lot of press. In March 2002 one could read that K-World had ceased broadcasting on Sweden's digital terrestrial TV and shortly thereafter the whole activity was closed.

This story could be repeated. Between 1997 and 2002 many ventures started and ended facing similar problems as K-World. Some of them had plans and activities larger than K-World but K-World was probably the most expensive experience for the Swedish e-learning market.

Formal and Informal Adult Education

During the major part of the 20th century, adult education, in various forms, played an important role in the Swedish education system. Folk high schools and study associations actually have an even older origin and so has distance education. Up to the end of the 60s, a small number of large correspondence schools were among the most vital players on this scene. Around the middle of the 60s, Sweden probably had the largest number of distant students in proportion to its total number of inhabitants.

However, in the late 60s, through a parliamentary Act, practically all forms of adult education in Sweden were made free of charge or highly subsidised. Adult education colleges (Municipal Adult Education) were set up all over the country. They added to the earlier education systems for popular education possibilities for adults to get formal education at secondary and upper secondary level. The correspondence schools found it very hard to meet the competition and either went out of business or had very limited activities.

As another and earlier initiative on the secondary and upper secondary levels, two National Institutes for distance education were founded: The first one in 1957 placed in the southern part of Sweden and then a second one in the North approximately ten years later⁷⁰. Both were single-mode institutions producing and giving courses solely as distance education. For more than forty years they worked in the field of distance education building up experience of distance teaching, distance learning and of the complex organisation around this way of performing education. This was of course a very important asset when the government wanted to realise their policies around flexible learning.

Presently the task for the different adult education institutions is to adapt their ways of working to suit the students better. Their old ways of working should be combined with new ones into a variety of study forms. Traditional classroom teaching has its given place but

⁷⁰ Statens Skolor för Vuxna in Norrköping (SSVN) and in Härnösand (SSVH).



computers and networks should be used to increase access, quality and flexibility in the organisational solutions; in the Swedish case that could be translated into flexible learning. The experiences from the distance education field are of high importance in this transaction process. Over the years distance education has been a laboratory or site for field experiments in innovation in education; online learning, e-learning, and Web-based learning could be developed on that basis.

The two national institutions thus got a new role as supporters in the change processes. They form the core of a new agency founded January 2002, the Swedish Agency for Flexible Learning (CFL). The agency shall work as an agent for change and support Municipal Adult Education and the various forms of liberal adult education when moving towards more flexible forms including online learning. The major tools for that are to

- support projects,
- develop and disseminate knowledge on methods and ways of working in flexible learning,
- provide further training for teachers and administrators,
- provide information on Internet-based software,
- act as a networked information agency for IT-supported distance education, and
- monitor and provide information on research and development work relating to distance education and flexible learning.

The range of activities has widened and CFL today also supports setting-up of learning centres⁷¹ and has responsibilities to develop methods and systems for validation of students' de facto competence and informal learning.

The National Broadcasting Company got a special assignment to arrange distance education courses for popular education. It had been active with the production of educational programs since the 40s⁷² and this was added to their earlier tasks. An Educational Broadcasting Company was founded.

Higher Education and Governmental Distance Education Initiatives

When in many other countries open universities were created, Sweden chose not to build a single-mode institution for distance education⁷³. Instead an extremely decentralised system

⁷¹ A Learning Centre is a meeting place where adult students can find support and resources for their studies.

⁷² The Educational Broadcasting Company (UR) is producing and delivering courses on different educational levels often in co-operation with one of the old correspondence schools and with a group of universities. UR is mainly using traditional designs and techniques for DE but still it is on the whole an advanced player in the field of DE when it comes to arrangements for the teaching and learning situations. However, during 1998 it was suggested to give UR new tasks mainly as producers of teaching material for the different DE institutions.

⁷³ *Mainly in different Commissions i.e.: SOU 1971:36 Produktionsresurser för TV och radio i utbildningen. Stockholm: Esselte tryck., SOU 1973:19 TRU:s försöksverksamhet 1967-1972. Stockholm: Almqvist & Wiksell. and SOU 1975:72 Distansundervisning. Lägesbeskrivning samt organisatoriska alternativ för högskolan. Stockholm: LiberFörlag Allmänna Förlaget.*



was set up for the tertiary level. The responsibility for carrying out distance education rested with the individual university departments, which at the same time organised traditional forms of university education. Thus a dual-mode system was created.

Those decisions during the 70s about the tertiary level led to a markedly small-scale type of distance education with, as a rule, a maximum of 30 students in each course. In the beginning of the 90s approx. 800 courses were arranged, labelled «distance education courses» at Swedish universities. A majority of those courses however had either no distance education at all or were courses with just few distance education elements. They were often a combination of pure self-study and compressed face-to-face lectures, most often at weekends. When they applied distance education methods, that could be a study guide and a few contacts at a distance via post/fax and/or telephone.

No doubt, this confusion was - to a great extent - due to the extremely decentralised and small-scale organisation of distance education at Swedish universities. Small changes over the years were shown⁷⁴ and the state of the art was not at all up to the standards expected by the authorities.

The academic year 1994/95 the number of students following distance education courses was 25,800 which was an increase of 60% over a couple of years⁷⁵. It was approximately 10% of the student population.

During the 70s, 80s and 90s the ambitions of the government were to increase distance education. That has successively moved over to include different educational formats using computers and the Internet. In the light of history the actions taken for improving that field can be described as four steps, each of which was a trial of alternative strategies.

Umeå University

In the late 80s the government made a first large-scale attempt by concentrating funds and efforts on a development programme at Umeå University. The overarching purpose was to contribute to rural development in the northern sparsely populated areas of the country. By developing expertise in distance education Umeå University could be the main actor in the field and a front-runner having followers at other universities. A mild description of the outcome could be that those ambitions were not fulfilled.

The University Consortia

A second step was taken by the government through making resources available to stimulate co-operation between universities. By gathering expertise from different institutional bodies and bringing a diversity of stakeholder perspectives together, new and more potent organisers of distance education could grow. This brought about the establishment of a number of university consortia with the purpose of developing distance education in joint

⁷⁴ Holmberg, C. (1994). *Reflexioner kring distansutbildning och pedagogik i Individanpassning, tillgänglighet, flexibilitet. Rapport från en distanslärarkonferens i Umeå 6-7 juni 1994. Umeå: Umeå universitet, Distansutbildning i utveckling, Rapport nr 10.*

⁷⁵ Data om informationstekniken i Sverige 1996. Stockholm, Statistiska centralbyrån, 1996.



projects. Co-operation between autonomous institutions at tertiary level is known worldwide as a difficult task. Apart from demonstrating that, the consortia had difficulties in building the necessary fundament of knowledge to be efficient producers and deliverers of distance education.

Dukom and Distum

A third step was taken through forming the Commission on Distance Methods within Education. The Minister of Education appointed the Commission during 1995 with the assignment to outline strategies for distance education policy⁷⁶, which have been described in earlier sections of this chapter.

The major suggestion by the Commission was to set up a new co-ordinating body for distance education. That institution should have resources to sponsor development work and research. It was to organise a national web site with tools for Distance Teaching and Distance Studies. It was also to inform about research in the field of distance education.

On 1 July 1999 the Swedish Agency for Distance Education (Distum) commenced its operations⁷⁷ in Härnösand in the north of Sweden. The agency would promote the development and application of distance education based on information and communication technologies (ICT-based distance education). The operations would encompass universities/colleges and popular public education throughout the country.

The major strategy of Distum was to support the development of new knowledge about flexible education at a distance and to disseminate that knowledge to universities and other bodies for adult education. Research and testing of ideas in practice were important tools for Distum. The hypothesis was that with a sound base of new knowledge the educational organisations would make decisions about revised forms for arranging education.

In March 2002 the Ministry of Education and Science closed Distum. A little more than 2.5 years was of course too short a time to test all basic ideas behind Distum's role as an agent for change. Many different factors were influencing the decision from the Ministry. One important aspect was that the organisation found it hard to gain credibility among the institutions for higher education.

Nätuniversitetet

The fourth route towards a more pluralistic way of teaching and learning at the universities has been tested since 2002. The government decided to set up the Swedish Net University as a dual- or multi-modal university based upon the courses and programmes already given by the universities and university colleges. Participation in the Net University is voluntary and the ownership of it is very clear. It belongs to the universities and university colleges delivering courses into it. In order to support the project, the Swedish Net University Agency was set up. The primary task of the agency is to co-ordinate the different courses

⁷⁶ Dir 1995:69, Directives of a Commission: Distance Methods within Education. Decision at Cabinet meeting May 4th 1995. Swedish Ministry of Education and Science.

⁷⁷ Excerpts from the Ordinance with instructions for the Swedish Agency for Distance Education (SFS 1999:249)



given by the various Swedish universities and for that purpose run a web site⁷⁸ exposing the courses. The agency will also support improvements in skills and competence among distance education teachers and other personnel and identify topics and areas that would benefit from more distance education.

Thus a lot of the initiatives in this fourth step of promoting distance education and its followers have moved back to the institutional level. That together with seed money is the driving force in this case. During the first years of existence each student taking courses via the Net University will give a much higher return to the university than students following on-campus courses. For the two first years 371 million SEK (€ 41 million) has been spent for this purpose.

So far no dramatic results can be reported. Still approximately 10% of the student population is following distance education courses. The quality of the courses provided and the degree of flexibility they give to students have not yet been analysed.

Still Waiting for Online Learning

Questions

Trying to answer questions like “How come online education is not a more dominating trait in our country?” or “What went wrong with all investments and hopes for the future?” is not simple. A variety of aspects have influenced developments to where we are today. On the positive side all work so far has created a very good climate for future development of online learning, on the negative side there has been and still is a lack of understanding of the complexity of the change processes needed to support these new forms of teaching and learning.

A Promising Future

The situation early autumn 2003 in Sweden is that many of the prerequisites for online learning are present. We definitely have a growing digital generation. Not just are growing numbers of youth competent users of the net and computers, but also a very large portion of those who have had to enter the digital world as grown ups. If there were measures of digital maturity, Sweden as a country would score high. The technology infrastructure is therefore also advanced. Already some statistical notes on this have been described. In January 2002 Eurostat presented the following status: 90% of Swedish households with children in school have computers, and 70 % of all Swedish households have at least one computer – and a majority of these are connected to the Internet. Of course these numbers have increased since then. More and more one also finds a supporting infrastructure for individuals using the Net as a tool for learning. Libraries are normally well equipped with computers and Internet access and with staff with a growing knowledge and interest in learner support. In connection with libraries or as autonomous units, learning centres or

⁷⁸ www.netuniversity.se/Default.asp?c=63



study centres are being developed all over Sweden. They are of course also of high importance to a student studying online.

The Obstacles

Maturity and infrastructure are thus at hand, but still something is missing for online learning to take off. One aspect is money or more correctly the willingness to pay for education. Swedes are not used to paying for education. It is looked upon as a free asset. An important source of income in the U.S. is tuition fees. The universities in Sweden are not allowed to receive payment from students for the provision of higher education. Tertiary education in Sweden is financed by public means. The incentive for Swedish universities to go online and educate foreign students for free is thus very limited. Therefore Swedish universities have not been active in the international Internet-based education business. On the other hand in the Swedish context it is hard for international competitors to compete because the national system offers the services for free and it also provides higher education in the native language, Swedish. International competition to recruit students has in Sweden therefore been very low or non-existent in comparison with the situation between the Anglo-Saxon (US, UK, Australia and Canada) global players on other markets. Formal and non-formal adult education has the same situation. Rarely do students have to pay for their education.

As introduced earlier, education has become a highly focused area. It is a hot topic in European and national policies. Different kinds of professionals are attracted to education, carrying with them values and beliefs established in other fields, but perhaps not suitable for building education systems or creating milieus for studies. Of course it is a positive thing that all these professionals enter the field of education. They bring with them fresh eyes, new viewpoints and can fertilise the field. The negative thing is that people moving into the field are lacking in knowledge about the "wheels invented before". Academia is specialised in referring to earlier work; strangely enough this is not the case when they start projects in ICT and learning. They are of course less knowledgeable about educational concepts: systemic mechanisms and established theory related to the development of education systems. Often they see education as a simplistic problem when it de facto is a complex social phenomenon; they lack holistic views and historical perspectives. The managements of education institutions could address this issue by adding "education system experts" to their management teams.

Also many of the attempts to develop and commercially introduce online learning have had problems related to lack of competence. In most cases the companies have been well prepared for business with financial and marketing staff. They have had advanced technological skills, often with young employees being in the frontline when using the possibilities of digital equipment. The "education system expert", the specialist in adult learning, and people with knowledge of the growing research around distance education and online learning have seldom been present in the project teams. Thus large investments have been made in business structure and in technology but too little or often almost nothing in adapting the "products" to the education market. Many of the now sleeping companies built their



commercial ideas on old pedagogy they themselves experienced at school, just implemented on the Net or on a CD. Limited knowledge of target groups and how they live and learn has been an obstacle and often made projects go bankrupt.

A more profound aspect of the change processes discussed here is of course the understanding of and the compliance with policies developed on the national level. The simple logic behind presenting "a good idea" and having people living in accordance with it is not always there. In a study⁷⁹ the focus was to describe and analyse if and how universities/university colleges had developed policies for their distance education. Thus the core issue in the study was to what extent the ideas and initiatives from the government and from central authorities were reflected in policy documents at the institutions for higher education in Sweden. The presence and the content of such local policies were to be analysed. The results were not very positive. The central bodies of the universities delivered documents sometimes rather immature in the thinking demonstrated around distance education/flexible education: often they had nothing to deliver. Local policies had not yet been developed. Of course there are many distance education courses given by universities without a formal policy. Individuals or departments act according to individual or departmental policy. A question around that could be raised: Is that a sustainable way towards flexible education?

The decentralised education systems we have in Sweden more or less presuppose that the development of the system is initiated and realised locally. As demonstrated in the survey, few of the institutions had listened to the voice of the government and acted accordingly. The academic leaders were guided in other directions and thought about other things than the politicians. Individual teachers and researchers in those institutions out of their own interest or in compliance with national policy were developing and giving education supported by ICT and with flexible formats for the students. Without a local policy framework supporting their efforts, their work in this area could be a brief exercise. The conflicts if any between university autonomy and those needs in society best fulfilled by universities, are issues that must be addressed.

The dominant values within academia direct activities towards excellence. This is embedded in the system at all levels. Success means to recruit elite students, the best researchers and to be visible in the Nobel Prize Committee. The connection between these values and caring for societal goals is not direct. To compensate people for lack of education, to upgrade the labour force and to cater for lifelong learning belongs to another world of values than the striving for excellence. Nothing says that activities aiming at fulfilling one set of values cannot be realised in the same system as activities fulfilling another set of values, but this must be brought out into the open and discussed.

⁷⁹ Holmberg, C. & Hansson, H (2002) ICT policies – university leaders versus politicians. Presence and impact on 49 Swedish institutions for higher education. Paper to *ONLINE EDUCA*, Berlin, November 27 – 29, 2002.



Anecdote 7. The Swedish Challenges: A Provocative Statement



The following statement⁸⁰ is a transcript of my presentation at the final panel discussion at the Netlearning2002 conference (www.netlearning2002.org) in Ronneby, Sweden. It is a personal, political statement from a foreigner who intended to stir discussion among the 200-300 Swedes in the audience.

“The most important trend in online education today is the transition from small-scale experimental courses to large-scale, mainstream operation. I like to call this the online education mega trend. Only in Scandinavia, we are talking about hundreds of thousands of online education users. My own institution, NKI Fjernundervisning (www.nki.no), alone offers 400 different online courses.

Our challenge is therefore to find effective ways to organize large-scale online education. And this is a huge challenge for educational institutions. We are facing a period of important organizational development and change. So far, too little focus has been given to this issue.

Another consequence of large-scale online education is that we need to focus on cost-effectiveness. Today the real cost of online education is far too high. We can simply not afford to pay two or three times more for online courses than we pay for on-campus courses.

Since I am a Norwegian who observes Sweden from abroad, I would like to address two issues, which I perceive as the Swedish challenges:

The first Swedish challenge has to do with cost-effectiveness. In Norway, online students typically pay € 4,000 for the equivalent of one-year full-time study. In comparison, Swedish universities receive about € 12,000 in governmental funds for this. Three times more than they do for on-campus students. This lavish funding is intended to increase the development of online courses, but it could easily set a standard for the future cost of online education courses. In my opinion, the Swedish approach is unwise, not cost-effective, and it could set an unhealthy standard for future overspending.

The second Swedish challenge has to do with tuition fees. In most countries, there is increasing acceptance of commercialization of education. Swedish universities are still not allowed to charge tuition fees from individual students. Norwegian universities and colleges are now allowed to charge tuition fees for further and continuing education. This has made it the most dynamic and innovative sector of education in Norway. Since Sweden

⁸⁰ The statement is available as an audio file at www.studymentor.com



lacks this economic incentive for change, Sweden will have significant problems competing with other countries in the emerging global online education market.

Therefore, I would like to use this opportunity to give a personal piece of advice to the Swedish Ministry of Education and to Nätuniversitetet. As I see it, online education in Sweden is far from cost-effective. And it is not sustainable. I predict that most of the online courses that have received financial support from Nätuniversitetet will not be offered again when the lavish, external funding stops a few years from now. When that happens, another economic incentive should be in place. And I am convinced that Sweden, like the rest of the world, must realize that the solution is to accept that students pay tuition fees for further and continuing courses that are taught online.”

Postscript

Since I made this statement, I have discussed the Swedish challenges with a number of Swedes that have strong opinions about some of my provocative statements. Many disagree with me, but some have lamented that Swedish taxpayers finance online courses for foreign students living abroad. Others argued that taxpayers should not pay further education for doctors, lawyers, and engineers who already have received the lion’s share of free education.

In Norway, there are many who prefer the Swedish model, and there has been a discussion in the Norwegian media⁸¹ about student payment for online education. A number of articles argue against tuition fees for online education.

⁸¹ Some articles about tuition fees for online education are available in Norwegian at the following addresses:

- *Lover kamp mot studieavgiftene:* www.aftenposten.no/jobb/article.jhtml?articleID=469520
- *Nettstudenter må punge ut:* www.aftenposten.no/jobb/article.jhtml?articleID=469518
- *...men i Sverige er det gratis:* www.dagbladet.no/kunnskap/2002/05/07/329446.html
- *30000 for grunnfag via nettet:* www.dagbladet.no/kunnskap/2002/05/07/329423.html
- *Nettstudenter må punge ut:* <http://universitet.no/n.nsf/alt/5HQUQL>
- *Utdanning er viktig - men hvem skal betale?* <http://universitet.no/n.nsf/alt/5G2HF5>
- *Universitetet i Tromsø tar betalt for grunnstudier* <http://universitet.no/n.nsf/alt/5G4EAR>
- *Få gratis etterutdanning fra de andre nordiske landene* <http://universitet.no/n.nsf/alt/57XLX2>



Online Education Support Systems in Scandinavian and Australian Universities: A Comparative Study

I first understood the cultural gap between Australian and Scandinavian educators when I visited Australia with a group of Scandinavian educators. One evening we went to a restaurant to experience local dishes of kangaroo and crocodile meat. There, we had to wait in the bar until a table was available. We ordered and paid for one drink each, but didn't realize it was happy hour before we all had drinks in both hands. The table was soon ready, the drinks hurriedly finished, and our spirits rose rapidly. The next day we met with a zealous international relations officer at an Australian university who proposed to establish a collaborative master's degree, allowing students to spend one year in Scandinavia and one year in Australia. His scheme included offering students two master's degrees, one from Scandinavia and one from Australia. Then, I immediately realized that I wanted to retire in Australia and establish a company with the slogan Happy Hour University: Get two degrees for the price of one.

Abstract

This article⁸² presents a comparative study of online education support systems in Norwegian, Swedish, and Australian universities. The online education support systems discussed comprise content creation tools and systems for learning management, student management, and accounting. The author arrives at the conclusion that there seems to be a general lack of integration between these systems in all three countries. Further, there seems to be little focus on standards specifications such as IMS Global Learning Consortium (IMS) and Sharable Content Object Reference Model (SCORM) in higher education in all three countries. It was found that both Norway and Sweden value the importance of nationally developed LMS systems and student management systems; however, this does not seem to be the case in Australia. There also seems to be much more national coordination and

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⁸² This article is based on the article [Online Education Systems in Scandinavian and Australian Universities: A Comparative Study](#). Originally published in the International Review on Research in Open and Distance Learning (IRRODL), Volume 3, Number 2, October 2002. Online at: <http://www.irrodl.org/content/v3.2/paulsen.html> Copyright (c) 2002. Reproduced with permission of Athabasca University – Canada's Open University."



governmental coercion concerning the choice of student management systems used in Sweden and Norway, than is the case in Australia. Finally, with regard to online education, the most striking difference between these three countries is that of economic policy. In Australia, education is considered an important export industry. In Norway and Sweden, however, export of education does not seem to be an issue for public discussion.

Introduction

This article was conceived in January 2002 during a two-week study tour of eight Australian universities in Queensland and New South Wales. It was later nurtured and developed further through literature studies, in-depth telephone interviews, and e-mail correspondence with representatives from the universities and a number of other contacts. Of particular importance, was the e-mail contact with National Council on Open and Distance Education (NCODE) - Flexible Learning Australasia (<http://ncode.mq.edu.au>), which helped me collect systems information from all Australian universities.

The Universities visited during the study tour were:

- University of Southern Queensland (USQ), Toowoomba, www.usq.edu.au
- University of Queensland (UQ), www.uq.edu.au
- Central Queensland University (CQU), www.cqu.edu.au
- Griffith University (GU), Logan Campus, www.gu.edu.au
- Charles Sturt University (CSU), www.csu.edu.au
- University of Technology, Sydney (UTS), www.uts.edu.au
- University of Wollongong (UW), www.uow.edu.au
- James Cook University (JCU), Cairnes Campus, www.jcu.edu.au

Thirty representatives from Norwegian and thirteen representatives from Swedish universities participated in this traveling seminar, and much time was spent discussing and reflecting upon differences and similarities between Norway's, Sweden's, and Australia's national educational systems. Many participants provided valuable input to this article both during and after the traveling seminar. The seminar was arranged by the University College of Lillehammer, which developed a website with information about the seminar and articles written by participants (<http://australia.hil.no>).

The author has some previous knowledge of Australian online education gained from the Cisaer project (Paulsen, 2000) (www.nettskolen.com/in_english/cisaer/index.html). Knowledge about higher education in Australia is also based on the higher education report for the 2001-2003 triennium (DEST 2001).

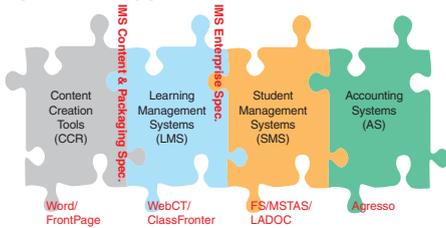
Online Education Support Systems

The online education environment is discussed in this article from a systems perspective that comprises a chain of four systems as listed below and shown in Figure 12.



- Content Creation Tools (CCT)
- Learning Management Systems (LMS)
- Student Management Systems (SMS)
- Accounting Systems (AS)

Figure 12. The jigsaw model for online education support systems



These online education support systems are more or less integrated, in that they may overlap, exchange data, or work seamlessly together. So far, in most institutions high levels of integration among systems remains limited. In a discussion of integration between Learning Management Systems (LMS) systems, Student Management Systems (SMS) systems, and Accounting Systems (AS) systems in Norwegian higher education institutions, Runnestø and Ristesund (2002, 159) concluded that there is a general lack of integration between LMS systems and SMS systems.

There are several emerging specifications of standards, such as the IMS Global Learning Consortium (IMS) (www.imsproject.org) and Sharable Content Object Reference Model (SCORM) (www.adlnet.org/scorm/downloads.cfm), which may result in improved and easier integration between the four systems. However, the results of this article reveal that there is still little focus on standards in Australian, Norwegian, and Swedish higher education.

A compilation of the online education support systems used by universities visited is presented in Table 20. The author has not had the capacity at this time, to compile information about which CCT and AS systems the universities are using.

Table 20. Online education support systems used by the Australian institutions visited

University	LMS	SMS and other systems	Standards mentioned
University of Southern Queensland	Blackboard, WebCT, Vista	Peoplesoft, Web-trends, Rightnow.com, GOOD	XML, IMS
University of Queensland	WebCT	Peoplesoft	
Central Queensland University	WebCT	Peoplesoft	
Griffith University	Blackboard (learning@GU)	Peoplesoft, Self-developed	



Charles Sturt University	In-house, Blackboard, WebCT	Banner	
University of Technology, Sydney	Blackboard, WebCT	Student One	
University of Wollongong	WebCT	Self-developed: LOL	IMS
James Cook University	Blackboard	Self-developed: studentsonline	

In the following, each of the four categories of online education support systems is discussed with particular attention paid to systems integration and national differences.

Content Creation Tools

Content creation tools (CCT) are used to develop learning material. Typical examples of such CCT systems are DreamWeaver, Frontpage, Word, PowerPoint, and Director. These are generic CCT systems with few features developed specially for online education. There are probably few national differences with regard to educational use of these CCT systems. Because there are many types of content such as plain text, slides, graphics, pictures, animations, audio, video etc., it is likely that institutions will need several CCTs. Moreover, it is unlikely that a single LMS system could meet all the needs for content creation.

Integration Between CCT and LMS Systems

Growing focus on standards, such as IMS and SCORM, may provide greater exchangeability of content between LMS systems. For example, The IMS Content and Packaging Specification will make it easier to create reusable content objects useful in a variety of learning systems. However, one should also take note that these are “specifications” rather than “standards.” As such, specifications are still developing and have not yet been ratified by any international standards-accrediting agencies. BlackBoard and WebCT, for instance, are partnering with IMS to develop and support such specifications.

It is also worthwhile to note that some LMS systems provide more or less advanced features for content creation. Creation of quizzes, multiple-choice assignments etc., are often handled more efficiently by LMS systems than by generic CCT systems. There are also specific content creation tools for creation of tests, and as such, The IMS Question Test Specification addresses the need to share test items and other assessment tools across different systems. Finally, one should also be aware that LMS systems may require templates and provide publishing features that may support or complicate the integration of CCT and LMS systems.



Learning Management Systems

In Australia, WebCT is perhaps the most widespread LMS system, with Blackboard ranking second. An NCODE-FLA (2002) LMS survey (<http://ncode.mq.edu.au>) of 34 Australian institutions showed 24 instances of WebCT use, 12 instances of BlackBoard use, and six instances of in-house developed LMS systems. This finding is supported by a brief on leading learning platforms (The Observatory on Borderless Higher Education, 2002), which shows that Australia holds the highest penetration of BlackBoard and WebCT, with 76 percent of the country's 34 universities licensing such LMS systems.

Among the Australian universities visited, WebCT is used at USQ, UQ, CQU, CSU, UTS, and UW; whereas Blackboard is used by USQ, GU, CSU, UTS, and JCU. The tour indicated that the gross figures would need to be closely examined to determine the level at which each application was used on both a subject and department level, as compared to an enterprise level.

In a personal e-mail, one manager at Charles Stuart University (CSU) Online reported that WebCT is the most commonly used LMS in Australia, but that Blackboard is used in the majority of enterprise installations. He further stated there are many stand-alone LMS installations used throughout Australia, and that such systems will never integrate with enterprise systems. These stand-alone systems are consistently counted in raw survey data, but one must question if they should be counted equally.

Charles Stuart University's online manager also reported using an in-house developed LMS, and they were just beginning a trial of Blackboard. Having used WebCT in the past for various small projects, CSU recently made the decision to switch from WebCT to Blackboard after a long, democratic process of discussion.

The University of Southern Queensland (USQ) has recently decided to use WebCT Vista, which was released in Australia in March 2002. USQ will use WebCT Vista for local and domestic students, but also continue to use Blackboard for USQOnline in conjunction with their commercial partner, NextEd. Their intention is to manage the transition to both LMS platforms from GOOD via the IMS specification.

Table 21. Number of LMS systems in Australia's 34 universities

LMS	Number of instances	URL
WebCT	24	www.webct.com
BlackBoard	12	www.blackboard.com
In-house	6	
TopClass	3	www.wbtsystems.com
WebMentor	1	
FirstClass	1	www.firstclass.com
Callista	1	
Lotus Learning Space	1	www.lotus.com

(Source: NCODE-FLA, 2002)



ONLINE EDUCATION AND LMS SYSTEMS

The NCODE survey (2002) showed that BlackBoard was the only LMS supported centrally at Edit Cowan University (ECU). However, they have previously used both WebCT and a system developed in-house. Further details from ECU are available in a case study (The Observatory on Borderless Higher Education, 2002).

It is interesting to note the dominance of commercial North American systems in Australia. Although there is an overall lack of Australian-developed systems on a commercial level, there are some systems developed in-house. This raises some concerns in Australia, in that the two major LMS players have the market “stitched,” meaning that the systems are embedded in the operational culture of Australia’s higher education institutions and that uncompetitive pricing structures could evolve.

An analysis of LMS systems in the Nordic countries (Paulsen 2002) states that Nordic institutions tend to prefer LMS systems developed in Nordic countries. Among the 25 different LMS systems identified in the analysis, 16 were of Nordic origin. All other systems were of American, Canadian, or Irish origin. The analysis further indicated that Classfronter, WebCT, FirstClass, and BlackBoard are the most commonly used LMS systems in the Nordic countries.

In Norwegian higher education, the dominant system in use is the Norwegian developed system Classfronter (www.fronter.com), while some colleges use standard commercial systems, and others have developed their systems in-house. Of Norway’s 54 universities and colleges, 32 offer online education (Runnestø and Ristesund 2002, p. 36). As shown in Table 22, several Norwegian universities use more than one system.

Table 22. Number of LMS systems used in 54 Norwegian institutions of higher education

LMS	Number of instances	URL
Classfronter	21	www.fronter.com
In-house developed	9	
Luvit	6	www.luvit.com
IT’s Learning	4	www.itsolutions.no
First Class	3	www.firstclass.com
Kark	3	http://kark.uib.no
WebCT	3	www.webct.com
BlackBoard	2	www.blackboard.com
TopClass	1	www.wbtsystems.com
Lotus Learning Space	1	www.lotus.com
TeamWave	1	
Response	1	

(Source: Runnestø and Ristesund, 2002)



Norwegian institutions emphasize the importance of using Norwegian-developed systems that are responsive to informational and feedback needs specific to Norwegian institutions.

In Swedish universities and colleges, no one system seems to dominate, but a number of standard commercial systems are used. According to personal e-mail correspondence with one of Sweden's leading experts on LMS systems, Fredrik Rexhammar (March 18, 2002), Luvit (www.luvit.com), Lecando, Infinity, Grade, Platon, and Web Academy, are the current Swedish-providers of LMS systems. Rexhammar also stated that WebCT and Blackboard are the most common foreign LMS systems currently used in Sweden. In addition, the Swedish-developed system PingPong (www.partitur.se) is also used by some institutions. The following systems are listed in a market overview of LMS systems (www.ssv.gov.se/avit/pform2.htm): Luvit, Mentor, Telia Instant Education, Maestro, FirstClass, Comenius Online, Lecando, Librix, Marratech, PingPong, Surfa och lär, and WebCat.

Integration Between LMS and SMS Systems

For historical, legal, and financial reasons, SMS systems tend to be more important than LMS systems. This is because the SMS usually serves as the "master system" from which the LMS accesses and draws necessary data. As a result, integration between SMS and LMS systems tend to vary in sophistication. One may distinguish between the following four levels of integration:

1. Both systems access the same database. However, since few existing systems were originally designed with integration and security in mind, high levels of integration may be difficult to achieve.
2. Both systems have separate databases, but the data is frequently updated and exchanged in a synchronized manner, for example during a daily batch process.
3. Data is frequently transferred one way, from the SMS database to the LMS database, for example during a daily batch process.
4. Data is transferred from the SMS database to the LMS database at the beginning of each semester when students are registered in the SMS. This process may be handled manually.

IMS, SCORM, and other specifications, may facilitate data exchange, thereby making it easier for institutions to substitute one system for another. Hence, these specifications may make institutions less dependent on system providers. For example, The IMS Enterprise Specification is aimed at administrative applications and services that need to share data about students, courses, and performance across platforms, operating systems, and user interfaces. Similarly, the IMS Learner Profiles Specification describes ways to organize student information, so the systems can be more responsive to the specific needs of each user.

One faculty member at Central Queensland University (CQU) reported in a personal e-mail, that an IMS consultant recently claimed that WebCT, Blackboard and PeopleSoft had agreed on IMS interoperability specifications, presumably for future releases.



ONLINE EDUCATION AND LMS SYSTEMS

Runnestø and Ristesund (2002, p. 159) pointed out that they found a general lack of integration between LMS systems and SMS systems in Norwegian colleges and universities. Awareness of this “lack of integration” is increasing in both Australia and Scandinavia. In the NCODE-FLA survey (2002), 11 Australian universities reported varying levels of integration as shown in the quotes below:

- The University of Adelaide has achieved full integration with PeopleSoft, employing nightly updates for staff and student details.
- Deakin University uses Callista as its student record system and Concept as its human resource system. Both systems are integrated with TopClass, with a fairly administrative-intensive transfer of records between FirstClass and the corporate administrative applications. There is no link with WebCT.
- Edith Cowan University uses a homegrown records system and enrollment system; however, these systems will be replaced by Callista in the future. The human system currently in use is Concept, and Blackboard is integrated with the existing student and human resources systems.
- Griffiths University uses PeopleSoft, which is fully integrated with its other systems.
- James Cook University has achieved integration with its JCU web, whereas purpose-built StudentsOnline and StaffOnline systems work remains ongoing.
- Northern Territory University is currently using the ASCOL student administration system and developing a Callista TAFE version. When development is completed, Callista will be implemented university wide. Integration with other systems is planned to occur as Callista is implemented.
- The University of Melbourne uses a homegrown student administration system, Merlin, and human resources system Genesys, which are integrated with its LMS, WebRaft. WebRaft is integrated with Melbourne University’s e-mail system.
- The University of New England uses Banner Student and Concept, which are both highly integrated using API with Banner and username and password systems.
- The University of the Sunshine Coast uses PeopleSoft for student administration, finance, human resources, and payroll. In its recent LMS tender, they are looking for integration with its PS systems.
- The University of Tasmania is in the market for a new student system: Concept and HRMS. Both are to be integrated with WebCT.
- The University of Western Sydney is using Concept for staff administration, alongside an in-house student administration system, SRS. These systems are only minimally and variously integrated with current LMS systems in use. Callista is slated to be implemented mid-2002, with the goal of developing gradual interoperability within an integrated system.

Student Management Systems

There seems to be more national coordination and/or governmental coercion in terms of choice of SMS systems used in Scandinavia, than is the case in Australia. Many SMS



systems used in Australia were developed in North America such as: PeopleSoft (CQU, GU), Banner (CSU), and Student One (UTS). However, other universities like the University of Wollongong (UW) and James Cook University (JCU), for example, have developed in-house systems, and therefore changing to a commercial system appears to be a major economic obstacle.

The NCODE-FLA survey (2002) provided information about the SMS-systems used by 21 of Australia's 34 universities. This survey indicates that PeopleSoft is the most widely-used commercial SMS system in Australia. It also shows that Callista is also widely used and that a number of institutions plan to switch, or are in the process of switching, to Callista. This survey also supports my impression that several universities have chosen to develop their systems in-house. It must be noted, that a relatively large range of other systems are also mentioned in the survey.

Table 23. Numbers of SMS systems used in Australia's 34 universities

SMS	URL	Number of Instances
PeopleSoft	www.peoplesoft.com	8
Callista	www.callista.com.au	6
In-house developed system		5

(Source: NCODE-FLA, 2002)

In Norway, two student management systems dominate the higher education market: Felles System (FS) (www.fs.usit.uio.no) used by most universities, and MSTAS (www.enet.no) used by most colleges. However, it must be emphasized that the two largest private colleges have chosen alternative solutions: The Norwegian School of Management uses Banner and NKI has developed its own in-house system, STAS.

FS is a computer-based student management system developed for universities and colleges in Norway. The first version of FS was developed in 1995-1996 and financed by the Ministry of Education with € 10 million.

Between 1996 and 2001, the following institutions have started using FS:

- Universities: Norwegian University of Technology and Science, University of Bergen, University of Oslo, and University of Tromsø
- State colleges: Oslo School of Architecture, Norwegian School of Economics and Business Administration, Agricultural University of Norway
- Colleges: Agder University College, Bergen University College, Buskerud University College, Oslo University College, Stavanger University College, Sør-Trøndelag University College, Tromsø University College, Stord/Haugesund College, Norwegian Lutheran School of Theology, Norwegian Academy of Music, National Art and Design Institute in Bergen



ONLINE EDUCATION AND LMS SYSTEMS

All publicly financed educational institutions that wish to use FS have access to it. Costs of maintenance and further development are shared among user institutions. This system has the following features:

- Persons (applicants, students, subject teachers/specialists and letter and address solutions)
- Application and admission procedure
- Study elements (Courses, subjects, study programs, requirements and regulations)
- Right of Admission, classes, leave of absence
- Term registration (invoice for term fee, automatic term registration)
- Payment (fees for study and exams, reports to financial systems)
- Lecture (planning, publishing, student administration)
- Exam (planning and student administration)
- Qualification (awarding of degrees and diplomas)
- Master and PhD (admission and student administration)
- Further and continuing education
- Application for recognition of foreign or external credentials
- Scholarships (application and awarding)
- Exchange students
- Reports to various governmental agencies among others.
(www.fs.usit.uio.no/fs-english.html)

All Swedish Universities use LADOK or LADOK NOVAU, owned by a consortium of 37 Swedish higher education institutions. Information about the LADOK consortium is available at www.ladok.umu.se. LADOK is a computer-based student admission and documentation system for a university or university college. It focuses on administration of undergraduate and graduate studies. The system is locally deployed and managed by the institutions.

The LADOK system has a “mutual core,” identical to all LADOK system installations in Sweden. This “mutual core” consists of a structure of database tables and computer programs. Every institution decides which parts of the “mutual core” it wishes to use. It is also possible to use locally developed addendums. In essence, the LADOK system can be viewed as a large “smorgasbord” from which the institution can pick-and-choose which parts it needs to use.

The LADOK system consists of two major parts: the admission system, and the documentation system. They are integrated and share data – e.g., name, address, and other facts about applicants and students. A third part, handling documentation of graduate students, has been added to the LADOK system’s “mutual core.” Undergraduate studies are handled in terms of single courses and programs of study usually totaling three or four years in length. System files contain information for student identification, general eligibility for university studies, admission to courses and study programs, registration on courses per semester, course data, credit points from courses, degrees awarded, and international studies.



The LADOK system mainly focuses on student admission and documentation, planning and follow-up. This system was designed for use in all Swedish state financed institutions of higher education. Users of the LADOK system at an institution can be found at all levels:

- University board and administration
- Faculty or school heads
- Departments
- Students

Data from LADOK is exported to the Ministry of Education and other agencies for follow-up purposes. An important objective of LADOK is to prepare and generate the annual invoice to the government for institutional level undergraduate studies. Although the LADOK system is owned by a consortium of 37 Swedish higher education institutions, maintenance for the LADOK system “mutual core” is the responsibility of a maintenance group at the University of Umeå. Local system usage is the responsibility of individual institutions, including payment for servers, networking, terminal equipment, and local support.

Integration between LMS, SMS and AS Systems

Most institutions have relied on accounting systems for many years. Although AS systems were not developed for integration with LMS systems in mind, they are often part of, or minimally integrated with, a university’s SMS systems. So far, integration between the LMS and AS systems has not attracted much attention. As online education generates more income for institutions, it is likely that increased levels of systems integration will become more important. Some institutions already accept that online enrollment, payment, and student credit account information must become more central.

Accounting Systems

In contrast to Australia, which enjoys a long history of serving tuition-paying students, Sweden does not accept any tuition fees from its students. In recent years, however, Norwegian universities and colleges have begun charging their students tuition for further and continuing education courses. These national differences are significant, in that both countries have developed different incentives for the development of online education and the integration of their AS systems with their SMS and LMS systems.

The accounting systems used in Australian systems are integrated functionally with the SMS or LMS systems. This seems to be the situation for the SMS systems: PeopleSoft and Student One. Similarly, Banner is an integrated accounting system used in the LMS system BlackBoard. In contrast, a separate accounting system named Agresso (www.agresso.com) seems to be dominant in both Norway and Sweden.



Discussion and Conclusions

In comparing online education support systems in Australia, Norway, and Sweden, several important issues become apparent. The most prominent finding facing all three countries is the general lack of integration between content-creation tools, LMS systems, student management systems, and accounting systems. To overcome these shortcomings, many institutions have recently initiated efforts to improve overall systems integration. It is hypothesized that those institutions that implement seamlessly integrated systems, will likely improve their chances of becoming successful, large-scale online education providers.

In all three countries, little attention has been paid to adherence to such standards as the IMS and SCORM specifications in higher education. This may stem from institutions' limited knowledge about such specifications, skepticism about the sustainability of specifications, general resistance to standards that seemingly limit individual freedom, and/or a conscious decision that adoption of such specifications is not important enough to justify cost and resource expenditures. Barron (2001) discusses some of these issues in detail.

Norway and Sweden tend to prefer nationally developed LMS and SMS systems. On the other hand, Australian institutions tend to prefer using commercially-produced systems. This difference may reflect language issues, but it may also stem from pedagogical traditions and other cultural factors.

In terms of choosing of SMS systems, higher levels of national coordination and/or governmental coercion are more evident in Scandinavia than they are in Australia. Many of the SMS systems used in Australia were developed in North America. However, two Norwegian systems and one Swedish system completely dominate in the Scandinavian countries, which may possibly result in future collaboration among the Scandinavian universities, surpassing that of Australian universities.

As compared to Norwegian and Swedish universities, Australian universities regard online education as a source of income. This difference may account for greater awareness in Australia of the necessity of integration among AS, LMS, and SMS systems. The most striking difference between the three countries with regard to online education is related to economic policy. In Australia, education is viewed as one of the country's most important export industries. The education and training action plan for the information economy from the Commonwealth Government (DEST 2000) clearly states: "Education in Australia is a multi-billion dollar export industry of vital importance to our economy." However, in Scandinavia, export of education does not even seem to be an issue for public discussion.

Australia benefits from having English as its first language. In contrast, Norwegian and Swedish are home to minority languages, and this fact alone may be one reason that higher education institutions in Norway and Sweden appear to be much less interested in exporting online education to other countries, compared to their Australian counterparts.

In Scandinavia, education is traditionally perceived as a public service that should be available free of charge. Although there is increasing acceptance of commercialization of education, Swedish universities are not allowed to charge their students tuition fees. In comparison, Norwegian universities and colleges are now obliged to charge tuition fees



for further and continuing education – educational initiatives that in recent years have become the most dynamic and innovative sector of education in Norway. Since Sweden lacks this economic incentive for change, the country will likely face future difficulties when competing with online education in other countries.

On balance, online education appears to be less developed in Sweden than it is in Australia and Norway. This may be partly due to the lack of economic incentives to offer online programs as a source of extra income. It may also be due to the fact that governmental online education initiatives tend to be imposed, and often without local institutional support. One such example is the three Swedish distance education consortia, which have received considerable governmental funding since 1993-94 (Hillefors et al., 2001, p. 22; Ranebo, 2001). At their peak, these three consortia offered from 40 to 50 courses to 5,000 to 6,000 students (Hillefors et al., 2001, p. 26). After nearly ten years of unimpressive results, funding is to be discontinued. To replace these consortia, the Swedish government has recently established Nätuniversitetet (www.netuniversity.se), a new national body to fund and coordinate Sweden's distance education activities. In 2002, Nätuniversitetet will provide financial funding for the equivalent of 2,350 full-time students at 30 Swedish higher education institutions.

Norwegian institutions typically charge students € 3,000 to 4,000 for online courses, equivalent to one-year of full-time study. In contrast, for the year 2002, Swedish universities will receive € 12,000 in governmental funding from Nätuniversitetet for similar online courses of equivalent length. This is about three times more funding than Swedish universities receive for an on-campus student engaged in full time studies. Such lavish funding is probably intended to increase the development of online courses. However, it could also easily set a standard for future costs of online education courses. In the view of this author, the Swedish approach is unwise, as it is not cost-effective and could set an unhealthy precedent for future overspending.

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Anecdote 8. NKI Fjernundervisning: Two Decades of Online Sustainability

By Morten Flate Paulsen and Torstein Rekkedal

This article is so far the last in a series of case descriptions written about the NKI Internet College. Much of the content is based on the previous three articles:

1. *The NKI Electronic College: Five Years of Computer Conferencing in Distance Education* (Paulsen 1992).
2. *The NKI Open Electronic College* (Paulsen 1995).
3. *The NKI Internet College: A Review of 15 Years Delivery of 10,000 Online Courses* (Paulsen and Rekkedal 2001).

One may say that the three articles present the three first generations of the NKI Internet College and that this fourth article includes updated information and additional discussion regarding the fourth generation of the college.

Abstract

This article presents a case description of NKI Distance Education and its experiences with online education from the time the idea was conceived in 1985 to the point when the total number of course enrollments exceeded 30,000 in August 2003. The article discusses important issues related to the development from a correspondence school to an online institution. The development covers four generations of online education. The first generation (1985-1994) was characterized by development of the EKKO LMS system and experimentation with emerging technology and pedagogy. The second generation (1994-96) was a period of transition from the EKKO system to Internet systems with text-based user interfaces. The third generation (1996-2000) began with the introduction of graphic user interfaces and the web. It was characterized by vigorous expansion and the development of Web-based systems for administration of online education. The fourth generation (2000-), started with the development of SESAM, NKI's integrated LMS system.

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www.studymentor.com



NKI: A Non-profit Foundation with Idealistic Aims



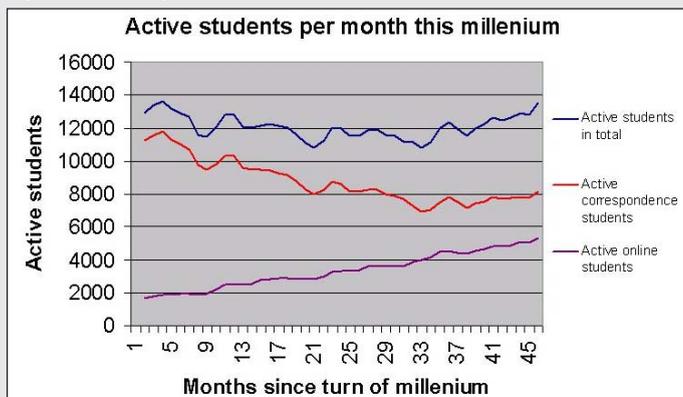
NKI (www.nki.no) is one of the largest nongovernmental educational institutions in Scandinavia. The NKI Group is organized as a non-profit foundation comprising NKI Distance Education, The Norwegian School of Information Technology (NITH), The Business Training Center (NA) and NKI Publishing House. In 2002, NKI had about 300 full-time and 1,600 part-time employees. The group's head office is situated in Oslo, and there are district offices in 15 other towns. Altogether the NKI Group has each year a total of around 6,000 full-time and 25,000 part-time students.

NKI was established in Norway in 1959, and the NKI Group has legally been a non-profit foundation since 1974. Financial surplus is kept within the organization for future development. Thus, NKI Distance Education is also a non-profit organization aiming to support Norway's educational policy as a reputable complement to the public education system. The overall business idea is "to cover needs for competence development by offering courses and programs for adult learning adapted to the participants' previous knowledge and skills, place of residence and socio-economic conditions." (NKI, 1999, p. 3). As a nongovernmental institution, NKI is largely dependent on student fees for its operation, but it also receives some state support. As a fee-charging institution, NKI has been devoted to beliefs and values of the service industry, considering students as customers who have all the right to demand high quality services. State accreditation has also required the institution to develop and update a formal system for quality assurance (Ljoså & Rekkedal, 1993; NADE, 1996).

NKI is recognized by the Ministry of Education and receives government grants covering less than 10% of operating costs. NKI Distance Education employs some 65 full-time and 400 part-time employees. The number of active students has typically been around 12,000, but varies from month to month as shown in Figure 13. Online course enrollments have increased substantially since 1996, but still only 40% of the active students have chosen online courses. During the last two decades NKI Distance Education has developed from a correspondence school to an institution applying the Internet for delivery of a large number of courses.



Figure 13. Monthly variation in active NKI students

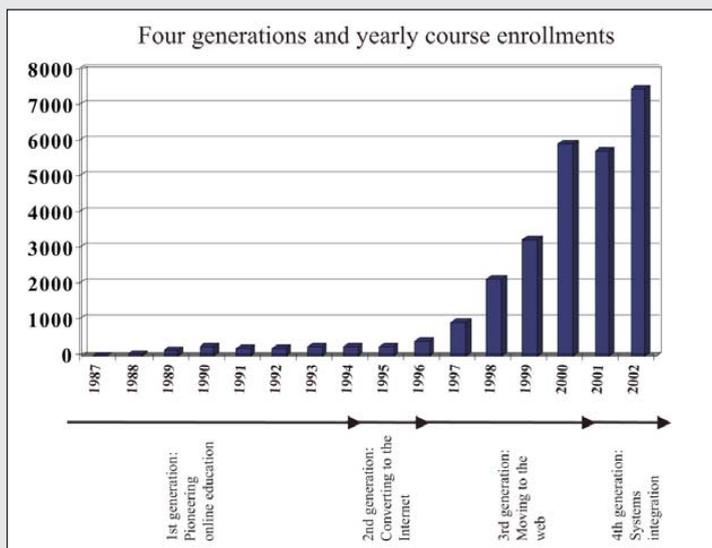


In 2002, the revenue of NKI Distance Education was about € 12 million and 36% of the revenue came from online education. Still, there is a substantial demand for traditional distance education courses, which in the year 2003 will constitute more than 50% of revenues.

NKI was one of the very first European online colleges, and it has offered online, distance education every day since 1987. Few, if any, online colleges in the world have been longer in continuous operation.

The expansion in online enrollments from 1987 to 2002 is shown in Figure 14. In June 2003, the accumulated number of course enrollments was 30,000, and the NKI Internet College had about 150 tutors and 5,000 registered students. Most of the students live in Norway, and almost all courses are taught in Norwegian. But there were 139 students registered with addresses in 36 foreign countries around the world. Of all the online students, 52% were women.

Figure 14. Number of course enrollments per year on NKI online courses since 1987



Structure, Culture and Processes

Although NKI Distance Education is one unit in a larger educational institution, it has a large degree of independence and may be viewed as a single-mode distance teaching institution. The core competence of the institution is development and delivery of cost-effective distance teaching programs. The institution has six departments: Academic Staff (including Research and Development), Learning Material Development, Student Counseling and Teaching Administration, Sales Department, Marketing Department, and Administrative and Clerical Staff.

Table 24. The NKI Distance Education Departments in 2000

Departments	Number of employees	Budget
Student Counseling and Teaching Administration	11	33%
Marketing Department	3,5	20%
Learning Material Development	11,5	14%
Administrative and Clerical Staff	14	14%
Sales Department	11	10%
Academic staff/Research and Development	13	9%

New courses and programs are developed by project teams, normally chaired by a representative from the Academic Staff, and including personnel from other departments and external specialists as course authors and consultants. There is a permanent external staff of some 350 part-time tutors coming from other educational institutions, research organizations, and business and industry. Before they start teaching, NKI requires them to complete the course *Tutor in Distance Education* that since 2000 has been offered only online.

Courses and Programs

NKI Distance Education offers both traditional distance education programs and online programs via the Internet. Altogether, this constitutes approximately 100 programs and more than 400 courses at secondary and undergraduate levels, as well as specialized courses for competence development in business and industry.

In June 2003, more than 55 complete study programs and 370 different courses at secondary and tertiary level were taught online. The increase in course enrollments is partly due to the increasing number of courses that have been offered online as shown in Table 25.



Table 25. Increases in NKI online courses and enrollments

Year	Number of courses taught online	Number of course enrollments	Number of enrollments per course
1995	13	256	19,7
1996	21	416	19,8
1997	29	953	32,9
1998	48	2148	44,8
1999	78	3228	41,4
2000	151	5911	39,1
2001	210	5724	27,3
2002	288	7464	25,9

NKI Distance Education offers courses and programs at secondary and tertiary level. Almost all courses are part of a program. Students may enroll in only one course, but they are encouraged to study a complete program. Most programs are equivalent to one semester, one year, or two years of full-time studies. They cover a wide range of subject areas. Some are specially developed courses preparing for careers in business and industry with no parallel in the public school system. Other programs and courses prepare for state examinations. Courses at tertiary level are either specifically accredited by the University Council or offered in co-operation with NITH, a public college or university.

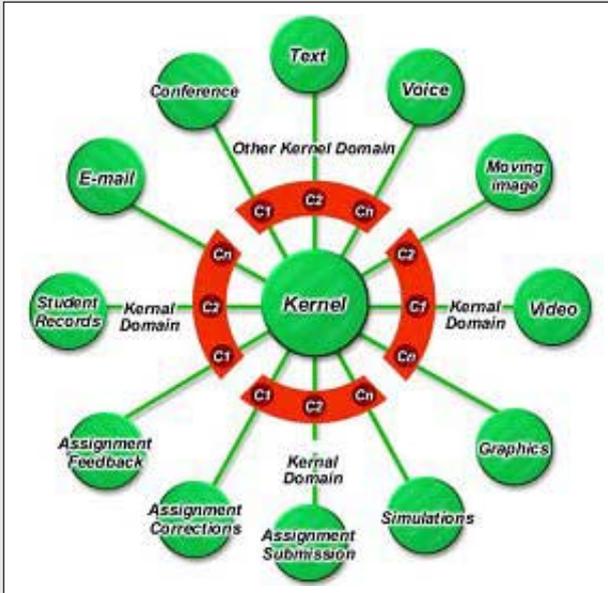
Media, Methods and Learning Material

NKI was mainly a correspondence institution till the beginning of the 80s, when videotapes, audiotapes, fax, radio and TV programs, computer software and laboratory kits, and in some cases, audiographics, satellite and local cable television were introduced – in many cases only as part of experimental and research projects (Rekkedal, 1993). The basic strategy underlying all experiments has been student flexibility, including the possibility of starting at any time and studying with individual progression. This has meant that media suitable for flexible and individual studies have been preferred before media requiring students to meet at fixed times and places. Quite early, the NKI research group understood that computer mediated communication would become an important technology in the future (Paulsen, 1987; Paulsen & Rekkedal, 1988). This is the reason for NKI's continuous research, evaluation and development of online courses and programs since 1987. Initially, the online courses included only text. With the introduction of the Web, graphics, animations, and multimedia gradually emerged. In the last few years, NKI has experimented with online audio and video as a supplement to other course content. For this purpose, NKI has used the theoretical model shown in



Figure 15. But too many students still lack the necessary bandwidth and computer equipment; so obligatory multimedia elements are restricted to special courses or user groups.

Figure 15. NKI's model for multimedia content



Teaching, Research and Evaluation

NKI is primarily an effective and efficient distance teaching institution. Although research is not among its main activities, unlike most other nongovernmental distance teaching institutions in Norway, it has established a research department that has maintained a continuous research agenda for 30 years (Rekkedal, 1998). The main aims of the research activities are quality assurance, institutional development, competence building, public relations, and contact with national and international academic institutions. The research projects, in particular, on online education have received considerable national and European funding.

Figure 16. Timeline showing NKI research activities



Economy and Cost-effectiveness

Most Norwegians have the financial means to pay for private education, but little motivation to do so, as education generally is considered to be a free service. Distance education is financially supported by the state. This scheme of state funding has resulted in lower tuition fees for the students. However, state support to distance education has continuously decreased from nearly 100% in 1975 to less than 10% in 2003. The amount of state money received is based on overall study activity during the preceding four years measured by students' completion of courses. In addition, distance students may apply for state grants and loans on similar conditions as ordinary students in public and private schools and colleges. Recently, public institutions have been given greater freedom to charge fees for further and continuing education, resulting in more "fair" competition and subsequently a change in attitudes concerning tuition fees.

In this competitive environment, NKI is still dependent on being continuously cost-effective. This means that during the conversion process from traditional distance teaching delivery to effective online delivery there is an absolute need to earn income from existing courses delivered traditionally and at the same time develop new courses and programs for online delivery. To keep pace with the developing market is a main priority.

Institutional Environmental Demands

The NKI Group has four income-earning units. The units have internal co-operation but to optimize effectiveness and cost-efficiency, are supposed to act independently. They are generally dependent on the central management for IT support, personnel management as well as budgeting and accounting services. Although top management initiates strategic planning, the Director of Distance Education has full responsibility for conducting the strategic planning process. Until 1997, online education was included in the strategic planning process as one among many technologies. In 1997, the increasing online activity and institutional attention to online education reached a level that sparked a separate strategic planning process that resulted in a distinct online education strategy (NKI, 1997).

NKI Distance Education is supposed, by legislation, governmental requirements and by NKI management, to maintain a quality assurance system to control and assess its quality. Student evaluation in different forms is often carried out to gain information about the quality of learning materials, teaching processes and administrative systems.

NKI Distance Education is required to generate a surplus every year for financing central and administrative functions. Investments for future development, such as transforming the organization from a traditional distance teaching institution to online delivery, have to be financed through the ordinary operational budgets.

NKI Distance Education co-operates closely with NKI's Norwegian School of Information Technology (NITH). Courses and programs from the NITH are offered as distance studies through NKI Distance Education. As the NITH specializes in information technology programs, its academics and students have been important resources in the development of online teaching. The initiative of the first experiments and the development of the first EKKO LMS system came from the NITH.



NKI Distance Education is also collaborating with public universities, colleges, secondary schools, and study organizations. One example is undergraduate studies in “Psychology” where NKI organizes and operates the online education, but students enroll at the University of Oslo and take the university exams. A similar example is “IT for Teachers” where students take the exams at Bodø College. NKI also co-operates with study organizations where local organizers arrange face-to-face classes for NKI distance students.

Four Generations of Online Education

NKI has experienced four generations of online education. The first generation system, 1985-1994, was based upon the EKKO computer conferencing system developed at NKI. The second generation, 1994-1996, was Internet-based and the third generation, 1996–2000, was characterized by Web commitment. The fourth generation started in 2000 with the integration between the LMS system SESAM and the student administration system STAS.

First Generation: Pioneering Online Education from 1985 to 1994

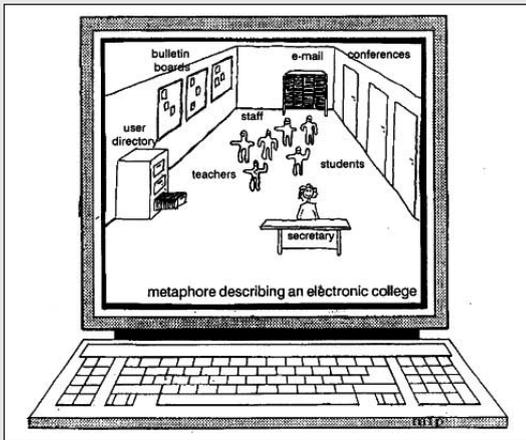
The idea of online teaching, under the name “The NKI Electronic College”, was conceived in 1985 and further developed by research on existing computer conferencing systems such as PortaCom, EIES, and CoSy, and on electronic colleges such as Connected Education and the Western Behavioral Sciences Institute (Paulsen, 1989). The basis of our ideas for establishing the “Electronic College” was largely taken from the Virtual Classroom Project (Hiltz 1986). In an early paper, Paulsen (1989) pointed out the following requirements for a virtual school:

1. It should emulate all the main tasks of a school: pedagogical, administrative and social.
2. It should be generally available in terms of geography, technology, economy and, competence.
3. It should be independent of time, i.e., continuously available and accept asynchronous communication.
4. It should emulate the different needs of human communication, one-to-one, one-to-many, and many-to-many.

During the first two years, the project was propelled by a handful of enthusiasts who devoted much of their spare time to the project. The idea was to use computers to facilitate flexible interpersonal communication in distance education. Students, faculty, and staff could communicate independently of time and space through the college’s central computer. They could exchange written messages both individually and in groups.



Figure 17. The EKKO LMS metaphor



The Electronic College needed administrative and logistical support from NKI Distance Education, and academic and technical support from the NITH. At first, few believed in the project, making it hard to get the necessary support and to integrate the project into the NKI organization. Gradually, the Electronic College thrived with satisfied students, receiving internal, national, and international recognition.

The first version of EKKO, the computer conferencing software hosting the electronic college, was designed and implemented during 1986. The system was used for the first time, as an optional supplement to on-campus teaching, in the autumn semester of 1986. The first attempt to deliver a distance education course via EKKO was made during the autumn semester of 1987. Two additional courses were introduced the following semester. Since the spring of 1990, the college has offered all ten courses within the *Information Processing Program* every semester. These ten courses constitute the equivalent of a 1-year full-time program.

Inger Bergland, one of the first Norwegian online students, made the following statement about her experiences from the fall of 1987:

Generally, I evaluate the scheme very favorably. It is right on target to offer a system pairing correspondence courses and evening classes. One may compare it with "combined courses," a combination of correspondence courses and lectures, which I have favorable experiences with from high school courses. In my opinion, it is wonderful not to have to attend five-hour lectures twice a week after work. (Paulsen 1992)

Lars Eskeland and Rolf Ingebrigtsen wrote extensive reports about their online teaching experiences in 1988 (Paulsen 1992). They stated that it had been an interesting and work-intensive teaching experience, but that their work could have been more efficient if EKKO had been better adapted to the teachers' needs. They also suggested that teaching would be less work-intensive the next time the courses were offered because many of the text files could be used again.



A comprehensive description of the experiences from the first generation is presented in the article *The NKI Electronic College: Five Years of Computer Conferencing in Distance Education* (Paulsen 1992). The article presents results from surveys of teachers, students, and administrators, as well as information about dropouts and grades. The article concludes:

The NKI Electronic College has proved its value through five years of operation, eight hundred courses sold, and to date, twenty graduates. These students have completed a ten-course program – equivalent to one year’s full-time study – via computer conferencing. Further, the students have obtained better grades than either correspondence students or on-campus students. The student surveys show that the students have a positive perception of the curriculum and the Electronic College. Student feedback also indicates that teacher activity is of crucial importance to students’ perception of a course. The teachers are generally positive about the Electronic College and its opportunities; their main reservation is in regard to the heavy teacher workload introduced by the medium. This perception highlights the importance of continued efforts to identify and refine efficient pedagogical techniques for the future Electronic College.

The first-generation user-interface was based on the Microsoft Disk Operating System (MSDOS) and offered only black and white characters as shown in Figure 18. During its most intensive period, EKKO served more than 3,000 users, including on-campus students, prospective students, active distance students, former students, tutors and administrative staff. The system included an e-mail system, closed and open conferences for administrative, teaching and social purposes, and bulletin boards. During the first-generation period the Electronic College delivered more than 1,000 courses with an average completion rate of above 80%.

Figure 18. The first-generation user-interface

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*** H O V E D M E N Y ***

<K>onferanser.
<P>ost.
<T>avler.
<B>rukerregister.

<I>nformasjonsrapport.
<N>y informasjon, finn og vis.

<M>enytype og sidelengde.

<A>vslutt EKKO.

HOVEDMENY K>>
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Second Generation: Converting to the Internet from 1994 to 1996

NKI considered the first generation of the electronic college to be quite a success as a distance education system. However, we continually followed other developments in teaching and learning methods. We examined different products and software on the market, such as CoSy, PortaCom, and FirstClass. We also studied the Internet with the aim of developing an improved "second-generation" system. When we had to introduce new solutions because of retirement of the old host computer, we decided to use the Internet, e-mail, the Listserv conferencing system, and the Mhonarc archival system. Since few students had Internet access, NKI also offered modem services to students.

The initial Internet platform represented in several ways a setback. The interface was still text-based and far from user-friendly. Norwegian characters and e-mail attachments were not supported. On the other hand, we got access to many more potential students and online resources. The following second-generation observations were presented in the paper *The NKI Open Electronic College* (Paulsen 1995):

The first semester was marked by transition to the second-generation system. Students, faculty, staff, and system operators had to learn and adjust to the new system.

The open system introduced additional problems regarding e-mail transmission of national characters and binary files. This is due to lack of standard interpretations among e-mail systems.

Some students have e-mail addresses prior to enrollment, but the majority of students must be provided with NKI e-mail addresses. With the increasing number of e-mail users, NKI expects that a growing number of students will have e-mail addresses prior to enrollment.

NKI has enrolled a few Norwegian students living abroad and also ventured to offer courses internationally. Experience shows that it is possible to offer courses internationally, but that the administration and logistics of such courses are not trivial challenges.

Students have access to Internet resources outside the NKI realm. Some students report that they use these possibilities, and research should be conducted on how these services are utilized and what benefit the students have from them.

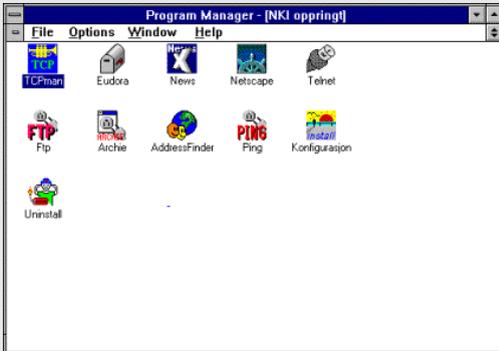
All the courses and programs developed after the introduction of the second-generation system were un-paced and without limits on times for enrollment. This solution was chosen as a result of general experiences and student evaluation surveys. "It is a major challenge to develop methods and organizations in distance education based on computer conferencing systems which take care of the students' need for autonomy and flexibility" (Rekkedal, 1990, p. 92).

Initially, the second-generation user interface for modem users was text-based, relying on the Telix communication software. The next step was, however, to offer modem users Internet access with communication software developed for MS-Windows and the Serial Line



Internet Protocol (SLIP). The new user-interface supported colors and graphics as shown in Figure 19.

Figure 19. The second-generation user-interface



Since few students had Internet access before enrollment, NKI provided free Internet access to the students. In 1999, NKI discontinued this service when most enrolling students already had Internet access through commercial Internet service providers.

Third Generation: Moving to the Web from 1996 to 2000

The third generation was introduced with the first Web-based courses in 1996. It was a period of vigorous growth with nearly 100% increase in enrollments every year. This resulted in major organizational challenges and a need for efficient systems and structures to manage large-scale online education.

An unexpected development, with regard to sales and marketing, was that the web site resulted in a dramatic increase in online requests for course catalogues from prospective students. In 1996, NKI had online requests from 789 prospective students. In 1998 and 1999, the numbers increased to 7,615 and 13,506.

With the introduction of Web-based courses, more and more of the course content was published online. This introduced new challenges to design, copyright issues, and maintenance of course content. This made it crucial to develop and manage a system with passwords so that only paying students had access to the course content.

The third-generation web service could be regarded as a two-level system. The top level, the NKI Internet College web site www.nettskolen.com depicted in Figure 20, provided general information about the college such as course descriptions, prices, contract form, contact information, support information, and an article library on online and distance education. The graphical and user-friendly Web interface introduced opportunities such as hyperlinking and multimedia presentations. However, there were also new challenges such as access control and copyright issues.



There is no doubt that the decision taken in 1996 to utilize standard Internet servers and client software used by the ordinary Internet user was a sound one. The Internet College puts great emphasis on facilitating learning according to students' needs, which could be described in the following way. A student may enroll at any time in any of the programs and courses or personal choice of courses and follow his or her own progression schedule. The College is open 24 hours a day, 365 days a year. The students may choose to study individually or take part in academic discussions or leisure and social communication with fellow students, teachers and alumni. In some courses group activities are obligatory. Concerning the conferences, we have chosen a combination of "push" (contributions sent as e-mail to all members of a conference) and "pull" (contributions archived and accessible to all members) technology.

Fourth Generation: Systems Integration from 2000

Development from small-scale to large-scale online education represents a major challenge for an institution. So it was an important improvement when we introduced a new, self-developed LMS system in March 2001. The system was termed SESAM (Scalable Educational System for Administration and Management).

In SESAM, all users got their unique, personal portal with access only to the courses and resources that they should have access to. All resources were available with a single log-on. This was important because we wanted to make it easier for users to find the information they needed. It also allowed us to develop tailor-made services for individual users and user-groups.

SESAM was developed to be integrated with STAS, NKI's student management system. This was an extremely important decision, since STAS stores all the data on NKI students, tutors, courses, exams, grades, wages, fees, etc. With the integration of SESAM and STAS we could maintain only one set of data and therefore reduce manual registration and errors. We could also automatically provide users with more sophisticated services such as online registration and presentation of grades, teacher remuneration, and exam registration.

NKI has a number of self-developed and commercial applications that together make up a comprehensive system⁸³ for student support services. Integration of the systems is extremely important for the total functionality, effectiveness, and quality of student support services. As shown in Figure 22, STAS is the pivotal master system that holds the core data that many of the other systems depend on.

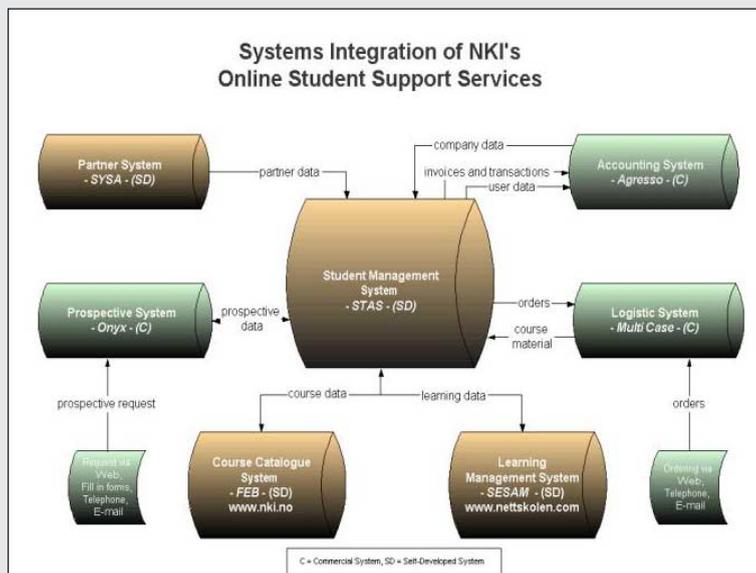
The backbone of an efficient large-scale distance teaching institution is the computer system for administering students. STAS, NKI's self-developed student management system has for many years been developed to satisfy the needs of a large-scale institution, including registration of assignments, monitoring student progression, distributing new learning materials, and paying tutors.

STAS was initially developed for correspondence courses and bar code registration of assignments. Initially it was not suited to serving online students, as there were no connections between the Internet systems and the administrative systems. As a joke, we said that it was inconvenient that e-mail did not come with bar codes. So, it was necessary to develop STAS further to handle online students efficiently.

⁸³ Truls Fagerberg has made important contributions to this description of NKI's student support system.



Figure 22. NKI's integrated systems for online student support



STAS is NKI's self-developed student management system. It holds all relevant data about students, teachers, courses and study programs. One of the largest advantages with STAS is that it is developed to handle students with individual starting-time and progression. It also provides excellent tools for generating various reports and statistics. STAS is NKI's master system and it is integrated with all other essential systems such as accounting, logistic, prospective and partner systems. STAS is also the master system for NKI's LMS system (SESAM) and business portal (FEB).

Agresso (www.agresso.com) is a commercial accounting system that handles tuition fees, invoices, wages, etc. When a course enrollment is registered in STAS, the corresponding student account is debited in Agresso. When tutors register grades in SESAM, they are transferred to STAS and the remuneration is added to their accounts in Agresso.

SYSA is a system NKI has developed to present information about local partners that organize face-to-face classes based on NKI's distance education courses. It provides contact information about local partners and the classes they offer for NKI courses. SYSA supports local partners' marketing and student recruitment. The partners' contact information is forwarded to STAS.

Onyx is a commercial system that is purchased to handle marketing activities and requests from prospective students. Each advertisement, brochure, TV commercial, Web campaign etc. is identified with a unique media code. The advertisements result in thousands of requests that are registered with contact information and media code. The requests may come via NKI's website, telephone, e-mail etc. from people who are considering enrolling on a course. Onyx is also used to follow up prospective students who have showed their interest, but never enrolled on a course. Onyx has access to STAS data



so that it knows which prospective students actually enroll on a course. As a result of this, Onyx provides a number of reports and follow-up services for the marketing department.

Multi-Case is a commercial logistics system for administration of purchases and shipments of textbooks and miscellaneous physical course material. When course enrollments are registered in STAS, Multi-Case automatically initiates shipment of the corresponding course material. It also provides a number of reports about royalties, material in stock etc.

SESAM (Scalable Educational System for Administration and Maintenance) is NKI's self-developed LMS system. It is developed to support the services that are important to NKI, and it is therefore well adapted to NKI's special needs. SESAM is developed for large-scale online education and it applies state-of-the-art Web technologies including Java, XML, XSL, Oracle 9i databases and Apache Web servers. SESAM is excellent for handling continuous student enrollment 365 days a year. The major additional advantages it has compared to commercial LMS systems, is its focus on cost-effectiveness and the necessary integration with all the critical student support systems. SESAM provides a number of services for students. Among them are:

- Access control
- Personalization of user-interfaces and services
- Access to course content and assignments
- Discussion forums
- Class lists
- Student presentations
- Information on exams and grades
- Course evaluation

The teachers have access to additional services such as:

- Online registration of grades
- Tutor support services
- Wage and payment data

NKI employees also have access to a number of additional reports and statistics on information about course enrollments, user statistics, course evaluations etc.

FEB is a self-developed business portal, which NKI launched September 16, 2002. It is the main portal for the NKI online course catalog (www.nki.no). It presents all courses and programs offered by NKI. This includes information on course content, necessary prerequisites, credits, exams, tuition fees, etc. Prospective students may register or apply to courses directly via FEB. The introduction of FEB seems to have had a very positive effect on the increase of unique users and prospective students. The number of unique users that visited www.nki.no increased from 37,372 in January 2002 to 60,166 in January 2003.

Similarly, the number of registered prospective students increased from 5,305 in January 2002 to 6,531 in January 2003.



In addition to course information, FEB also includes a comprehensive database of articles with news, frequently asked questions, and more general information on distance and online education. A number of research articles and reports are also available in FEB. It also provides a search engine covering the course catalog, www.nki.no and www.nettskolen.com. FEB is built on current Web technologies including Java, XML, XSL, Oracle 9i database and Apache Web server.

In February 2003, FEB for the first time automatically provided the course information used in the printed course catalog. For the first time, it was also possible to order the printed course catalogue via SMS-messages from a mobile telephone.

Consequences and Implications

The process of converting the organization to online course and program delivery has had a number of consequences. Whether these have been intended or unintended is largely a question of timing, as unintended consequences at one time may be intended or actually, if negative, be reduced or removed by counteraction at a later stage.

Costs of Online Delivery

While NKI believes that online delivery of distance learning programs, when handled competently, using pedagogically sound practices, should imply a more satisfactory study experience and better learning than correspondence-based individual distance learning, until now NKI has charged the same fees for both modalities. At the same time, online students appear to have higher expectations of service quality, and quantity and quality of communication with their tutors. While earlier distance learning systems had high front-end costs, which could be compensated for by lower delivery costs in large-scale systems, it seems that high-quality online learning might have both high front-end costs and high delivery costs. Thus, it is a challenge to find ways of reducing either development costs or tutor costs. We have not yet found a solution to this problem. During the first generations of online delivery we had the working hypothesis that less emphasis could be put on the pre-production phase of courses. In our experience, this is not a correct assumption if we want the students to be satisfied.

Parallel Versions

To stay in business, we have had to offer courses in two parallel versions. This has made course development and student support more labor intensive and expensive. Further, as many of the courses are also offered in a "combined education" model, we may also have distance students in local face-to-face classes who have access to the Internet and students who have not. This situation has been difficult to organize both administratively and pedagogically. Thus, online delivery to combined education students has been a problem, and it has been difficult to satisfy the needs of both student groups.



Tutor Recruitment, Tutor Workload, and Tutor Satisfaction

NKI Distance Education only engages part-time tutors, and online delivery required recruitment of new tutors. Some of the senior correspondence tutors have not been interested in online tutoring. On the other hand, online delivery has attracted new groups to distance tutoring. Some online tutors find this way of teaching especially exciting and rewarding. To prepare new tutors, NKI has for many years offered an obligatory training course. Beginning in 2000 this course is being offered only online. Thus, tutor training is a necessary element in the process of converting to online delivery. NKI has at any one time some 50 prospective tutors in the tutor training course. Because tutor workload is generally perceived to be heavy in online education (see, for example, Paulsen, 1998), it has been difficult in some subjects to recruit competent tutors and to develop pedagogical solutions and administrative software to rationalize and ease the workload for online tutors.

Research, Funding, Marketing Effects and Academic Contacts

As NKI has been an entrepreneurial institution in online delivery of distance learning programs, it has been a necessity to engage in field research. By attracting external funding from national and international bodies, the research activities made it easier to recruit competent personnel, led to co-operative engagements with national academic and research institutions, and made us an attractive partner in a number of national and EU projects (e.g., specifically concerning survey, analysis and evaluation of online learning). See www.nki.no/in_english.xsql. It has also given positive publicity through published articles, research reports, conference papers and media coverage.

Twelve Reasons for NKI's Success

It is not possible to isolate a few important causes for the relative success of the NKI Internet College. It is probably more correct to claim that NKI has made many sensible choices and few major mistakes. However, the twelve causes presented in List 9 have all contributed to the success.

List 9. Twelve reasons for NKI's success

1. NKI is an institution with high competence in both distance education and information technology. Both competencies have been pivotal for the development of online education.
2. Some NKI enthusiasts have always believed in online education and over many years made invaluable contributions to the Internet College.
3. NKI has been careful to only adopt standard and widely-used technology. This practice enables students to apply the software and hardware they have at their disposal with little need to buy additional equipment.



4. Students' time flexibility has always been a focal point for NKI. It has been committed to asynchronous communication and deliberately avoided synchronous communication technologies. Communication should take place when it suits the student, not the institution.
5. After some years experience with paced courses starting twice a year, NKI made a strategic choice to focus on individual start-up and progression. The choice was based on student surveys, much internal discussion, and pilot courses that showed increasing enrollment. Hence, NKI students may start a course whenever they want and follow their individual pace of progression.
6. Tuition fees pay for development and operation of NKI courses, so NKI has to provide cost-effective courses. The focus is on much learning for the money.
7. The Department of Research and Development has conducted continuous research and evaluation of online education, and has accumulated knowledge and competence in online education. In addition, the Department has conducted or participated in a number of R&D projects financed externally by Norwegian and European governmental sources.
8. NKI is flexible, with little rigidity compared to public colleges. It has a number of times shown that it is capable of rapid adjustment. The employees have shown the ability to detect new trends and adapt to the changing market. This may be due to the fact that NKI has continuous enrollment and therefore experiences changes in market demands earlier than institutions that offer enrollment only once or twice a year.
9. NKI covers a wide range of subjects and levels. It is not dependent on having in-house competence in all subject areas; it has a long tradition of collaboration with other educational institutions and engaging faculty from other institutions to participate in the development and teaching of courses.
10. NKI has over many years developed high credibility with the government and public administration. It has been committed to achieving approval for public credits, certificates, and student loans.
11. NKI has chosen not to separate the Internet College from the Department of Distance Education. It has deliberately chosen to gradually enhance the online education competence for all employees in the Distance Education Department.
12. NKI has continuously focused on evolutionary development of the Internet College and the administrative systems that support it. Consequently, NKI has had more effective administrative systems than its competitors and at the same time people with high competence on these systems.



And Twelve Challenges for the Future

We consider that we have had reasonable success in transforming NKI from a traditional distance teaching institution to an institution adapted to deliver Internet-based distance education. But we still face a number of challenges. The issues listed below are among the most important issues that still remain unresolved or are only partially resolved:

1. The importance of effective quality management increases as the number of courses, tutors and student grows. Arbitrary and ad hoc evaluations are not sufficient to secure high quality, so more systematic and continuous systems and schemes for quality management must be implemented.
2. It is important to further develop teaching methods and strategies to fully exploit the possibilities of the Internet. We have still much to learn about how to design online programs. Online learning activities must be designed to achieve optimal outcomes for different kinds of learners in diverse subjects with various aims and objectives.
3. Satisfying both the individual student's need for flexibility and needs for collaborative learning in a social group is a great challenge. It is especially important to develop teaching techniques that facilitate cooperative learning in unpaced courses.
4. Too many students seldom or never access NKI's web pages. However they may still be successful students since much of the work can be done by reading textbooks and communicating via e-mail with the tutor. They can also follow the discussion forms, since all messages are forwarded via e-mail.
5. The large number of courses, students, and discussion forums result in vibrant activity in some areas of the online colleges. In other areas, there are few enrolled students, users that seldom log on, and courses that are being phased out or even discontinued. These areas remind us more of ghost towns. To handle this, NKI needs to carry out a number of activities that have been termed *Operation Ghost Busters*.
6. Soon, most of the NKI distance education income will come from online activities. Then we can gradually terminate some increasingly redundant offline activities and hence rationalize the operation. We can also require all teachers to work online and with that improve the overall quality of our online systems and services.
7. Still, most of NKI's income comes from individual students, but a growing number of corporations and organizations are writing tenders for online education. These tenders require much work and development of additional online services. But NKI has a portfolio of courses, advanced student support services, and an efficient organization that makes it well suited to become a comprehensive provider of online education services for corporations and organizations.
8. We need to search for better solutions concerning tutors' functions and workload. The tutor costs can easily become higher than allowed by the fees charged.
9. Students expect online learning material to include multimedia elements. So, there is a need to find ways of developing multimedia material that is both learning-efficient and cost-effective.



10. We still need to refine the SESAM LMS system, the STAS student management system, and the integration between them and all other systems for online student support.
11. Most tender invitations today require general adherence to e-learning standards. The standards are however very comprehensive, and it is probably a waste of resources to implement many of them. The challenge is therefore to find a balanced approach to implementing standards that are beneficial and cost-effective.
12. NKI is increasingly dependent on online services. This makes the operation vulnerable to technological disruptions and problems. We have experienced a disturbing growth of virus attacks, spam messages, commercials, and other unwanted elements that may cause serious problems for online education and reduce the future usability of the Internet.

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Part Four

TRENDS AND FUTURE DEVELOPMENTS

The current mega trend shows clearly that online education is shifting from small-scale experiments to large-scale operations. (Page 317)

The analysis shows that there is an obvious request for additional bandwidth and better multimedia abilities. (Page 301)

All are evolutionary developments that were visible 15 years ago and not really hard to predict. The only really revolutionary development in online education during this period was the introduction of the Web. This technological development, which nobody foresaw, emerged as the development with the largest impact on online education. (Page 314)

Even though we have experienced tremendous developments in online education during the last 15 years, it is interesting to observe that written communication, perhaps the most important part of online teaching and learning, has not changed much. Most communication still consists of plain text, and the time it takes to turn on the computer, receive e-mail and compose messages has not been reduced. (Page 315)

The recent development in speech synthesis has made it so understandable and user-friendly that more learners may benefit from it. These include blind students, dyslectic students, and students who for example spend much time in a car. It is conceivable that in the future it would be just as easy and inexpensive to “speech” a text as it is to print it. (Page 321)

...campus-based students are increasingly voting with their mouse and taking significant parts of their undergraduate degrees online from other institutions. (Page 331)

Figure 23. Industrialized online education



Online education becomes mainstream education in Scandinavia. Before year 2000, typical universities piloted a few online courses with some pioneering students. Today, many higher education institutions are implementing online education services to all their students. Even primary schools offer online services to many teachers, students, and parents. This illustrates that the current mega trend in online education is the transition from small-scale experiments to large-scale operations. Still, few institutions can claim that the provision of Web-based courses has been an economic success. So, to obtain a sound economy for large-scale operation, some sort of industrialization of online education must be considered.

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Potential LMS Improvements

Abstract

This article presents an analysis of the answers the Web-edu project team members received when they asked 113 experts in 17 European countries what features they would like to see included in their future LMS systems. The analysis indicates that there is:

1. a need for better integration between LMS systems and other related systems,
2. an interest in standardization of content and tools that could be applied in online education,
3. a request for local presence, language support, and special characters,
4. a concern about cost-effectiveness,
5. an urge for multimedia and broadband capacity,
6. a potential for improvements with regard to tests, assignments, and evaluations,
7. a request for improved communication and collaboration tools,
8. a need for better administrative tools,
9. a potential for simpler and more user-friendly solutions,
10. a request for more flexible systems,
11. an interest in mobile learning and e-commerce,
12. a request for better systems for content management and development,
13. a wish for systems with more features.

Features of Importance

What features would you like to see included in your LMS system in the future? This was the last question asked in an in-depth interview with 113 experts in 17 European countries, and this article presents an analysis of the answer to the question. The analysis was conducted in 2001 and 2002 within the framework of the European Commission Web-edu Project (www.nettskolen.com/in_english/webedusite/index.html).

About 80 of the 113 interviewees answered this question. It was the last question in a lengthy interview, and some of the interviewees had not enough time or stamina to answer this question. But there were also a few interviewees who explicitly stated that they had no special request for future features or that they had not sufficiently explored the system to request additional features:

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ONLINE EDUCATION AND LMS SYSTEMS

No special requests, although we do make feature requests from time to time via the manufacturer's web site. [Great British university using WebCT]

The program was not sufficiently explored, therefore, we don't have the necessary elements to identify new characteristics. [Portuguese non-profit association using WebCT]

Nevertheless, the answers revealed many interesting issues that are presented and discussed in the following. The themes that emerged as important through the analysis were:

1. Better systems integration
2. Interest in standardization
3. Local presence, language support, and special characters
4. Concern about costeffectiveness
5. Multimedia and broadband urge
6. Tests, assignments, and evaluations
7. Improved communication and collaboration
8. Better administrative tools
9. Simpler user solutions
10. More flexible systems
11. Interest in mobile learning and e-commerce
12. Content management and development
13. Additional features

Better Systems Integration

Many interviewees wanted better integration between the LMS systems and various other systems and services. Some claimed that there was a need for integration in general terms:

Integration with other systems. [Portuguese private university using TWT]

Fundamentally, the issue regarding integrated management of all management/organization mechanisms of the course, mainly in the dematerialized environment of a course, in the perspective system administrator, so as to allow a global reading of the course. Integrated management system capable of monitoring. [Portuguese public university using WebCT]

Better import of already completed supports from other resources /environments. [Czech university department using Tutor2000]

The universities and colleges were concerned about integration with the student management systems that usually contain the central student databases with student records, examination results, fees etc. Some institutions also wanted integrated online payment systems.

The integration with MSTAS should be carried through. [Norwegian college # 6 using Classfrontier]



POTENTIAL LMS IMPROVEMENTS

Integration with other systems – student records, examinations, photos, more security, faster speeds. [Northwestern European institute of technology using BlackBoard]

Staff/Institution integration re enrollments etc. [Northwestern European institute of further and higher education using BlackBoard]

A possibility to integrate our self-developed materials as separate additional materials to the official ones. A possibility of connection/link of own student database to central student database. [Czech technical university using GLN – Global Learning Network]

I would like to see an integrated system for registration of examinations, online payment, and that FC became 100% integrated with the Web so that we don't need to use the client software. [Danish consortium using First Class]

And the companies focused on integration with their human relation management systems and competency management systems:

It is necessary to improve the tool. The features to introduce are the management of competencies and the integration with Centra platform. [Portuguese private company using Intralearn and Centra]

Formare will evolve into an LMS with a lot of potential in training management integrated with HR management. [Portuguese private company using Formare]

A Norwegian distance education institution mentioned the need for better integration with the online course catalogue that it uses for marketing and with automatic tracking of textbook shipment:

I would like to see better integration between SESAM and the NKI Distance Education online course catalogue that is used for marketing of the courses. I hope to include a user-friendly system for online payment of tuition fees, and an automatic system that allows students to track the shipment of the textbooks that we send them. [Norwegian distance education institution using self-developed LMS]

Finally, it seems that some of the services within the LMS systems could be better integrated:

The document archive and the discussion groups should be more integrated. Today, you have to quit one function to enter the other. [Norwegian college # 6 using Classfrontier]



Interest in Standardization

The analysis indicates that there is an interest in standards and standardization that might make it easier to exchange content and data between LMS systems and between LMS systems and other systems. Some of the interviewees spoke of the importance of standardization in general terms:

Compliance with LMS standards in order to integrate 3rd party Web-based CBT materials. [Northwestern European institute of technology using WebCT]

In the future, I hope we will have less complex LMS systems with better solutions for exchange of data between other systems. [Norwegian semi-private provider of primary education using FirstClass]

Many were concerned about the possibility to use, import, and export standardized course content and learning objects:

Dynamic course change options. Continued support for macs. Ability to successfully import and export LMS content packages. [Northwestern European further education college using FDL Learning Environment]

My vision is that colleges should not become providers of standard products. We have to focus on flexibility and adapt to the users' needs. We should focus on areas in which we have special competence. We should also focus on standardization so that course content could be shared and recycled. [Norwegian educational company using Classfrontier and CourseKeeper]

In the future, I would like to have better course development tools and more flexible competence inventory tools. Further, I would like to see systems that are better at exchanging learning units between courses, programs and companies. [Norwegian educational company using Saba]

Standardization for the reuse of contents/activities... more in the perspective of activities... [Portuguese private university using TWT]

Standards for distribution of content should be further developed. [Norwegian private college using BlackBoard]

Two German experts spoke about the importance of XML and metatagging: To extend the possibilities to import whole modules or courses developed on xml-basis and furnished with metadata. Options to communicate externally and introduction of external tools. [German faculty of university using self-developed LMS]

At the moment, we want to build up the options provided by metatagging. This is important for future development in the learning area. The system is xml-based, and we want to have an improved capacity for reworking the graphic side of our material. [German company #2 using self-developed LMS]



And many references were made to specifications and initiatives concerning standards such as SCORM, IMS, AICC and IEEE:

In the future, the import and export of courses on the basis of standards of SCORM, improvement of internal e-mail functions, and course structuring within the LMS should be more flexible. We chose this product because it is possible to work on its further development together with the company. [German university consortium using Clix campus]

We want an improved function in regard to SCORM. [Norwegian university using Classfrontier]

We see no alternative when comparing with other systems in the synchronous area. It would be nice to see diverse standards being established, which would be possible if quality criteria could be set up, and technical interfaces defined, i.e. AICC, but this is a very broadly-based standard, and seems to be hardly usable. [German public-private partner using DLS from ETS]

In the LMS market in general I would like to see standards implemented more rigorously, for example more compliance with standards such as SCORM and AICC. Big companies such as Macromedia and Microsoft demonstrated tools that will enable easy creation of SCORM-compliant learning objects. It is important to keep up with future developments. One of the main criticisms is summed up by Clark Aldrich: "LMSs fail to track a surprisingly large number of self-paced formal learning options, including books, magazines, conferences, meetings and speeches, mentoring and apprenticeship programs, and such group projects as designing a new product or helping a company develop a new marketing plan." This applies to our LMS also. [Northwestern European company using Visit]

Global tracking of students, and cross-course e-mailing, and further movement towards IMS/IEEE specs. [Great British university college using WebCT]
The vendor should include SCORM compatibility (it's promised for the next release). More synchronous interfaces- for example we would like to include the normal Net-meeting, more interfaces for the courses. [German technical university using BlackBoard]



Local Presence, Language Support, and Special Characters

The analysis indicates that there is a request for local representatives and national language versions. Some of the systems don't meet these needs very well:

Czech localization. [Czech university department using Tutor2000]

Bb suffers from a lack of 'real estate'. This will be addressed in V6.0.

American English discontinued in favor of British English. [Northwestern European further education college using BlackBoard]

Italian version. [Italian university using BlackBoard]

Most teachers want to have an Icelandic interface. WebCT itself does not promote translations. We translated version 2 to Icelandic, but that translation cannot be used in version 3. [Icelandic vocational collage with distance education department using WebCT]

Some interviewees also focused on insufficient support for various alphabets that are needed in language courses and special characters that are used in mathematics and chemistry courses:

We have a number of foreign language courses such as Russian and Arabic that are hard to teach online because of difficulties in using their special characters. [Swedish university using Ping Pong]

A problem that is more related to the web than to WebCT itself is the problem of writing mathematical formulas. Without better ways of writing these formulas, it is hard to teach mathematics and chemistry online. [Icelandic vocational college with distance education department using WebCT]

Concern about Cost-effectiveness

A few interviewees were concerned about improving cost-effectiveness and lack of necessary financial resources:

Just hope to have more financial resources to encourage the current stagnant situation. [Czech independent institution using self-developed LMS]

It does not necessarily need any new features. Possibilities for system integration could be useful but in my opinion the development of this platform has reached the point where the long-term cost-effectiveness is more important than any possible new feature. [Finnish university #2 using WebCT]

Finally, I would like to see more national and international collaboration, especially among institutions in Scandinavia. In my opinion, it is important to collaborate, since it is very expensive to develop online courses. [Danish university using BlackBoard]



Multimedia and Broadband Urge

The analysis shows that there is an obvious request for additional bandwidth and better multimedia abilities:

In the future, I would like to see that all users have more bandwidth so that we can provide more advanced multimedia material. [Danish distance education center using TopClass]

Support for creation of education multimedia materials. [Czech university department using Tutor2000]

More user support, more multimedia support. [Slovak association using self-developed LMS]

We would like to use moving pictures and voice, so that the students could sit by their private computers and participate in teaching lessons in real-time (Web camera). [Norwegian college #2 using Classfronter]

Classfronter should have the possibility to use streaming technology, because that would make it easier to publish multimedia. [Norwegian college #4 using Classfronter]

We want a simplified system for transfer of small voice files. Today the transfer is done outside the LMS, and presupposes there is a tape player on the client computer. The files must be compressed to mp3 format, one can hardly escape from that work. [Norwegian college #8 using Classfronter]

I want a simple function for compression of voice in connection with Power Point or other presentation programs. [Norwegian college # 6 using Classfronter]

Dual voice and pictures when using broadband, so that you can see the one you are collaborating with. This would make demonstrations of practical skills via a Web camera possible. [Norwegian college using IT's Learning]

Several interviewees wanted to include video services such as streaming video, video-conferences, Web cameras, and moving pictures. Audio services such as voice communication and audio files were also requested:

The possibility to apply more demanding technologies (Streaming video, video-conferences etc.) - it depends mainly on the quality of the technical equipment at the client's workstation. [Czech company using Tutor2000]

There is no need for transferring moving images in real-time today, but there might be in the future. [Norwegian college #8 using Classfronter]

We would like a system for transferring small voice files within the LMS. Today such transfer is done outside the LMS, and requires a recorder on the client computer. It takes some work to compress the files to mp2 format, but perhaps that work is unavoidable in any case. [Norwegian college #8 using Classfronter]

I would like to see better and more interactive course content in the future. I would also like to see more and better synchronous communication. We have



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done some experiments with video-conferences, which also could be available as streamed files. I hope that we can have future use of Web cameras and better integration of audio and moving pictures. [Danish university using BlackBoard]

It is mainly to guarantee an authorized access into the courses and to secure a reliable functionality of the system. Furthermore the system should have various integrated possibilities for online communication (chat, video, sharing, voice communication). [Slovak university using Tutot2000]

A technology for streaming. A connection to external databases also from a single-server version of the system. [Czech technical university using WebCT]

I would like to have some user-friendly audio tools integrated in WebCT so that we did not need to use additional audio tools to handle audio files. [Swedish university using WebCT]

Some of the interviewees especially focused on multimedia tools such as video-conferencing and voice chat for better synchronous communication:

We would like to have realtime video-conference: we will install this within the next 12 months. [German company using Learnlink evoeeye]

In the future, I would like to see better voice chat and video-conferencing services – useful for end users with limitation of ISDN-connections. [Danish consortium using self-developed LMS]

First, I would like to have better tools for synchronous communication, which includes video capabilities. Second I hope that we will have better integration with external tools and services such as for example multimedia tools. Third, I want a more open data structure in FC. [Danish university center using FirstClass]

Tests, Assignments, and Evaluations

The analysis indicates that several LMS systems should improve their test and assignment tools:

Improvement of question and testing formats. [Northwestern European further education college using WebCT]

One could think of an enlargement of this system in the direction of more courses and including tests and assignment system from other faculties. [German company #1 using self-developed LMS]

They could also be improved with regard to evaluation, e-portfolio, commenting on student presentations, management of competencies, assessment tools, and reports:

The possibility to be trained in evaluation and certification matters. [Italian upper secondary school using First Class]



E-portfolio, easier system for commenting student presentations and easier file management, connection to university student management system. [Finnish university #1 using WebCT]

Management of competencies. Better engine for assessment tools construction. Possibility for better content construction. [Portuguese non-profit private institution using Learning Space]

More advanced assessment system of the reports linked to the statistics etc. Functional improvement of the dictionary of terms...[Slovak e-learning center using Intralearn]

Improved Communication and Collaboration

Many interviewees were concerned about the need for better and more advanced communication and collaboration tools. Two simply stated that they wanted better communication possibilities and protected communication:

Better communication possibilities. [Czech technical university department using Tutor2000]

Protected communication in all ways to be implemented into the LMS. [Czech university using Tutor2000]

Others requested better support and more tools for teamwork and collaboration:

Better support for teamwork. [Czech college using WebCT]

We would like to develop in the field of collaboration, for example E-mail, live-collaboration, or chat-lines for students. We have a good content-management system, a good LMS and a good author environment. We lack collaboration tools in the first phase. [German company using Learning solution]

I would like to have a NetMeeting-client installed in Classfrontier. [Norwegian college #4 using Classfrontier]

We want to have the possibility to invite for example 3 students to create a room within the ordinary classroom, in order to avoid so many rooms. Today, we can invite them to a folder, but we can't create a discussion forum within a folder. [Norwegian college #3 using Classfrontier]

In addition, some especially focused on the need for better tools for synchronous communication and immediate feed-back:

I should like the chat function to be displayed in a separate window. So that we could open the chat function while other tools are in use. [Norwegian college #1 using Classfrontier]

Better communication tools. What is missing in our release are synchronous communication tools. We had to integrate compatible software for e-mail and forum. This aspect should be improved. [Italian non-profit training organization using Greenteam]



I would like to have better tools for synchronous communication. For example better chat functions that allow moderators to control the sequence of contributors. [Swedish university using Luvit]

Synchronous communication. [Czech university department using Tutor2000]

Only that the tools for synchronous work become a little more refined. [German public teacher training institution using interwise-ecp]

What we miss is the possibility of providing immediate feed-back, but this aspect goes beyond technological limitations. [Italian non-profit training organization using Greenteam]

Better Administrative Tools

There is a general need for better administrative systems and tools. The analysis shows that many systems could have better tools for administration of students, tutors, and content:

The administrative tools could have been better. [Norwegian distance education institution using Luvit]

The administration of the system is not good enough. Imagine 5,000 users and you are going to find out to which subjects a student has access privilege to while all students are in a pile (flat database). [Norwegian college #10 using Classfrontier]

We are developing a better system of administration of participants and resources. [German technical university using BlackBoard]

Students should have more administrative privileges within their own groups. [Norwegian private college using BlackBoard]

More attentive environment for the student, as well as for the teacher. [Czech university department using Tutor2000]

The interviewees asked for better group management tools, student record systems, improved course management, and better password management facilities:

I would like to include: db students, further group management tools to better divide users, better articulated statistics (one per class, alphabetical order); the possibility to work directly on course development without the need of using dream river. [Italian institution using Esperienze]

Full enrollment and student record system. [Northern Irish further and higher education college using IT Campus]

Tools for vertically-structured course management (courses with more levels of modules, chapters and sections). [Czech company using Aspen]

It would be good to have even better facilities to put links, to change passwords etc., probably some interfaces or plug-ins or to have a better overview of activities. [German technical university using self-developed LMS]



Some interviewees more specifically wanted better services for student tracking and reporting functions:

We would like some form of student tracking integrated with the system. [Northwestern European university using Intranets]

It is difficult to find out whether a student is active or not. [Norwegian college #10 using Classfronter]

More reporting functions. [German company using Corporate learning]

I want to know how many who have downloaded a certain document. [Norwegian college #10 using Classfronter]

More control over the intervention of students, what was the participation of the student... how long does each student spend on each service. [Portuguese private university using TWT]

A special view telling you that you are logged on to this college. [Norwegian college using IT's Learning]

Simpler User Solutions

Several interviewees indicated that systems might be too complex for some applications. They requested simpler and user-friendlier solutions for teachers and administrators:

TopClass should be easier to get on with for teachers. [Norwegian college using TopClass]

The metaphors concerning the administration of the system are too difficult. It is difficult to get a good enough mental picture of how the administration of the program works. [Norwegian college #2 using Classfronter]

We plan to open up the system so that it may become easier for other people to use the platform, we want to reduce service-work. We want to develop a kind of a trading place for architecture projects where you might find a counselor and/or fellows. [German university consortium using self-developed LMS]

In the Top Class system I would like to see a much shorter run-up time for the tutors: something simpler - an easier path from beginners to improvers to advanced. Many of my colleagues were put off in the beginning. They were blocked from having their notes in Word entered into the Top Class system. [Northwestern European institute of technology #2 using TopClass]

Luvit provides many more opportunities and features than we actually can or need to include. However, in the future we would like to see a feature that allows us to cut and past in Luvit and we would also like to utilize the online communication tools much more. [Swedish company using Luvit]



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One interviewee wanted shortcuts for more efficient use:

There are few possibilities of shortcuts in the execution of tasks in Luvit. For those of us accustomed to Luvit, shortcuts would have been convenient. [Norwegian college using Luvit]

Some Nordic interviewees also pointed out the need for easy access to suppliers and developers:

It ought to be easier to get through to the supplier with proposals for improvements. [Norwegian college using TopClass]

Actually, I would like to make some things simpler to use logically and technically. As I belong to a group that is developing Profiler and its new versions, there is a direct way to development. [Finnish university using LC Profiler]

More Flexible Systems

A few of the interviewees especially pointed out that they wanted more flexible solutions because they felt too dependent on the systems' intrinsic structure and design. One especially wanted better control of graphical design, logos, etc. Another would like to have access to the system's source code:

I would like to be able to structure information in Luvit in other ways such as according to mind maps. In my opinion, Luvit only allows us to follow the Windows file structure. [Swedish university using Luvit]

I would like to see a more flexible system. We sometimes feel too dependent on Boxer's structure and thinking. [Norwegian private secondary school using CourseKeeper]

There should be a greater degree of flexibility to grant privileges to teachers as well, not just to the system administrator. [Norwegian college #10 using Classfronter]

We want to design the user interface with the layout we want, and decide which information shall be available and also possibility to place pictures where the news are. Some of this is possible, but not to such a degree as we want. We would also like to see easier administration of users and courses. And finally a chance for enclosures to the contributions in the discussion forum. [Norwegian college #4 using Classfronter]

Some teachers want more control of the design elements so that they could personalize the course with a special graphic design, logos, etc. [Swedish university using Luvit]

I should like the source code in TopClass to be open. [Norwegian college using TopClass]



Interest in Mobile Learning and E-commerce

One interviewee wanted enhanced mobile services so that users could utilize mobile phones and PDAs to access the LMS systems. Another was interested in wireless access to the system:

Right now we want to enhance mobile aspects of the system, right now you may log in via mobiles for changes of dates, news, addresses, counseling hours, telephone numbers etc. We are going, though, to include transparencies in pda formats together with audio files and offer these parts of learning material via WAP so you may learn e.g. on the train. There are AVANT-GO channels worked out where you can download parts to your pda – also the part for FAQs has been developed. [German university using self-developed LMS]

Wireless access to the system. As far as we know, the contractor is working on this. [Norwegian private college using BlackBoard]

Some interviewees wanted tools for online invoicing, e-shopping, and fee payment:

Invoicing online. [Spanish university using Elias]

Virtual projects, e-shopping, searching by keywords. [German distance education institution using self-developed LMS]

The possibility/provision of enrollment and fee payment to be within the system. We would like to use this form (by means of LMS) to offer paid courses as a kind of lifelong education to the public. [Czech university department using Tutor2000]

Content Management and Development

There is a request for improvement of some systems so that they better can handle content management and interconnection of content modules:

It's necessary to improve the content management databases. In the 3rd platform upgrade we will explore the content management. There is software that only manages content that can be incorporated. [Portuguese private non-profit association using Aep e-cursos]

Interconnection of all created modules. [Slovak distance education institution using self-developed LMS]

Some interviewees also request LMS systems that are more open to collaboration with content suppliers and have better support for development and publication of content in various file formats and media types:



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The strategic collaboration with content suppliers should be developed. Blackboard has some of this today. Concerning many courses, our institution acts as a content supplier today. [Norwegian private college using BlackBoard]

More provisions for incorporation of more formats, not only HTML, PPT etc. [Czech technical university department using Tutor2000]

Support of different media. [Portuguese private university using TWT]

It is desirable to use Classfrontier to make simple homepages on the net. [Norwegian college #7 using Classfrontier]

Tools for publishing of different kinds of material. [Norwegian college #9 using Classfrontier]

Additional Features and Comments

Several interviewees wanted extra features in addition to those provided in their LMS system. Some of these were features that they probably would find in other systems, such as online lectures, planning calendars, assessment tools, chat, automated students enrollment, audio and video streaming, form creation, statistical functions etc.

We would like to present online lectures. [Swiss private e-learning institution using self-developed LMS]

A planning calendar. [Czech university using Tutor2000]

-software tools: assessment, chat, automated students enrollment in courses and exams, audio and video streaming; -course design: improvement of the current didactic environments, online administrative facilities, online retrieval of library resources. [Italian university using self-developed LMS]

Enrich content: multimedia, prior experience, management knowledge. Flexibility of content. "Anonymous" for students, students' well being. [Portuguese company using EvoluiTech]

I would like to have a function for form creation, forms for registration, evaluation, application and so on. [Norwegian college # 6 using Classfrontier]

The statistical function could have been used to make simple forms of course evaluation on the way. This is possible; we just haven't done it. [Norwegian college using Luvit]

I should like to see a statistical function in Luvit. Plus an administrative shell around the professional content. [Norwegian college using Luvit]

Others wanted more special features such as modules for visualization of the learning processes, integrated study agendas, an offline navigator, and user-friendly authoring packages for creation of simulations and virtual reality content:



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I would like to add a module for students which can help them to organize and visualize their own learning process, learning management! [Swedish university using Luvit]

Study agenda to be directly included as an internal part of LMS or automated link with IS Student. [Czech university department using Tutor2000]

Development of an offline Navigator in platform 2003: So the student must not stay online for longer times; after downloading the navigator will remember all actions. [German university using Virtual-U]

The possibility to work offline. As it is today, you have to work online all the time, since the service is Web-based. [Norwegian private college using BlackBoard]

TopClass and other LMSs in the near future will need to offer user-friendly authoring packages for teachers and trainers to create simulations and courses with a virtual reality dimension. [Northwestern European institute of technology #1 using TopClass]

Finally, some comments were made regarding teacher training, internal courses, surveys of students and contents:

Teacher training. Administrative development. From pre-enrollment to the obtainment of the title. The University should improve teacher training for virtual education. [Spanish university using Elias]

Courses for internal business use and benefit should be developed. [Norwegian private college using BlackBoard]

A global survey of students and content, in a time-frame of years. [Norwegian college #5 using Classfrontier]



Important Findings about LMS Improvements

The analysis revealed 13 important findings, which are presented in List 10, with regard to features the interviewees would like to see in future LMS systems.

List 10. Thirteen important findings about LMS improvements

1. *Better Systems Integration.* Many interviewees wanted better integration between the LMS systems and various other systems and services. Some claimed that there was a need for integration in general terms. Universities and colleges were concerned about integration with the student management systems that usually contain the central student databases with student records, examination results, fees etc. Some institutions also wanted integrated online payment systems. And the companies focused on integration with their human relation management systems and competency management systems. A Norwegian distance education institution mentioned the need for better integration with the online course catalogue that it uses for marketing and with automatic tracking of textbook shipment. Finally, it seems that some of the services within the LMS systems could be better integrated.
2. *Interest in Standardization.* The analysis indicates that there is an interest in standards and standardizations that can make it easier to exchange content and data between LMS systems and between LMS systems and other systems. Some of the interviewees spoke of the importance of standardization in general terms. Many were concerned about the possibility to use, import, and export standardized course content and learning objects. Two German experts spoke about the importance of XML and metatagging. And many references were made to standard specifications and initiatives such as SCORM, IMS, AICC and IEEE.
3. *Local Presence, Language Support, and Special Characters.* The analysis indicates that there is a request for local representatives and national language versions. Some of the systems don't meet these needs very well. Some interviewees also focused on insufficient support for various alphabets that are needed in language courses and special characters that are used in mathematics and chemistry courses.
4. *Concern about Costeffectiveness.* A few interviewees were concerned about improving cost-effectiveness and lack of necessary financial resources.
5. *Multimedia and Broadband Urge.* The analysis shows that there is an obvious request for additional bandwidth and better multimedia abilities. Several interviewees wanted to include video services such as streaming video, video-conferences, Web-cameras, and moving pictures. Audio services such as voice communication and audio files were also requested. Some of the interviewees especially focused on multimedia tools such as video-conferencing and voice chat for better synchronous communication.



6. *Tests, Assignments, and Evaluations.* The analysis indicates that several LMS systems should improve their test and assignment tools. They could also be improved with regard to evaluation, e-portfolio, commenting on student presentations, management of competencies, assessment tools, and reports.
7. *Improved Communication and Collaboration.* Many interviewees were concerned about the need for better and more advanced communication and collaboration tools. Two simply stated that they wanted better communication possibilities and protected communication. Others requested better support and more tools for teamwork and collaboration. In addition, some especially focused on the need for better tools for synchronous communication and immediate feedback.
8. *Better Administrative Tools.* There is a general need for better administrative systems and tools. The analysis shows that many systems could have better tools for administration of students, tutors, and content. The interviewees asked for better group management tools, student record systems, improved course management, and better password management facilities. Some interviewees more specifically wanted better services for student tracking and reporting functions.
9. *Simpler User Solutions.* Several interviewees indicated that the systems could be too complex for some applications. They requested simpler and user-friendlier solutions for teachers and administrators. One interviewee wanted shortcuts for more efficient use. Some Nordic interviewees also pointed out the need for easy access to suppliers and developers.
10. *More Flexible Systems.* A few of the interviewees especially pointed out that they wanted more flexible solutions because they felt too dependent on the systems' intrinsic structure and design. One especially wanted better control of graphical design, logos, etc. Another would like to have access to the system's source code.
11. *Interest in Mobile Learning and E-commerce.* One interviewee wanted enhanced mobile services so that users could utilize mobile phones and PDAs to access the LMS systems. Another was interested in wireless access to the system.
12. *Content Management and Development.* There is a request for improvement of some systems so that they can better handle content management and interconnection of content modules. Some interviewees also request LMS systems that are more open to collaboration with content suppliers and have better support for development and publication of content in various file formats and media types.
13. *Additional Features.* Several interviewees wanted extra features in addition to those provided in their LMS system. Some of these were features that they probably would find in other systems, such as online lectures, planning calendars, assessment tools, chat, automated students enrollment, audio and video streaming, form creation, statistical functions etc. Others wanted more special features such as modules for visualization of the learning processes, integrated study agendas, an offline navigator, and user-friendly authoring packages for creation of simulations and virtual reality content.



Anecdote 9. Accessibility: Online Education for All

Computer conferencing and electronic mail have been used at RIT to lessen some communication barriers for persons with physical disabilities. They have permitted a blind teacher to communicate written material with seeing students and have also facilitated his interactions with the hearing impaired without requiring the services of an interpreter. They have similarly facilitated communication between a recently-deafened faculty member and his hearing students. (Coombs 1989, 184)

When I read this statement in Norman Coombs' ⁸⁴ article *Using CMC to Overcome Physical Disabilities* (www-icdl.open.ac.uk/literaturestore/mindweave/resource1.html) back in 1989, I understood that online education had an enormous potential for students with a disability. More recently, I have learned about these issues through NKI's accessibility project that aims at adapting online courses and support services to meet the special needs of people with a disability and thereby improving the online education services for all. The project is still in progress, but so far it has focused on improving accessibility and audio content for students that are visually impaired. The project is financed by the Norwegian Agency for flexible learning in Higher Education (SOFF).

NKI's partners in the project are the Association for Adapted Adult Education in Norway (www.funkis.no) and MediaLT (www.medialt.no). MediaLT is a small firm that has developed and arranged a distance education program for the European Computer Driving License (ECDL) that is especially adapted for people who are blind or partially sighted. In October 2001, the first blind student completed all seven course modules. According to Morten Tollefsen in MediaLT, visually impaired computer users are dependent on complicated support devices like Braille displays, artificial speech synthesizers, and screen enlargers. In the ECDL courses, MediaLT uses Daisy formatted course material, Chatterbox for speech-based chatting, and tactile graphics for special purposes.

A web site or page is *accessible* if it is reasonably possible for anyone to access the content. Accessibility awareness could improve the quality of online education for all students, but it could be of special importance to students with a disability. An introduction to Web accessibility is available from Webaim (www.webaim.org/intro/intro). The introduction discusses five types of disabilities that affect Internet usage. These are: visual impairments, hearing impairments, mobility impairments, cognitive impairments, and seizure disorders. Further, the *Web Accessibility Initiative* (www.w3.org/WAI) provides some excellent online resources for professionals. There are also several good online services for analyzing and evaluating accessibility of web sites. Bobby (www.cast.org/bobby) and Wave (<http://wave.webaim.org/index.jsp>) are two examples that generate automatic accessibility reports for your Web pages.

⁸⁴ Coombs has later established EASI (www.rit.edu/~easi)



Using these resources, NKI has improved the accessibility of its web sites. The major improvements have been related to better navigation structures, inclusion of alternative descriptions of graphic elements, and adaptation of more individual control over how the information could be presented. These improvements benefit all users, and are relatively easy to implement in well-structured web sites.

NKI's accessibility project has also produced a number of *audio files* from existing textbooks and other course readings. They include Daisy books, human narration, and speech synthesis narration.

The standard used for *Daisy books* (www.daisy.org) originated in Sweden in 1994. The books can be explained as a set of digital files that includes digital audio files with human narration of the text, a marked-up file containing the text, a synchronization file to relate markings in the text file with time points in the audio file, and a navigation control file which enables the user to move smoothly between files while synchronization between text and audio is maintained. To develop Daisy books, NKI needed the course content in text files. For some of the textbooks, this was a real challenge, since some publishers did not have the books available in text files or, for copyright reasons, were reluctant to give us the files. Our preliminary conclusion, with regard to the Daisy books we produced, is that they are excellent to use, but far too time-consuming to develop. Further, the Daisy book files are large, and not suitable for distribution via the Internet.

Speech synthesis and *digital audio files* could be of great help to visually-impaired students, people with dyslexia, learners with preference for an auditive learning style, and students who can listen to audio while they drive or perform other work that is hard to combine with reading. Therefore, NKI has developed a number of audio files for distribution via the Web. All audio files have been produced in the popular MP3 format so that they could be easily transferred via the Internet and played from PCs, MP3 players, mini disk players etc.

It is easy to produce MP3 files from human narration. We experienced that we were able to obtain a more than acceptable quality by using an NKI employee as narrator. But the narrator needs time to feel comfortable with the textbook, read it aloud, and repeat sections that were not successfully read the first time. So, we evaluated a number of tools for speech synthesis and experimented with them in order to save time and money producing audio files. We decided to use Voxit Budgie (www.voxit.se), and the resulting files seem to be of an acceptable quality. A group of students has also been provided with the Budgie software to develop audio files themselves. The audio files have just recently been offered to real students, so we still don't know how the students will evaluate NKI audio adventures.

All in all, the serious challenge regarding special online education services for students with a disability is that the cost often is high and that there are few users to shoulder the costs. Even if there are public sources to support accessibility initiatives, we should focus on affordable solutions that are beneficial to all users. If we can build these solutions into standard courses, we will be able to provide a large amount of online courses and services that students with a disability can benefit from.



A Personal View on Future Online Education

It is hard to predict the future of online education. In this article, however, I will try to envisage some of the developments towards 2010. My predictions are based on the history of online education and the trends that have been elucidated throughout this book.

Retrospective Observations

During the 15-year period since the end of the 1980s we have seen the following developments in the Nordic countries:

- The number of online students has increased by a magnitude of 1,000.
- The number of online courses has increased by a magnitude of 1,000.
- The bandwidth has increased by a magnitude of 1000, from 300 bits per second to 300,000 bits per second.
- A large number of commercial and self-developed LMS systems have been developed.
- Online information developed from black-and-white text-only to also including colors, graphics, and animations. Multimedia content has started to emerge.
- Communication costs have gradually become less dependent on time, which has stimulated increased use of the Internet.
- Online communication costs have basically become independent on distance. We do not pay more for global communication than we do for local communication. This phenomenon is pivotal for the globalization of online education.
- Wireless local area networks and mobile communication have started to emerge.
- Mobile computer equipment is becoming more widespread.

All are evolutionary developments that were visible 15 years ago and not really hard to predict. The only really revolutionary development in online education during this period was the introduction of the Web. This technological development, which nobody foresaw, emerged as the development with the largest impact on online education.

Learning from the past, we may see that the major development in future online education could come from a new, revolutionary innovation that none of us can foresee. Hence, I

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have here concentrated on evolutionary developments that are possible to observe at the moment. However, if I were to point out one issue that could nurture a revolutionary development, I would suggest the emerging always-online lifestyle. Since more and more people pay monthly fees that are not dependent on how much they use the Internet, they will spend more time online both as active users and as passive consumers of Internet services. This development will allow the Internet to compete with radio and television broadcasting and it will probably nurture completely new applications that may revolutionize online education.

We have also experienced setbacks that have degraded the value of online education services such as the proliferation of spam messages, viruses, and online commercials. These unwanted phenomena could reduce the effectiveness of online education and they could hamper future use of the Internet as an effective educational medium.

Even though we have experienced tremendous developments in online education during the last 15 years, it is interesting to observe that written communication, maybe the most important part of online teaching and learning, has not changed much. Most communications still consist of plain text, and the time it takes to turn on the computer, receive e-mail and compose a message has not been reduced.

It is also timely to point out that development of online pedagogy has made relatively little progress. We tend to apply traditional pedagogy in a new environment, and we have barely started to investigate pedagogical challenges such as how we can facilitate collaborative learning in courses with individual pacing.

The Future that Used to Be

It is interesting to review the future, as it was perceived in the past. The following long citation (Rekkedal and Paulsen, 1989) shows that most of the development was expected 15 years ago. One may also sense that the authors expected internationalization and pedagogical development to come even further than it actually has:

Despite the fact that a number of institutions around the world have applied computer conferencing/computer-mediated communication to deliver educational programs, or as part of their program, it is in our view correct to describe the majority of these experiences as pilot trials or research studies carried out by individual enthusiasts. We can therefore only have some vague notions of the potential and possibilities in the years to come. There are a number of aspects for future development and also a number of challenges:

(i) *Technological developments.* The prerequisite technology for educational computer conferencing consists of computer and telecommunication equipment. Technical standards are developing continuously. Speed and storage capacity are rapidly increasing. The introduction of the ISDN (Integrated Services Digital Network) network will imply a large increase in the speed of data transfer. As the ISDN network can transfer 64,000 bits/sec, data can be transferred 25 to 50



times faster than with the 1,200 or 2,400 modems in use today. This situation opens up the potential for using color and graphics to a much larger extent than is possible with the technology now in use.

(ii) *System and program developments.* The conferencing systems currently in use in education were generally not originally developed for distance learning. The systems are generally not user friendly. They normally do not include graphics and mathematical symbols. Consequently, there have been some restrictions on the subjects and learning objectives, which could be adapted to teaching by computer-mediated communication. These restrictions will soon be eliminated. Better systems are already on their way.

(iii) *Availability of computers and familiarity with computer applications.* To some extent it might be claimed today that computer conferencing is best suited for students who are confident in using computers and/or for students who are interested in computer technology or who study subjects where computers or computer applications are relevant. There seems to be no doubt that the number of students and subjects suitable for teaching by computer conferencing, based on the above considerations, will expand rapidly.

(iv) *Internationalization.* Distance education is in the process of being internationalized. Programs are offered across national borders. Computer conferencing will probably speed up this process considerably. The authors of this article have themselves studied and taught via computer conferencing in Norway, at Connected Education and the New School of Social Research in New York. We have also seen that the Electronic University Network in the USA markets its courses in Norway. On the European scene there are important interests in transfer of university programs and credits within the EC. In these efforts we see co-operative projects between business/industry and university partners. One such organization, EuroPACE, distributes educational programs on high technology by satellite, supported by computer conferencing. It has been argued that computer-based communication is especially suitable for communication in a foreign language. It allows the participant to study and submit information with his/her personal requirements for time and speed.

(v) *Pedagogical developments and challenges.* We have pointed out some possibilities of computer conferencing in Distance Education. We introduced this article by referring to some media developments that had not fully lived up to expectations. To some extent this may be explained by the slowness in developing the technology in its pedagogical applications and its theory. At this stage some experience have been gained, but there is a long way to go before we know how to design learning based on computer conferencing or how to include computer conferencing as a viable addition to existing media and methods. (Rekkedal and Paulsen, 1989)



Important Current Trends

In the remaining part of this article, the following important current trends are discussed in more details:

- The large-scale mega trend,
- The systems integration trend,
- The standardization trend,
- The market trend,
- The mobile trend,
- The broadband and multimedia trend,
- The globalization trend.

The large-scale trend is maintained as the mega trend of online education, and one may argue that the integration trend, the standardization trend and the market trend merely are consequences of large-scale trends, since it becomes necessary to rationalize and increase efficiency as activity increases.

The Large-scale Mega Trend

Online education has increased considerably during the last years. Five years ago, a typical educational institution piloted a few online courses for a limited number of students. Today, many institutions are implementing a broad range of online education services to all their students. Evidence of the worldwide spread of e-learning in recent years is easy to obtain. No fewer than 60,000 courses are listed on the TeleCampus portal from TeleEducation, New Brunswick, Canada (<http://courses.telecampus.edu>).

The current mega trend shows clearly that online education is shifting from small-scale experiments to large-scale operations. This mega trend was pointed out in the Cisaer project:

The interest in online education is high, and it seems to be proliferating rapidly and globally. A Canadian competitive analysis (www.telelearn.ca/g_access/news/comp_analysis.pdf) shows that the primary expansion strategies are more and diverse programs, international students, and new, attractive markets such as corporate training. The Cisaer interviewees foresaw a future with more Web-courses, additional online services, better-quality courses, enhanced focus on teacher training, further collaborations with other institutions, and additional organizational consequences. (Paulsen 2000)

The Web-edu analyses confirm that there is a clear trend that institutions offer more online courses today than they did three years ago. One may say that the trend is to go from small-scale to large-scale online education. If one characterizes institutions that offer at least 50 online courses as large-scale providers of online education, 30 of the 89 institutions (34%) Web-edu has data from could be characterized as large-scale providers. The analy-



ses indicate that the trend towards large-scale online education has come further in the Nordic countries (60%) than in the other regions.

The large-scale trend makes it necessary to focus much more on organizational issues, human resources, and division of labor. This could be a huge challenge for many educational institutions.

The Systems Integration Trend

With the introduction of large-scale online education, the need for integration between LMS systems, student management systems, and other student support services is increasing. The number of system providers and educational institutions that recognize this need seems to be increasing rapidly. Some pioneer institutions have successfully started the integration process, but even the most advanced institutions have room for many improvements and further integration of additional services. There is a general lack of systems integration and the potential for improvements is substantial. This is a major challenge for system providers, educational institutions, and even ministries of education that should stimulate and perhaps coordinate this integration on a national level.

The integration trend will result in new and better student support services, improved cost-effectiveness, and competitive advantages for institutions that handle the integration process successfully. It also implies that the institutions will be more dependent on their systems and that the systems will be more complex and harder to substitute.

The Standardization Trend

There is a trend towards standardization of online education. The benefits are obvious. With standards we will experience a more open online education world. It will be easier to identify courses and course content in public databases and portals. Courses and learning objects will be reusable in other learning environments. LMS systems will become easier to integrate with student management systems and other student support systems. Institutions will be less dependent on a single system provider.

Online educators in Europe are aware of the emerging e-learning standards, and several claim that their systems follow the standards. But so far relatively few state that the standards are important to their institution, and e-learning standards do not seem to have had much impact on online education in Europe.

But there is also a sound skepticism towards the emerging standards. Many European educators perceive the standards as dominated by North Americans. The university sector may perceive the standards as supportive of the business and training initiative – not the university sector. Many educators are skeptical about losing their pedagogical freedom, and they are not willing to spend limited resources on standardization before they are really sure that they will benefit from the extra work and trouble.

The standardization trend is still in its infancy. It may have a huge impact on future online education, but many educators are skeptical of standardization initiatives. So, it is hard to predict where the standardization trend will lead us.



The Market Trend

The Cisaer project concluded that the financial barriers to online education are significant. The analysis indicates that there are few institutions that can claim that provision of Web-based courses has been an economic success, if they disregard external research and development grants. At the same time, most of the Web courses have relatively low enrollment. The cost of development and maintenance may be high, and there are many examples of expensive pilot projects that experiment with high-cost, state-of-the-art technology. All this implies that it is necessary to focus much more on how online education could become more cost-effective. This includes a focus on how online courses could handle larger enrollment and prioritize cost-effective technology and development schemes.

The current development towards large-scale operation entails that it is increasingly important that institutions establish an efficient, cost-effective infrastructure that supports online education. This includes systems and routines for course development, customer relations management, course enrollment, student support, technical support, teacher training and support, examinations, payments, and logistics.

The Web-edu project also concludes that cost-effectiveness becomes more important as the institutions become large-scale providers of online education. The interviewees have, however, only a vague knowledge of the system's maintenance and operating costs. The cost and pricing structure for the commercial systems varies from system to system. This might make it difficult to compare real costs. Some interviewees were concerned about high and increasing prices for the commercial LMS systems.

The Mobile Trend

M-learning is a "buzz-word" for mobile learning. It means learning that can take place any time, anywhere with the help of a mobile computer device. M-learning has so far not had any impact on education, but it is spurred by the general development of mobile technology and services such as the following:

- Telecommunication companies have invested enormous resources in a broadband mobile telephone infrastructure such as GPRS, 3G, and MMS.
- The market is flooded by new and improved mobile terminals such as PDAs, tablet PCs, and advanced mobile phones, digital cameras, MP3 players, and pocket-sized multi-media jukeboxes as shown in Figure 24.
- Private wireless networks are affordable and increasingly popular in offices and private homes.
- Public wireless networks are available in an increasing number of airports, hotels, restaurants, gas stations, and other so called hot spots.
- E-books could replace paper-based textbooks.



Figure 24. Multimedia Jukebox from Archos (www.archos.com)



But new technology is not enough for m-learning to succeed. Dye et al. (2003, i) conclude that:

...wireless Internet is a must for m-learning to take off. To cater for huge chunks of data that is common in most educational websites, there is a need for high-speed wireless data transfer. However, this should be at affordable costs to the general public. The biggest impact m-learning will have on both students and teacher is increased flexibility. As a result, learning will be able to take place in other environments. Increased flexibility will place some demands on both teacher and student. It will require the student to have a high level of discipline in order to achieve his or her academic goals, while the teacher might have no clear-cut division between working hours and leisure time.

The key to making m-learning courses widely adapted is to target devices that have already penetrated the market and have good usability. There is no use creating courses for a device that is not widely adapted. The user will not buy a new device for m-learning, but might use an existing device for something new, such as education. Technology might help education by providing an easier way to communicate among peers as well as between students and teachers. The possibility of instant help from a peer or tutor creates an ideal environment for collaborative learning.

Even though mobile data communication is increasing, it is likely that there will be distinct differences between mobile and stationary services. Mobile communication will probably continue to be slower and more expensive than stationary communication. The result is that mobile and fixed communication will continue to be supplementary services that are used differently.

The mobile trend will introduce additional challenges and costs since online educators have to provide additional mobile services in parallel with their traditional fixed services.



The Broadband and Multimedia Trend

The bandwidth capacity has increased steadily and significantly ever since online education was introduced. This development will continue in the foreseeable future and provide online education with opportunities for more rich media content.

The Web-edu project showed that there is an obvious request for more bandwidth and more multimedia abilities (page 301). Several interviewees wanted to include video services such as streaming video, video-conferences, Web-cameras, and moving pictures. Audio services such as voice communication and audio files were also requested. Some of the interviewees especially focused on multimedia tools such as video-conferencing and voice chat for better synchronous communication.

The multimedia trend is also easy to observe in the electronic consumer market. Digital cameras and video cameras have become affordable and omnipresent. Audio- and video-editing software are standard features on new PCs, and consequently ordinary PC-users can now both utilize and produce multimedia content. Both legal and illegal Internet distribution of digital music and movies has exploded lately. This development has increased people's request for educational multimedia content.

Figure 25. Multimedia Web lecture made in Microsoft Producer.



Recent developments in speech synthesis have made it so understandable and user-friendly that more learners may benefit from it. This include blind students, dyslectic students, and students who for example spend much time in a car. It is conceivable that in the future it will be just as easy and inexpensive to "speech" a text as it is to print it.

But the multimedia development is approaching a crossroads, as all common media types are available in a digital format. Video, which has been the most challenging format to digitize since it requires much storage and bandwidth capacity, is already abundant on the Internet. We will certainly experience much more digital content and a plethora of new devices to present the content. However, perhaps the technical evolution of multimedia and broadband services will change its focus when there are no more old media types to digitize?

A disturbing consequence of the multimedia trend is that the technology will require educational institutions to have more competence and resources for content development. It requires investments and costs that could make it difficult for small institutions to compete with larger institutions that have more students to bear the costs.

The Globalization Trend

In legal terms, according to Ishii and Lutterbeck (2001), education is an international commodity, and as such falls under the regulations of the World Trade Organization (WTO) and the General Agreement on Trade in Services (GATS). As a consequence, national efforts leading toward any regulations in the area of education could be interpreted as a trade barrier that infringes the concept of free trade and international competition.

In the preface to her book *Globalising Education. Trends and applications*, Robin Mason (1998) stated:

Unlike the soft drinks market, education is unlikely to be dominated by a few giant providers. Why? Because it is too difficult; there is too little money to be made, too many complex issues to handle, and too great a need for «people skills» rather than technical skills.

But there are many indications of globalization in education:

- The ongoing European harmonization of degrees, certificates, credits, and grades encourages global mobility for online students.
- The commercialization of education and the growing acceptance of tuition fees make it interesting to increase income by targeting foreign students.
- The proliferation of a few, predominantly North American, LMS systems such as WebCT and BlackBoard and the growing acceptance of e-learning standards makes it easier to use foreign content and to collaborate with foreign institutions.
- In Australia, education is one of the country's most important export industries.

International delivery of online courses can be organized in many ways such as direct delivery to individuals in other countries, franchise of foreign programs, or joint partnerships between equal institutions in different countries.

Independently of organization, one pivotal issue concerning global courses is how well cultural issues are addressed. These issues include language, educational tradition,



perception of educational imperialism, national policy on certification and transfer of credits, and local support structures.

Many educators are concerned with the dominance of English as the language of global education. Countries with a minor national language may find it difficult to compete in a global market with countries that have English as their first language. Other educators are worried about cultural imperialism as a result of Western institutions export of online courses to the Third World.

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Sources of Further Information

Online Catalogues

There are a large number of online catalogues presenting courses and course providers. Among them are:

- The World Lecture Hall: (www.utexas.edu/world/lecture)
- TeleCampus online course directory: (<http://database.telecampus.com>)
- TeleCampus, Listing of classes (<http://telecampus.edu>)
- Beta Online Course Database: (www.pbnet.com/external/disted.nsf)
- Arragob, Database of programs (www.arragon.com)
- Globewide Network Academy, Listing of online courses (www.gnacademy.org)
- New Promise Interactive Index of Online Courses and Degrees (www.caso.com/index.htm)
- Peterson's Distance Learning Database Site (www.petersons.com/dlearn)
- Directory of Online Colleges, Internet Universities and Training Institutes (www.geteducated.com/dlsites.htm)

Recommended Books

Some classic books were written about online education before the Web was introduced. A significant early book was *Mindweave* edited by Mason and Kaye (1989). Later important contributions were *Online education* edited by Harasim (1990), *Empowering networks* edited by Waggoner (1992), *Computer-mediated Communication and the Online Classroom* edited by Berge and Collins (1995), and *Learning Networks* written by Harasim, Hiltz, Teles, and Turoff (1995). More recent books that could be recommended are:

- *Web-based Instruction* (Khan 1997)
- *Building a Web-based Education System* (McCormack and Jones 1998)
- *Web-based Training Cookbook. Everything you need to know for online training* (Hall 1997)
- *Web-Teaching, A Guide to Designing Interactive Teaching for the World Wide Web* (Brooks 1997)

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- *Web-based Training: Using Technology to Design Adult Learning Experiences* (Driscoll and Alexander 1998)
- *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom* (Palloff and Pratt 1999)
- *Virtual Learning: A Revolutionary Approach to Building a Highly Skilled Workforce* (Schank 1997)
- *Creating the Virtual Classroom: Distance Learning with the Internet* (Porter 1997)

Online Education Journals

There are many journals related to online education, but the quality and sustainability varies considerably. The following is an alphabetical list that should be of interest to online educators. Additional lists are available from ICDL (www-icdl.open.ac.uk/lit2k/journals.html) and IRRODL (www.irrodl.org/journalpg.html).

The American Journal of Distance Education (www.ajde.com) is the internationally recognized journal of research and scholarship in the field of American distance education.

Best Educational E-practices (www.spjc.edu/eagle/BEEP/issues.htm) is a publication of Project Eagle, St. Petersburg College.

Computer-Mediated Communication Magazine (www.december.com/cmc/mag/) has been reviewed after it ran issues from May 1994 to January 1999. It reported on people, events, technology, public policy, culture, practices, study, and applications related to human communication and interaction in online environments.

Educational Technology & Society (<http://ifets.ieee.org/periodical/>) is a quarterly journal that seeks academic articles on the issues affecting the developers of educational systems and educators who implement and manage such systems.

Elearningeuropa (www.elearningeuropa.info) is a web site for European e-learning.

eLearning Journal (www.elearningjournal.com) is a weekly e-mail newsletter synthesizing important news, trends, resources and organizations that impact the e-learning marketplace.

E-learning Magazine (www.elearningmag.com/elearning/) is a magazine for distributed learning.

eLearn magazine (www.elearnmag.org) is published by ACM, a non-profit educational association serving those who work, teach, and learn in the various computing-related fields.

elearningpost (www.elearningpost.com) is a digest of daily links to articles and news stories about Corporate Learning, Community Building, Instructional Design, Knowledge Management, Personalization and more.

The European Journal of Open and Distance Learning (www.eurodl.org) is an attempt to create a European online journal for discussion of ODL issues.

IMEJ (<http://imej.wfu.edu>) is a prototype of an interactive multimedia electronic journal edited and produced at Wake Forest University.

International Review of Research in Open and Distance Learning (www.irrodl.org) is a



refereed e-journal of advance research, theory and best practice in open and distance learning worldwide.

Intervir (www.intervir.org) is an online journal of education, technology and politics. Published in Portuguese and English.

JEDlet Journal (www.jedlet.com) presents tips on how to run business and training initiatives more efficiently.

Journal of Computer-Mediated Communication (www.ascusc.org/jcmc/) has been on the Web quarterly since June 1995.

Journal of Distance Education/Revue de l'enseignement à distance (<http://cade.icaap.org>) is an international publication of the Canadian Association for Distance Education (www.cade-aced.ca).

The Journal of Distance Learning Administration is a peer-reviewed electronic journal offered free each quarter over the Web. The journal welcomes manuscripts based on original work by practitioners and researchers with specific focus on implications for the management of distance education programs. (www.westga.edu/~distance/jmission.html)

Learnativity (www.learnativity.com) is a web site with resources for online educators.

Learning in the New Economy (www.linezine.com) is a publication claiming to introduce the best thinking on learning, performance, knowledge, and human capital in the New Economy.

Learning Circuits (www.learningcircuits.org) is the American Society for Training & Development's (ASTD) journal about e-learning.

Malaysian Journal of Distance Education (www.usm.my/Journal/jpjjm/) is available in an English and Malaysian version.

New Horizons in Adult education (www.nova.edu/~aed/newhorizons.html) is an electronic journal, founded in 1987, focused on current research and ideas in adult education.

Learning Technology (http://lthf.ieee.org/learn_tech/) is a publication of IEEE Computer Society, Learning Technology Task Force.

La Revista Electrónica de Tecnología Educativa (<http://edutec.rediris.es/>) is a journal that gathers articles and reflections generated relating to educational technology in Spanish.

Syllabus (www.syllabus.com) is a monthly publication focusing on technology in higher education.

T.H.E. Journal (www.thejournal.com) is a widely-read education technology publication, which has served educators for over 30 years.

The Technology Source (<http://ts.mivu.org/default.asp>) is a peer-reviewed bimonthly periodical published by the Michigan Virtual University.

Training magazine (www.trainingmag.com) is a magazine that advocates training and workforce development as a business tool.

The Turkish Online Journal of Distance Education (<http://tojde.anadolu.edu.tr/>) is a peer-reviewed e-journal with an international scope.



Canadian Postscript



Dr. Dominique Abrioux is President of Athabasca University. He is actively involved in national and international distance education initiatives, most notably as founding president of the Canadian Virtual University; International Council For Open and Distance Education (ICDE) vice-president for North America; and International Commission Member of the (US) Council for Higher Education Accreditation (CHEA). In 2003, he was conferred with the honorary degree of Doctor of The University by The Open University (United Kingdom).

I first met this book's author in Barcelona (1998) where we were both attending a think tank on the potential establishment of an ICDE⁸⁵ Virtual University. Like many initiatives of this sort, whether national or international, this exploratory meeting did not have any tangible results directly linked to its *raison d'être*, though it did allow me to meet Paulsen and, through him, to catch up on the development of Nordic distance education and its transition to the online environment. Like many distance education academics, my interest in the contributions of Nordic countries to the development of distance education had been sparked by Börje Holmberg's pioneering work in the field, though it had also later been tweaked by Bernt Ottem, a Norwegian visiting scholar who spent a sabbatical at Athabasca University in the early 1980s and shared with us his innovative approach to teaching music at a distance.

On several occasions since our Barcelona meeting I have had the opportunity to hear Paulsen present around themes and research that this book expands upon. Moreover, his appointment as an adjunct professor at Athabasca University (where he also taught an online course from abroad) and his contribution to our online journal⁸⁶ both as reviewer and contributor (the article *Online Education Support Systems in Scandinavian and Australian Universities* on page 257 in this book is based on an article from this journal) have enhanced my familiarity with his work. It was, however, my perusal of the manuscript for

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⁸⁵ The International Council for Open and Distance Education (www.icde.org)

⁸⁶ *The International Review on Research in Open and Distance Learning* (www.irrodl.org)



this book that led me to accept that a brief Canadian perspective on the issues raised by the author might also be of interest to its readers.

Much of the insight into Nordic online learning provided by Paulsen is equally applicable to the Canadian context, but it is his rallying of Nordic countries to consider and coordinate their online education development both as an export-related economic growth strategy and as a defense against what he terms “American instructional imperialism” that most hits home. There is, however, a twist: English being one of Canada’s official languages, it should be much easier for Canada to capitalize on its online education as an export industry, but this same linguistic feature of Canada also makes it more susceptible to the importing of courses and their ingrained cultural biases from online exporters such as the United States, Australia and the United Kingdom.

In a country where education remains a heavily defended provincial jurisdiction, and where no related national strategy seems possible (there is no national department of education as is the case with our neighbor to the south), the majority of Canada’s publicly funded universities engage autonomously in online education, albeit at very different levels. Given the widely accepted practice of allowing comparable credits earned from one institution to be transferred to a different credential awarding university, and the fact that online education does not respect provincial (never mind national) boundaries, the lack of coordination at the national, inter-provincial, and inter-institutional levels has given rise to an online university market that is characterized by duplication, redundancy, and restricted economies of scale. With the recent dismemberment of the Open Learning Institute and the pending amalgamation to the Télé-université du Québec by the Université du Québec à Montréal, Athabasca University, Canada’s Open University, is now the only large-scale (by Canadian standards) national or even provincial online university.⁸⁷

In order to better serve Canadian students, to defend its domestic market and to expand internationally, Athabasca University conceived of the Canadian Virtual University – université virtuelle canadienne (www.cvu-uvic.ca). It was incorporated in January 2000 and within one year comprised a consortium of nine publicly funded universities committed to working together and combining their distance and online programs so that students at any of the member universities could benefit from the courses offered by other consortium members. This strategy mirrored that being implemented across many US states or regions (though not across the entire US), but CVU-UVC sought to further distinguish itself both from these and from the now defunct Canadian Telecampus portal referred to by Paulsen by: a) only including in its catalogue complementary, that is not competing, programs; b) reducing barriers that made it difficult for students from one member institution to take courses from another member institution (e.g. academic restrictions on the number of equivalent courses that could be taken from another member institution; special fees levied by both institutions and associated with ‘visiting’ student status; cumbersome administrative

⁸⁷ For the most recent case study of Athabasca University, see my chapter in *The Virtual University: Models and Messages; Lessons From Case Studies*. Ed. Susan d’Antoni. Unesco Publishing: International Institute for Educational Planning. 2003. (www.unesco.org/iiep/eng/focus/elearn/webpub/)



processes) such that the consortium was as transparent to students as possible; c) centralizing student services associated with taking courses through the CVU-UVC consortium (e.g. recruitment, advising); d) collaborating on new course and program development; and e) advancing a common online research agenda.

Today, CVU-UVC regroups ten members, two hundred and seventy programs, and one thousand six hundred and ninety individual courses. University members are well satisfied with their principal return (new enrolments) on human and financial investment, but since students enroll in courses and programs directly with their home university, correlating enrollment increases with activity on the CVU-UVC portal is no easy task. The fact that members continue to pay a very low annual fee (Cdn. \$5,000), primarily because of the support for the secretariat provided by the Province of Alberta (which funds Athabasca University), certainly contributes to the level of satisfaction. Principal advantages attributed by members to membership in the CVU-UVC include: increased course registrations; improved regional and national visibility for their distance and online initiatives; political recognition for working collectively; opportunities for professional development; greater awareness about developments in and strategies around online education.

This notwithstanding, CVU-UVC has had to face several key issues during its brief history and some of these may well be similar to, or have relevance for, the Nordic examples and recommendations cited by Paulsen.

In order to attract members both during its launch and in subsequent years, several of CVU-UVC's founding principles had to be watered down. The intention of not listing competing programs was never truly implemented and was formally reversed by the Board of Directors in 2003. Collaboration at the program level, never mind at the course development level, has remained elusive, as has the identification of a common research agenda. Similarly, the goal of having all member institutions treat CVU-UVC credits as if they had been awarded by the student's home university has not been achieved, primarily because this would have involved changes in policy at the institutional rather than the programmatic level, and dual-mode universities do not have the culture to even contemplate this. Moreover, the consortium mix of non-traditional institutions (i.e. Athabasca University, Open University of British Columbia and Télé-université du Québec) and campus-based universities with peripheral distance education programs that could not drive significant out-of-the-box thinking at the institutional level, also resulted in the goal of creating transparent inter-institutional administrative processes not having been fully achieved. While these last two objectives have not been completely met, it does need to be stated that the CVU-UVC has nevertheless achieved marked improvements for its students in transfer credit acceptance and administrative transparency.

The fact that this consortium's development was almost entirely self-funded by the members (a very small development grant of Cdn. \$100,000 was received from the Government of Canada), and that it sought to regroup existing distance and online curriculum offered by its member institutions, have meant that there is no common LMS system and hence no economy of scale or consistency (for academics, students, and administrators) in the development and delivery of the collective online curriculum. This outcome leads it to very much resemble the



multi-platform fledgling Finnish Virtual University (FVU), though a key difference is that the CVU-UVC curriculum has been designed by individual members, not by or for the consortium. Like its Finnish counterpart, the Canadian Virtual University seeks to serve its national students first and has aspirations to use its portal to export its members' educational programs; unlike the FVU, the CVU-UVC does not intend to offer its exported products in other than its official national languages. The absence of a common LMS and the fact that its courses, programs and credentials are linked to the individual university rather than the consortium, make it very difficult for CVU-UVC institutions to leverage the consortium internationally, an experience that may be relevant to any Nordic international strategy in this area.

In sharp contrast to the FVU which has received a commitment of some ten million euros primarily from its national government, the Canadian Virtual University has not benefited from significant government funding and so should escape the fate of the three Swedish distance education consortia or the Danish Virtual University cited by Paulsen. CVU-UVC, after all, is a grassroots operation, with ownership and commitment driven by the institutions themselves, or by specific programs within a member university.

The Canadian context, and the experience of Athabasca University which, like NKL, has had to transform its pedagogical, student support and administrative models in order that they maximize the online distance learning environment, also lend considerable support to the other theses advanced by Paulsen. As in the Nordic countries, there is no national allegiance either to student management systems or to LMS systems. This notwithstanding, PeopleSoft and SCT Banner dominate the former market, and WebCT the latter, though Blackboard, Lotus Notes platforms (for business programs), and homegrown products are also significant players. The fact that there is no linguistic barrier for Canadian institutions that offer courses and programs in English when they adopt a propriety LMS does mean, however, that they are understandably much more likely to do this than are their Nordic counterparts.

Paulsen would have as much difficulty identifying a completely virtual or online university in Canada as he does in Nordic countries. Athabasca University comes closest to this, but though its graduate programs are all delivered predominately online, like NKL it has had to maintain much of its undergraduate curriculum in parallel print/telephone and online models, lest traditionally disadvantaged learners be further disadvantaged by the digital divide.⁸⁸ Just as Paulsen reports is the case in Nordic countries, print still plays an important role, usually in the form of core textbooks, even in programs that are predominately online. In programs where both print/telephone and online infrastructures are available to students, they take full advantage of the opportunity to engage in human interaction with their tutors over the telephone as well as through e-mail. To date, the primary advantages of the online learning environment include: the establishment of a community of learners that facilitates group work and peer support; communication with tutors and the electronic transmission of assignments; accessing complementary library and other secondary web-based resources; and conducting administrative and student service related activities (online advising, registration etc.).

⁸⁸ This notwithstanding the fact that a 2003 survey showed that 97% of Athabasca University students had Internet access from home (and almost two thirds of these had high speed access).



As is the case with NKL, Athabasca University regards its niche as flexible learning. As such, students enroll in undergraduate courses year-round and complete courses at their own pace. They are not part of a class cohort and this serves to reinforce the importance of addressing what Paulsen identifies as the greatest challenge for online educators: the dilemma between learner-driven individualized learning and faculty-promoted collaborative learning, though most of Athabasca's undergraduate faculty (unlike the vast majority of their Canadian colleagues) would not fall into this camp. This notwithstanding, and based on our Canadian experience, I would fine-tune Paulsen's dilemma by emphasizing that many of the learners who come to us because of our flexibility also expect their educational experience to include some collaborative learning. Understandably, they want to have it both ways, and our major pedagogical task is to rise to this challenge and to develop cooperative learning activities that add value for individually paced learners.

From the administrative perspective, the Canadian experience also supports the book's Nordic-derived warning that the online education costing model will continue to pose a very significant problem if its scalability is not satisfactorily addressed. The blending of costs formerly clearly attributable in traditional distance learning either to course development (fixed) or course delivery (variable) poses a real problem for the scalability of Canadian online learning, as 'class size' and associated teaching costs assume the costing importance that they have in classroom-based education. This, of course, is premised on a cohort-driven model, though there is a comparable concern with individualized online learning if it fails to re-engineer its pedagogy and administrative processes for the online environment and is then faced with additional rather than replacement costs.

While Nordic and Canadian online education today would seem to face many similar issues and challenges, there does appear to be one significant point of divergence, probably linked to the highly competitive nature of the Canadian e-learning market and its greater subjection to national and transnational competition. In a country where university tuition costs are significant, where degree programs at all institutions are modularized into 3-credit components, where there is a strong tradition of credit transfer, and where capacity problems in campus-based institutions significantly reduce flexibility and course selection, campus-based students are increasingly voting with their mouse and taking significant parts of their undergraduate degrees online from other institutions. Efficient, timely, and effective service represents one of the key ways in which providers can compete for this business (the others being branding, quality, and flexibility), but this necessitates the development of a very strong institution-wide service culture (not exactly a hallmark of universities!). The importance of a strong service culture is magnified in the online environment, where clients not only expect 24/7, just-in-time access to resources and services, but also demonstrate expectations that are forever increasing. In turn, this requires a complete re-thinking by online providers of how services are accessed (e.g. intelligent data bases; web-enabled; call-centres) and the role of academic, professional, and administrative staff.

Mindful of Paulsen's push for Nordic countries to create new regional and international markets, of the curriculum modularization commitment contained in the Bologna Declaration, and of the trend towards significant tuition fees in several Nordic countries, the concept of



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online learning as a service industry may well be the most important lesson that Nordic providers of online education could take from their Canadian counterparts. Failure to do so may well jeopardize not just any international expansionist strategy, but also local and regional markets.



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About the Author

Morten Flate Paulsen is the Director of Development at the NKI Internet College. He finished the degree of Master of Science in Engineering at the Norwegian Institute of Technology in 1980 and became Doctor of Education at Pennsylvania State University in 1998. In 2003, he was re-appointed Adjunct Professor for a second three-year period, at the Athabasca University, Centre for Distance Education.

In 1982, he started working for NKI (Norwegian Knowledge Institute), the major provider of distance education in Norway. There he worked in a team that established the NKI College of Computer Science as a private, traditional, face-to-face campus. So, for several years he taught face-to-face courses on information technology in an organization with much expertise in distance education.

In 1986, Paulsen became one of the very first European online educators when he initiated the development of the EKKO computer conferencing system and taught his first online course. Then he initiated the NKI Internet College in 1987. This college may have been the first European online college, and few (if any) online colleges in the world have been longer in continuous operation. Since then, he has worked continuously in the field and published a number of books, articles and reports about the topic. Paulsen is a well-known speaker at conferences and seminars and participates often in public debates about online-education.

In 1990, he enrolled in the doctoral program at the Pennsylvania State University, Department of Adult Education and Instructional Systems. As a graduate assistant at the American Center for the Study of Distance Education, he established The Distance Education Online Symposium (DEOS) as an online adjunct to the American Journal of Distance Education. DEOS consists of DEOSNEWS, the world's first online journal related to distance education, and DEOS-L, an accompanying discussion forum still vibrant in 2003. Paulsen edited 52 issues of DEOSNEWS and DEOS-L moderator the two first years.

Paulsen has participated in nine European research projects. In the Cisaer project he conducted an international analysis of web-based education, and in the Web-edu project he studied experiences with LMS systems used in Europe. At the moment, he is investigating findings from open and distance learning in the Nordic and Baltic countries as a partner in the Boldic project and the state-of-the-art in European online education through his participation in the Delphi project.

Paulsen taught his first online course at a distance via a 300 bit per second modem in 1987. In 1988, he co-taught his first international course for the New York based Connected Education. Later he has taught NKI courses online while living in Pennsylvania and Canadian master students while living in Oslo. In 2003, he taught his first m-learning course via a 300,000 bit per second wireless Internet connection at home and a PDA with mobile connection to the Internet when he traveled.

Paulsen has designed and developed several online courses. Most recently, he has been project manager for the Specialization Program in International Online Education (SPICE), which is a five courses, master level, program. Paulsen's interest in online



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education is also evident in his dissertation *Teaching Techniques for Computer-mediated Communication* and in his *Theory of Cooperative Freedom*.



