

An Analysis of Learning Management Systems (LMS) in Scandinavia

A First Draft

January 2002

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The Web-edu Project

The Web Education Systems project (Web-edu) is supported by the European Leonardo da Vinci program. The project aims to study Internet based Learning Management Systems (LMS) to provide comprehensive recommendations and reference material for European education and training organizations.

The project is an international study in the e-learning field aiming to analyze experiences of the use of different Learning Management Systems for the management and delivery of online education and training. By analyzing the experiences of major institutions in the European 18 area, the project intends to provide traditional universities and the vocational education and training field with a comprehensive analysis of standard and non-standard systems, able to manage hundreds of courses and deal with thousands of teachers and students.

The project's homepage is available via www.nettskolen.com/in_english/ and the project partners are:

- Ana Dias, Tecminho, Portugal
- Desmond Keegan, Distance Education International, Ireland
- Morten Flate Paulsen, NKI, Norway
- Helmut Fritsch, ZIFF, Fern Universität, Germany
- Gro-Anett Olsen, NKN, Norway
- Paulo Dias and Pedro Pimenta, Minho University, Portugal
- Carina Baptista, Inofor, Portugal



Picture of the project members taken at the project meeting in Oporto September 1st, 2001.

Several of the project partners were involved in the CISAER-project (www.nettskolen.com/in_english/cisaer/index.html), which in several ways led to the Web-edu project. The CISAER project provided a comprehensive, international survey and analysis of online education. This author's report *Online Education. An International Analysis of Web-based Education and Strategic Recommendations for Decision Makers* (Paulsen 2000) is in many ways the precursor to this report.

Research Design and Methodology

This analysis is based on in-depth, qualitative, primary telephone interviews with selected Scandinavian training managers who have comprehensive experience using Learning Management Systems. The interviews were conducted in October, November, and December 2001.

The selection of training managers were based on the contact information available from the CISAER-project (www.nettskolen.com/in_english/cisaer/index.html) and on the researcher's personal contacts and knowledge about Scandinavian online education institutions.

During the research period, the interviewer was engaged as the advisor of two students who conducted research on system managers' experiences with LMS systems in most of the Norwegian universities and colleges (Runnestø and Ristesund 2002). Consequently, this study deliberately emphasized on other types of institutions than Norwegian universities and colleges.

The interviewees were first contacted via e-mail or telephone and asked if they were willing to participate in a one-hour telephone interview about their experiences with LMS systems.

Before, during, and after the interview, the interviewer studied and included information from relevant institutional web pages.

All interviewees had access to the Interview Guide (Appendix A) prior to the actual telephone interview. Each telephone interview took about one hour. The interviewer used a loud-speaking telephone and a word processor to write down key words and statements in Norwegian during the interview. After the interview, the interviewer transcribed and translated the interviews into English. Then it was e-mailed to the interviewees for corrections, clarifications, and acceptance.

Reliability and Validity

In a Danish article about the qualitative research interview, Kvale (1979) discussed the following general factors that may influence reliability and validity:

- the interviewer may change style, sensitivity etc.;
- the interviewer may pose leading questions;
- the interview analysis may be superficial or biased;
- the interview may not analyze what should be analyzed.

Awareness of these factors may increase reliability and validity in general, and the researcher is not aware of any change in style or sensitivity or of any leading questions. It should be mentioned, though, that Desmond Keegan conducted the interview with the University of Oulu, and this researcher appreciate that both the interviewer and the interviewee allowed me to include the interview in this analysis.

More specifically, reliability, and validity may be influenced by the researchers affiliation to NKI Distance Education and the fact that he has been in charge of the development of NKI's SESAM system since 1986.

The reader should also be aware of the fact that the interview with NKI was an auto-interview conducted both by and with this researcher. On one hand, this fact may introduce some bias in the interview and the analysis of the other interviews. On the other hand, it suggests that the interviewer has some first-hand knowledge of the field.

The Institutions

This analysis comprises a range of very different types of institutions in Scandinavia: From primary level to university level, from public to private, and from providers of LMS services to costumers of LMS services.

Table 1. The Institutions

Institution	Country	Type
The Competence Network	Norway	Commercial provider of LMS-related services
Nettskolen	Norway	Commercial provider of courses
Nettgymnas	Norway	Private secondary school
Globalskolen	Norway	Semiprivate provider of primary education for children abroad
Danmarks Netskole	Denmark	Consortium of public technical colleges
Center for Fjernundervisning	Denmark	Distance education center at business college
NKI Fjernundervisningen	Norway	Private distance education institution
Midhögskolan	Sweden	Public University
Statens skolor för vuxna	Sweden	Public distance education institution
Skandia	Sweden	Global savings company
University of Oulu	Finland	Public University

A short description of each institution is presented in the following.

The Competence Network (NKN)

NKN is a commercial company, 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.

NKN is a provider of LMS services to companies (customers) in collaboration with course and content providers (partners). It has signed contracts with 50-60 course and content providers. Altogether they offer 850 courses to NKN customers.

NKN has used the Saba LMS system since it was officially launched on August 16, 2000. They used WebLearn Plus, from InforMania in San Francisco during a six months pilot period.

Nettskolen

Nettskolen is a company owned by SPAMA and the employees. SPAMA (www.spama.no) is a competency centre for the bank and finance sector. *Nettskolen* depends on a close collaboration with Gjøvik College (www.hig.no). *Nettskolen* has six fulltime employees. Four of them are situated at the College of

Gjøvik and two are located at SPAMA's headquarter in Oslo, Norway. *Nettskolen* was established in June 1999.

Nettskolen uses ClassFronter for credit courses offered to individual students on the open market. CourseKeeper is used for special courses offered to companies and organizations. The systems supplement each other. ClassFronter is better with regard to communication between people, and CourseKeeper has more focus on advanced presentation of the course content.

Nettgymnas

Nettgymnas is a private, Secondary School. It is owned by *Norsk Privatskole*, which operates a private, face-to-face high school in Tromsø, Norway.

Nettgymnas is the name of their online teaching activities.

The institution has spent two years developing the course content. It introduced CourseKeeper in August 2001. It is a standard system developed by the Norwegian company Boxer Technology.

Globalskolen

Globalskolen provides primary education for Norwegian children abroad. The students are from 6 to 15 years old. The institution also provides guidance to the parents of the youngest students. *Globalskolen* was established by *AV-senteret*, a company owned by four municipalities in western Norway. *AV-senteret* is the mother organization of *Globalskolen* and *Norsk Nettskole* (www.norsknettskole.no).

Globalskolen uses FirstClass during the school year 2001-2002. The previous year, they used Imaker. They changed system because the system was not stable, and because the administrative solutions and system security did not meet their needs.

The mother organization, *Norsk Nettskole*, is developing PedIT, a self-developed LMS. This is hosted on the institution's server in Ålesund. *Norsk Nettskole* will probably offer PedIT as a host system for other providers of online courses in the future. At the moment, *Globalskolen* uses PedIT for their online school journal and some other resources and they will probably migrate *Globalskolen* to PedIT as soon as it is as good as FirstClass for *Globalskolen's* special needs.

Danmarks Netskole

Danmarks Netskole is a consortium of three technical colleges: *Fredericia-Middelfart Tekniske Skole*, *Teknisk Uddannelsescenter – Horsens*, and *Nakskov Tekniske Skole*.

The LMS system is self-developed, and it was introduced October 1, 2001. The server is located at *Fredericia-Middelfart Tekniske Skole*, but it serves all three partners.

Center for Fjernundervisning (CFU)

Center for FjernUndervisning (Center for Distance Learning) was established in 1997. It is a faculty within Randers Business College and is situated in the mid-eastern part of Jutland, Denmark. The faculty is managed by a group of 10 people and they only operate within Distance Learning.

CFU has used TopClass since August 1997. They will convert to BlackBoard (www.blackboard.com) from January 2002 because they belong to an association of 28 schools and institutions that have signed a framework agreement with Blackboard.

NKI Fjernundervisningen

NKI is one of the largest non-governmental educational institutions in Scandinavia. The NKI Group is organised as a non-profit foundation comprising NKI Distance Education, The Polytechnic College (DPH), The Business Training Centre (NA) and NKI Publishing House. It has approximately 350 full-time and 700 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 Distance Education offers both traditional distance education programs and online programs via the Internet College. Altogether, this constitutes approximately 100 programmes and more than 400 courses at secondary and undergraduate levels, as well as specialised courses for competence development in business and industry. NKI Distance Education employs some 65 full-time and 400 part-time employees. Each year it has around 15,000 active students (about 30 percent of them are now online students) out of a population of four million Norwegians. It is recognized by the Ministry of Education and receives government grants covering about 15 % of operating costs. During the last 15 years NKI Distance Education has developed from a correspondence school to an institution applying the Internet for delivery of a large number of courses. Still, in the year 2001, traditional distance education courses constitute about 70 % of the revenue and online courses constitute the remaining 30 %.

NKI has offered distance education online since 1987. The institution has experienced three generations of online education since it started. 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 to the present, is characterized by web-commitment. In June 2000, the accumulated number of course enrolment exceeded 10,000. In the autumn of 2000, the NKI Internet College had about 75 tutors and 2,500 active students in 15 countries. At the end of year 2001, the NKI Internet College offers about 50 complete programs and 250 different Norwegian courses online. The number of active students had increased to 3,300 and the number of online tutors exceeds 100.

NKI Distance Education has a self-developed LMS, which is named SESAM 4.0. This is the fourth generation of a system that has been developed by evolutionary systems development over 15 years.

A case study titled [The NKI Internet College: A Review of 15 Years Delivery of 10,000 Online Courses](http://www.irrodl.org/content/v1.2/nki.html) is available at www.irrodl.org/content/v1.2/nki.html.

Midthögskolan

Mid Sweden University is a multi-campus network university with centres in Härnösand, Sundsvall, Örnsköldsvik, and Östersund. It was established on July 1, 1993, when the University Colleges of Sundsvall/Härnösand and Östersund were merged. On July 1, 1995, the Sundsvall/Örnsköldsvik and Sundsvall Colleges of Health Sciences were also incorporated.

The university offers 50 study programs and approximately 500 single-subject courses. There are approximately 1000 employees at the university, 500 of whom are involved in teaching, and 11,000 students, of whom approximately 140 are doctoral students. The annual turnover for the academic year of 1999 was 670 million SEK.

Midthögskolan has used WebCT since 1996. They have also tested FirstClass and West.

Statens skolor för vuxna, Norrköping (SSVN)

SSVN is a distance education institution that primarily offers secondary education courses to adults. It introduced online education in the fall of 2000 and it has developed a LMS system, which is termed SSVN2000.

They use FirstClass for internal communication among tutors. They did use a system called LEKTOR from LECANDO. It was suitable for the distance education model they apply. Their focus is on individual learning in which the students choose their individual start-up date and progress plan.

Skandia

Skandia was established in 1855 and has been listed on the Stockholm Stock Exchange since 1863. It has been an international company since the start, with offices around the world. Skandia has been active in the USA since 1900, in Latin America for more than 40 years, and in Japan for about 30 years. Skandia has undergone a profound transformation in recent years, from an insurance company with a main emphasis on property and casualty insurance, to what it is today: a focused, global savings company. Savings business is conducted in more than 20 countries and has expanded rapidly, entirely through organic growth.

Skandia developed 4 online courses for LUVIT. The courses are related to financial and insurance issues. In addition to the 4 online courses, they offer much distance education supported with some face-to-face sessions. They also provide much e-learning that not utilize LUVIT. One example is the Computer Drivers License courses. They have also developed some e-learning courses and found that they were almost impossible to integrate with LUVIT. In general, it seems to be very difficult to integrate LMS-systems with existing e-learning content.

LUVIT was founded in 1998 in Lund, Sweden, but its origins can be traced back to 1997 when the University of Lund first started its efforts of becoming truly virtual and interactive by developing a unique system for online education.

University of Oulu

University of Oulu in Finland is a science community of 3,000 employees and over 14,000 students. The university has a scientific base of nine educational areas, which are organized in six faculties.

LC Profiler is a LMS system offered by the company LC Prof. The company's services are based to the methodology and the system developed at the University of Oulu in several domestic and EU R&D and training projects.

Table 2. Some information about the surveyed institutions

Name of Institution	URL of Institution	Primary LMS	Other LMS	# online courses	# online tutors	# online students	# years in use	Typical course duration
NKN	www.nkn.no	Saba	WebLearn Plus	850	hundreds		1	3 hours – 6 months
Nettskolen	www.nettskolen.no	ClassFronter CourseKeeper		10	15	150+150	2	2-3 months
Nettgymnas	Nettgymnas.no	CourseKeeper		6	6		<1	1 school year
Globalskolen	www.globalskolen.no	FirstClass	PedIT Imaker	28	10	180+150	1	1 school year
Danmarks Netskole	www.netskole.dk	Self-developed		40	30	7000 course enrollments	<1	16 weeks
CFU	www.cfu.dk	TopClass	BlackBoard	20	Equivalent of 4 full-time positions	500	4	1-4 months
NKI Fjernundervisningen	www.nettskolen.com	SESAM (Self-developed)		250	125	3300	15	6 months
Midthögskolan	www.mh.se	WebCT	FirstClass West	200	Between 100 and 200	2-3000 40% at a distance 60 on campus	5	0.5 – 4 semesters
SSVN	www.norrk.ssv.se	SSVN2000 (Self-developed)	LEKTOR	50	20-25	500-1000	1	Few weeks – several years
Skandia	www.skandia.com	LUVIT	None	4	???	650	2	6 months
University of Oulu	www.oulu.fi/english/	LC Profiler		41	???	2500 users		Several weeks or months

The table shows that there are large variations among the institutions with regard to the number of online courses, tutors, and students. There are also substantial variations in the number of years in use and course duration.

The number of online courses range from ??? to ???

The number of online tutors...

The number of online students..

The number of years in use..

Typical course duration.....

Table 3. List of LMS systems used by the institutions

LMS systems	Nationality of LMS	Language of LMS	URL of LMS	User institution
BlackBoard		English Danish	www.blackboard.com	CFU (secondary)
ClassFronter	Norwegian	Norwegian English	www.fronter.com	Nettskolen (primary)
CourseKeeper	Norwegian	Norwegian English	www.coursekeeper.com	Nettskolen (primary) Nettgymnas (primary)
FirstClass		Norwegian Others	www.firstclass.com	Globalskolen (primary) Midthögskolan (secondary)
Imaker				Globalskolen (secondary)
LC Profiler	Finish	Finish English	www.lcprof.com	University of Oulu (primary)
LEKTOR	Swedish	Swedish		SSVN (secondary)
LUVIT	Swedish	English Swedish Danish Norwegian	www.luvit.com	Skandia (primary)
Saba	American	English Norwegian	www.saba.com	NKN (primary)
Self-developed	Danish	Danish		Danmarks Netskole (primary)
Self-developed: PedIT	Norwegian	Norwegian		Globalskolen (secondary)
Self-developed: SESAM	Norwegian	Norwegian		NKI Fjernundervisningen (primary)
Self-developed: SSVN2000	Swedish	Swedish		SSVN (primary)
TopClass		English Danish	www.wbtsystems.com	CFU (primary)
WebCT		English Swedish	www.webct.com	Midthögskolan (primary)
Weblearn Plus		English		NKN (secondary)
West				Midthögskolan (secondary)

The table shows that a substantial part of the LMS systems are developed in Scandinavia.

Analysis of the Interviews

The Web-edu project group identified six centers of focus for the collection of data on LMS systems to provide a successful analysis of these systems:

- Course development tools
- Student support tools
- Tutor support tools

- Administrative systems
- Technology
- Cost.

In a further analysis, each of these six centers of focus was divided into five major components, based on an in depth study of e-Learning systems, which gave a 30-point grid for analysis. It was considered that if adequate and accurate data were collected on the 30 points in the resulting questionnaire instrument, an adequate volume of data would be aggregated for a professional evaluation of LMS systems.

A compilation of previous LMS studies and comparative analysis of these studies led to the identification of the specific focus of the project. Most of the previous studies focused on the technical aspects of the LMSs or selected a grouping of LMSs on the market for analysis and reporting.

The focus that seemed to be absent from the other studies was the evaluation of the satisfaction of the institutions, whether public or private, with the LMS that they had purchased or developed.

The accumulation and analysis of data on this aspect was considered to be the most valuable for EU higher education and company training providers, and as it was little represented in the literature it was chosen as the center of focus of the project.

Course Development Tools

1.1 Course Creation

How satisfactory was the LMS for course creation?

The LMS systems are usually not used for development of the course content. A broad range of other development tools are used to develop the content before it is published in the LMS system.

The software tools for course creation referred to in the interviews are listed in Table 2.

Table 4. Software tools used for course creation

Software tool	Type of content	URL
Word	Text	
PowerPoint	Text	
Macromedia Authorware and Director	Multimedia	
Flash	Multimedia	
FrontPage	HTML-pages	
DreamWeaver	HTML-pages	
Netscape Composer	HTML-pages	
Viewlet	Graphics (Screenshots)	www.qarbon.com
Coral	Graphics	
PhotoShop	Graphics	
ReadyGo		readygo.com
ToolBook		

Here are the comments made in the interviews:

We use Macromedia Authorware and Director for content creation. Much of the content is text, presented in Word or PowerPoint format. We are looking for simple authoring tools, and we have tested ReadyGo (readygo.com), which is compatible with the SCORM standard. [Nettskolen: ClassFronter & CourseKeeper]

We used Authorware og Flash for content creation. We are satisfied with these tools, but they have many advanced features that are not easy to use. [Nettgymnas: CourseKeeper]

The tutors develop weekly schedules using either HTML or Word-format and publish them in FirstClass. 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. [Globalskolen: FirstClass]

We started offering online, distance education courses six years ago. The first online courses we developed were for the "PC-user program". We developed printed material that was traditional mailed to the students, and offered additional services via an Internet News group and web pages. Now, we have developed an in-house conferencing system. A typical course includes a course presentation, a syllabus, and some readings in the conferencing system. In addition, most courses also include textbooks. Each week, the tutor presents some material, and posts assignments. The students may ask questions in the discussion forum. We use Microsoft FrontPage for creating much of the course content and we are also considering using ToolBook. We include PowerPoint presentations in some courses. [Danmarks Netskole: Self-developed]

We use FrontPage for development of web-pages, Coral for graphics, Macromedia Authorware for multimedia elements, and Viewlet (<http://www.qarbon.com>) for sequences of screenshots. [CFU: TopClass]

SESAM supports efficient compilation of all standard resources associated with our courses, such as lessons, external links, forums, class lists, personal presentations etc. All the resources are compiled using standard graphical and structural templates. One of our employees is responsible for consistent page design, style sheets, file-formats, meta-tagging etc. [NKI: Self-developed SESAM]

In our department, the tutors use Netscape Composer to create web pages. In some of the courses, the tutors are supported by web-designers. [Midthögskolan: WebCT]

We use Dreamweaver, PhotoShop and a number of other programs for course creation. We are satisfied with these tools and they meet our needs. Our teachers use these tools, because they also work in project teams that design the courses. A team typically comprises a project manager, a tutor and a web-technician. [SSVN: Self-developed SSVN2000]

Saba provides tools for development and publication of courses, but we don't use them. This is because NKN does not develop any courses or course content. Our partners develop all courses and course content. NKN provides however a catalogue in which various resources are registered and linked to NKN. These resources may vary a lot with regard to user friendliness, didactic flexibility and support for graphic design. In other words, Saba does not pose important limitations on course development and pedagogic presentation. [NKN: Saba]

Profiler has "built in" structure for a course and if teacher's/ course's approach fits in, course creation is easy. [Oulu: LC Profiler]

We prefer to buy reproduced course content, but it is hard to find what we need. We develop some content in-house and some with help from of external course designers. We primarily use Word and PowerPoint to develop the course content. We have some problems converting Word-documents to the LUVIT-format. It is also a problem that some of our employees not have access to LUVIT. [Skandia: LUVIT]

1.2 Openness, Structure and Didactic Flexibility

In the creation of course materials did the LMS permit didactic flexibility? Was the structure open to differing didactic possibilities?

We perceive standards as very important. CourseKeeper emphasizes on the SCORM standard and ClassFronter is also focusing more and more on SCORM. [Nettskolen: ClassFronter & CourseKeeper]

Animation and audio are important components of our courses. The tools handle this very well. I perceive them as flexible, but not easy to learn. [Nettgymnas: CourseKeeper]

Not at the moment, but that is what we intend to. [Danmarks Netskole: Self-developed]

SESAM was developed to support the didactic choices made by NKI. So, I perceive SESAM as flexible, within the boundaries of NKI's strategy, which is to specialize in flexible enrollment and progression. As a result of this, NKI has for example chosen to focus on asynchronous communication and SESAM do not support chatting or video-conferencing. [NKI: Self-developed SESAM]

We use various media in our distance education courses. We have experiences with a number of alternatives, but now we basically use three models. These are:

- a) The course is based on printed textbooks and printed study guides. In addition, the course has a web site that includes additional resources such as forms, FAQs, e-mail addresses, and discussion forums. The tutor could also publish a personal presentation, an introduction to the course, links to external resources, progress plan etc.
- b) In the second model, the study guide is also available on line.
- c) In the third model, all course components are web-based. This could include interactive course content, multimedia elements etc. [SSVN: Self-developed SSVN2000]

We have developed a standard template for the course content. [SSVN: Self-developed SSVN2000]

One "virtual space" of Profiler is "Library" and teacher/tutor can put materials (like core readings) to there. Material can consist text, pictures (html) and multimedia elements as well as links to outside. There is automatic material comment/discussions - tool for students.

One or more instructor / tutor can get modify access to the "Library material" and teacher can give access to material from other Profiler courses.

More than just through materials Profiler supports different pedagogic approaches / uses of environment. Teacher can choose a profile for the course: Project based, Material based, Communication based. These profiles hide "unnecessary tools" from student. [Oulu: LC Profiler]

1.3 Teacher Userfriendliness

How easy was the LMS to use by teachers and course developers?

We have a team of tutors and other employees who design the course content. [Nettskolen: ClassFronter & CourseKeeper]

Five people work with Flash development, only a few of the content experts have developed some flash material. [Nettgymnas: CourseKeeper]

Most of the people that work for us are full-time employees. Usually they work both as course designers and tutors. They work together in course development teams. [Danmarks Netskole: Self-developed]

A team of tutors designs the course content. [CFU: TopClass]

The tutors are part-time engaged to teach the courses, and they do usually not take part in the development and maintenance of the course material. SESAM is developed to handle large-scale online education, so SESAM and its development team are focusing on features that can reduce the workload of teachers and course developers. I do however, perceive “teacherfriendliness” as a training and organizational issue, not merely a technical issue. [NKI: Self-developed SESAM]

Technically it does not require special IT skills and starting a course is easy.

If and when teacher understands basic idea of the environment, use is quite natural. –Of course normal IT technology creates problematic situations with several Web-browser versions etc. [Oulu: LC Profiler]

1.4 Support for Graphics, Audio, Video, and moving images

Did the LMS support the provision of graphical materials, moving images, audio and video in the course content?

Most institutions seem to apply some multimedia:

One of our developers has used Macromedia Authorware. Some courses apply multimedia, such as for example our course in web-design. [Danmarks Netskole: Self-developed]

Course designers may include graphical materials, moving images, audio and video in the course content. SESAM is not used for development of such material, but it poses no limitations with regard to integrating such material. We also use Dreamweaver, HomeSite, PaintShop, and Flash. [NKI: Self-developed SESAM]

Some interviewees are cautious about too much use of multimedia:

We have little use of multimedia, but we will include more audio elements in the future. So far, we have used Windows SoundRecorder and looked at an interesting product called Wimba (wimba.com). [Mithögskolan: WebCT]

The bandwidth is capable of handling multimedia elements, and LUVIT does not pose any limitations with regard to multimedia content. However, employees who want to access the courses from home, usually have less available bandwidth. [Skandia: LUVIT]

Other institutions seem to be even more cautious about including online video:

Interactivity is important, you may say that it supports the edutainment factor. To achieve this, we utilize Authorware Director. We have used some video, but found that it requires too much bandwidth. The market is not ready for online video yet, but it is feasible to use animations. [Nettskolen: ClassFronter & CourseKeeper]

We have not developed any video content. Our experiences with development of graphics, audio, and moving images are positive. [Nettgymnas: CourseKeeper]

In 2000 we have 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. [Globalskolen: FirstClass]

Other comments:

Material can be any “web-browser capable” media. Complex-pages is better to open to a new browser window. Profiler itself does not contain any “plugins” or viewers. One example of Profiler with multimedia elements is described on: <http://imej.wfu.edu/articles/2000/2/01/index.asp> [Oulu: LC Profiler]

1.5 Questioning, Assessment, and Assignments

What provision was made by the LMS for student questioning and assessment and the design of student assignments?

We need to use assignments and assessment in a pedagogic framework. So, we use various types of assignments and assessment. Among these are multiple choice assignments and interactive assignments. Our credit courses use multiple-choice assignments, and ClassFronter has a built in multiple-choice tool. We have positive experiences with an assignment scheme in which the assignments are available from 9 to 12. Portfolio assessment is gaining attention from the educational authorities, and portfolio assessment is supported by student folders in ClassFronter. A folder may for example be open for two weeks. This has to be configured before course start. ClassFronter

provides no support or registration of grades. The tutors have to note and register grades manually. [Nettskolen: ClassFronter & CourseKeeper]

We provide some assignments in the courses. The students must write some essay-style e-mail messages to the tutor. The tutor then provides feedback via e-mail. Our tutors do not grade the assignments. We do not use online multiple-choice assignments. [Nettgymnas: CourseKeeper]

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 Webwinder (www.webwinder.com/quiz/quiz_MC_Ref.html) and others for development of 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: FirstClass]

A course includes a number of assignments that usually should be answered in the discussion forum. We have little use of multiple-choice assignments. We have several examination models, but all require that the students meet face-to-face at one of our four sites. Some exams are based on written reports that the students must present and defend orally. Other exams are traditional written examinations as well as oral examinations without written reports. [Danmarks Netskole: Self-developed]

Both TopClass and Blackboard are equipped with tools for Multiple Choice and other types of assignments. Assignments and questions are usually e-mailed to the tutors. In our Economy Program, the tutors grade the coursework during the course, but the final grade is exclusively based on a traditional exam. In our computer driver license courses we use a Swedish examination software (Autotest). [CFU: TopClass]

SESAM does not include any support on development of assignments. All assignments are designed with external authoring tools. We have used Javascripts and Dreamweaver for development of multiple-choice assignments etc. [NKI: Self-developed SESAM]

We use WebCT for assignments and assessment. It works well, is stable and effective, but the user interface is complicated for inexperienced tutors. [Midthögskolan: WebCT]

We include both multiple choice and tutor assessed assignments. [SSVN: Self-developed SSVN2000]

The Competence Network has tools for questioning, assessment and assignments, which are included in Saba. We also have tools that for example

could be used for development of assignment-supported training. This could for example involve apprentices in a company who need to complete on-the-job training in addition to ordinary courses. Our customers may have access to these development tools. The course material they develop could be hosted anywhere. These tools are integrated in Saba, and they function satisfactory. They provide for example features like time limits and system notices etc. The graphic tools are limited. [NKN: Saba]

Profiler's idea is based on project based learning and students' active production (like study project plan, study products/documents, discussion comments) and student's progress should be visible through this. There is no test tools or assessments tools. [Oulu: LC Profiler]

Our quality control system is based on multiple-choice tests, and LUVIT is well equipped to support this. [Skandia: LUVIT]

Student Support Tools

2.1 Interactivity Possibilities

What provision does the LMS make for student interaction?

The LMS systems seem to provide a lot of opportunities for student interaction:

In general, we have more technology available for training than we utilize. We basically train sales people who are very social. They do not ask for online communication, so we do not emphasize it. [Skandia: LUVIT]

We provide interactive content, e-mail communication, discussion forums, and chatting. [Nettgymnas: CourseKeeper]

Discussion forums seem to be of special interest:

Discussion forums are important to us; we typically organize one common and several minor discussion forums per course. The forum activity is dependant on how it is integrated with the assignments and the course requirements. A course requirement could be that the students have to post a number of comments to a forum. We try to minimize e-mail communication, because it entails a heavy workload. We are now testing web-cameras for video conferencing. It is too early to say if it will become a success. [Nettskolen: ClassFronter & CourseKeeper]

Globalskolen provides a common discussion forum, which is open to all our students. In addition we have about 28 discussion forums, one for each of the courses we teach. [Globalskolen: FirstClass]

SESAM allows us to establish asynchronous discussion forums. One class may have access to several forums, and several classes may have access to the same forum. The students must now enter their comments via a web-interface. Earlier, we allowed users to post comments to a forum via e-mail, but we decided to discontinue this service because of virus threats and the fact that a lot of error messages were generated since many students used several e-mail addresses during a course. However, students may read the forum messages both via the web and via e-mail. The students decide how often they prefer to receive messages from the forum via e-mail. [NKI: Self-developed SESAM]

Use of e-mail is also important, especially for institution with individual course progression:

We primarily rely on e-mail communication since students have individual course progression. However, we have established one discussion forum per course. My experience is that many students are reluctant to participate in the discussion forums. We have experimented with chatting channels without much success because the format does not really support our focus on individual time flexibility. [CFU: TopClass]

We use a shareware conferencing system. (Which one?). We also use FirstClass for internal communication among tutors. We also have discussion forums for students, but most of the communication is conducted via e-mail between a tutor and an individual student. Our students are reluctant to work in groups because of our focus on individual progression. [SSVN: Self-developed SSVN2000]

Chatting could be used for international communication to reduce costs:

The users have few problems with WebCT. The tools are integrated in one common user interface. The communication must be integrated into the assignments. The discussion forum is most important. We do not use chatting for within Sweden, but it is used for international communication when telephone calls become too expensive. [Midthögskolan: WebCT]

Other comments:

NKN does not develop the courses, so our LMS does not provide any interaction with the course material. However, the students may interact with Saba for tests and evaluations. The students may further utilize the support services in our LMS system. The users have to order courses and learning material via NKN. [NKN: Saba]

Interactivity with environment:

- Students can product study products, (template for project plan...)
- Students can form a student team (for common study product...)

- Students can make “internal links” to course pages
- Students can search from course documents

Interactivity with other students:

- Material comment tool on materials section. Commenting starts automatically comment discussion.
- Discussion areas for whole course or sub groups.
- Students’ can form teams and team (members) can have modify access to team’s own study products (documents).
- “Chat type” *Online café discussion area for socializing.*

On discussion text messages and study product documents student can see who has read his/her text. [Oulu: LC Profiler]

2.2 Online Student-to-student Communication

What facilities does the LMS provide for student communication (synchronous and asynchronous) to other students and how successful is it? Is both synchronous and asynchronous communication between students supported?

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 providesome form of chatting as a tool for synchronous communication. The experiences with chatting do not seem to be especially positive:

We use e-mail and discussion forums. Some courses apply chatting. We are also experimenting with voice chatting. For this we use Rodger Wilco chatting. See www.rogewilco.com. [Danmarks Netskole: Self-developed]

Most of the time we use asynchronous e-mail and forum communication. We have used chatting a few times, but it does not work well with more than 10-15 users. Chatting has to be chaired very well, and we have varying experiences on this. It is most useful for social purposes, for community building. I believe chatting will become more successful in the future when the technology for visual chatting and avatars is widely available. [Nettskolen: ClassFronter & CourseKeeper]

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. [Globalskolen: FirstClass]

SESAM does not support synchronous communication. This is an intentional choice, because it may limit the time flexibility that is a major, strategic advantage for NKI. SESAM provides a class list and optional personal presentations so that students may find information about each other that can stimulate collaboration. [NKI: Self-developed SESAM]

Other comments:

The Competence Network is not configured to support student-to-student communication. Such communication is handled in the actual courses that are organized by our course providers. It is not a problem to bundle NKN with synchronous or asynchronous communication tools. In fact, Saba has this functionality, but it is not visible for the users, because we do not present it on our web pages. [NKN: Saba]

Communication / interactivity with other students:

- Material comment tool on materials section. Commenting starts automatically comment discussion.
- Discussion areas for whole course or sub groups.
- Students' can form teams and team (members) can have modify access to team's own study products (documents).
- "Chat type" Online café discussion area for socializing. [Oulu: LC Profiler]

2.3 Online Student to Tutor and Institution Communication

What facilities does the LMS provide for student communication (synchronous and asynchronous) to the tutor ion to the institution's administration and how successful is it? Is both synchronous and asynchronous communication supported? Are these support services available 24 hours a day?

Technical and administrative support is a challenge that could be handled in various ways:

I handle the technical and administrative support. In addition, FirstClass offers a help desk that is available both for our students and me. The parents do not receive a user account, but this might be helpful for the youngest students. [Globalskolen: FirstClass]

The students may contact the tutors via e-mail and discussion forums. SESAM provides personal presentation of both the teachers and students. Technical and administrative support is handled by separate staff via e-mail and telephone during office hours. Some telephone support is available in the evenings and weekends. [NKI: Self-developed SESAM]

Our customers may contact our Customer Service Center on weekdays from 0800 to 1600. In all our customer companies, we have trained Super Users that answer most of the trivial questions from local users. The Saba software was first installed on a server at the University of Oslo, but Telenor now hosts it. They offer 24-hour support to guarantee that the system and communication lines are working. This solution seems to work well. [NKN: Saba]

Response time is also an important issue:

We guarantee students response from tutors in less than 48 hours. Our goal is 24 hours. The administrative staff handles administrative questions.
[Nettgymnas: CourseKeeper]

Other comments:

- On Profiler there is no one-to-one communication to student. Teacher can form discussion area without student access.
- Recently e.g. University's faculty of education has "rent" course space for two courses from LC Prof-company. There is e-mail support and advice available, however no 24 hour/day duty. [Oulu: LC Profiler]

2.4 Resources, Library, and References

What facilities does the LMS provide for student acquisition of resources required by the course, especially library resources and references to required readings?

In general, the systems seem to have limited use of library resources:

We do not provide any of these resources. [Nettskolen: ClassFronter & CourseKeeper]

The most common services are links to existing Internet resources:

The only resources we provide are links to internal and external Internet resources. [Nettgymnas: CourseKeeper]

Some courses include links to external online bookstores and library resources. Other courses include full text articles that have been published on the web. All our course content is designed with one version that is made especially to be read on screen and one version that students can print and read on paper. [NKI: Self-developed SESAM]

Today, a company may organize and include the resources and services they want. This has to be done by the responsible administrator in the company. An ordinary user is not allowed to do this. NKN collaborates with The National Office for Research Documentation, Academic and Special Libraries (www.rbt.no) in a project with the intention of integrating library services and databases with NKN. [NKN: Saba]

No direct integration to any university's system. Teacher can "build" some level integration, because Profiler is closed environment (personal UI and password) it is possible to link non-public (web) sources outside. [Oulu: LC Profiler]

Some institutions special services for their online students:

The school's online journal is used as 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. [Globalskolen: FirstClass]

The resources vary from course to course. The distance students have a special status as VIP-user to the library. [Midthögskolan: WebCT]

2.5 Feedback on work and Assignments

What is the quality of provision of feedback to students on their work and assignments?

Tutors seem to be pivotal with regard to feedback on work and assignments:

The tutors are part-time employed as online tutors. [Nettgymnas: CourseKeeper]

The tutors provide most of the feedback via personal e-mail to the students. The tutors may register the grades via the web. The online registration of each grade automatically increases the stipulated amount of money the tutor has earned. This amount is presented on the tutor's personal web page. The students have access to the grades obtain in all mandatory assignments in all their NKI courses via their personal web pages. [NKI: Self-developed SESAM]

Our tutors give students written feedback on their assignments, but they do not grade their work. Our students register for the national high school exams and receive their official grades and course diplomas from the national exams. [SSVN: Self-developed SSVN2000]

No automatic "feedback tools". Cause of the pedagogical idea, feedback comes from peers, tutors and teacher(s). Minimum level is that one can see that who has read ones input to the environment. [Oulu: LC Profiler]

Other comments:

The students are expected to answer more than half of all assignments connected to the course. [Danmarks Netskole: Self-developed]

NKN is not responsible for this; it is our partners that provide the feedback to the students. [NKN: Saba]

Tutor Support tools

3.1 Tracking Students - Database Questions

How user friendly is the LMS for tutors wishing to track their group(s) of students and retrieve data from the student database?

Some institutions do not express a need for tracking:

We have scarce information about how much training the employees have completed. We do, however, have a good overview on how they perform through sales reports etc. [Skandia: LUVIT]

But most systems seem to have some tracking included:

It is important to split the responsibilities among a number of people. We have administrative staff that handles technical support and a system operator who monitors the system. We do not need additional support services, since the number of users is still manageable. [Nettskolen: ClassFronter & CourseKeeper]

We have log-files that show which assignments the students have completed and how much time they have spent on the course. [Nettgymnas: CourseKeeper]

The tutor has access to a log-file that shows which web pages each of the students have opened. The tutor cannot automatically see which assignments a student has answered, unless the assignment is mailed to the tutor. We have a routine that requires the tutors to e-mail a reminder to students who have been inactive for two weeks. After three weeks, the tutor is required to phone the inactive students. [Danmarks Netskole: Self-developed]

TopClass tells us whether a student has accessed the learning material, which tests they have taken etc. We have also developed an e-mail based database system that holds information about the results from the student assignments. Whenever a tutor e-mails a student with a carbon copy (CC) to the systems e-mail address, text and header information is stored in the database. [CFU: TopClass]

WebCT is very good for tracking of students. We can for example check the individual students' quiz scores, how many times they have logged on, the last time they logged on, the number of comments they have read and written, and the number of pages they have read. [Midthögskolan: WebCT]

The Competence Network is designed so that all data and activities can be presented in reports. The reports are developed with a standard report generator

(Crystal Report). When a report is designed, the administrator only needs to click the correct menu option to see the report. The course activity can be listed for all courses that follow the AICC standard. [NKN: Saba]

There is a activity log for each student and teacher/tutor can “track back” when and what student has done and when. [Oulu: LC Profiler]

The following tracking system is especially interesting:

A tutor has typically somewhere between 50 and 200 students, and we have developed an internal LMS system (SSVN200) for student tracking etc. It is developed in collaboration with an external consultancy company. I will estimate that we spent 3-4 man-years of development work. We have no current plans to develop SSVN2000 so that it could be accessed via the Internet. As soon as a student is registered in a course, the information is available to the tutor. The tutors see a list of all students registered in their courses. A color code distinguishes between students who only have registered in the course, students that are on schedule according to their progress plan, and students who lag behind their progress plan. Each student has an individual progress plan that is entered into SSVN2000 by the tutor as a result of a telephone or e-mail discussion with the student. [SSVN: Self-developed SSVN2000]

Some interviewees focus on personal presentations:

The system provides a résumé, in which the students may introduce themselves for the other users. But in my opinion, the system does not provide a good overview with information about the other students in their class. [Globalskolen: FirstClass]

SESAM provides class lists including names, e-mail, and optional personal presentations. In addition, the tutors have access to reports that show their students' progression and grades. The system also tracks information about when the users log on. In addition, NKI personnel can access a number of detailed reports. They can for example see how many men and women who enrolled in all our online courses during the month of May 1996. [NKI: Self-developed SESAM]

3.2 Group Management Tools

What facilities are provided by the LMS to the tutors for managing their group(s) of students?

Comments on management of groups:

The staff handles group management and enrolment of individual students. To open a new course, the staff has to register all necessary course information. This includes information about the tutor (such as name, address, and payment

data) and information about the course (such as price, number of assignments, and grading system). In addition all resources associated with the course content must be mapped to the course homepage template. This usually means to establish links to the course units, the class list, the discussion forum, external resources etc. [NKI: Self-developed SESAM]

Groups are managed on several levels. We organize groups according to a company's units, departments, and divisions. Each group has a system administrator who manages and monitors the group. [NKN: Saba]

Teacher can form sub-groups with their own (local) tutors. Sub-groups may have their own discussion areas and info-pages. [Oulu: LC Profiler]

We can set up a new website for group-sessions. The tutor can arrange this. [Danmarks Netskole: Self-developed]

Comments on services available to groups:

CourseKeeper provides class lists, chatting channels, and discussion forums. The system administrator creates new users with individual passwords and gives them access to the course resources. This is done by creating an individual progression plan (studieplan) that defines all assignments the student should complete. This is somewhat cumbersome. [Nettgymnas: CourseKeeper]

We have established a general chatting service. Through this, each student may invite other users to chatting sessions. However, discussion forums have to be set up by a system operator. We are only two people who can do that. [Globalskolen: FirstClass]

TopClass provides a list of all students in the class. The list includes information about names, e-mail addresses, when they enrolled, and when they plan to finish the course. In addition, our CFU-database holds information about phone numbers, addresses etc. The CFU-database is available via a web-interface, but it is not integrated with the LMS and it is only available for the tutors. [CFU: TopClass]

3.3 Preparation of Questions and Assignments by Tutor

How successful is the LMS in providing tutors with user friendly and didactically successful tools for the design of student questions and assignments?

The system does not provide any tools for grading. [Globalskolen: FirstClass]

The NKI courses are designed and developed by a project team. This team designs the questions and assignments. The designers are more and more aware of how they should utilize the special pedagogical opportunities of the online environment in the development of questions and assignments. The tutors only

give feedback and advice on the assignments via e-mail and forum discussions. [NKI: Self-developed SESAM]

Our test tools have limited graphical capabilities, but questions can be included in several ways. Multiple-choice assignments with one correct answer, multiple-choice questions with several correct answers, lists, and open-ended questions. It is also possible to use alternative assignment tools as an integrated part of the system. We usually apply alternative tools, since it gives us more flexibility. [NKN: Saba]

Cause of the pedagogical idea, there is no special tools for e.g. questions, but whole structure is built to support solid web-studying. [Oulu: LC Profiler]

3.4 Course Planning for Students (Monitoring Pace)

What tools are provided by the LMS to tutors to enable them to monitor and plan student progress?

Some interviewees focus on the ability for teachers or students to follow the students' activity and progress:

The workbook feature is elegant. It allows the tutor to follow the students' progress and observe whenever a student contribute to a discussion forum or complete an assignment. [Globalskolen: FirstClass]

Tutors (and students also) can see other students' products (reflection) and they can see average (usage) activity. [Oulu: LC Profiler]

Other interviewees describes the administrative challenges of tracking students with individual progress plans:

NKI allows individual course enrolment 365 days a year and individual pacing over a two-year period. This is an administrative challenge for most institutions and SESAM is especially designed to handle this. It is, however, continuously improved to handle this more effectively. At the moment, the tutors have access to the assignment grades that give some information about student progression. We also run periodic reports that list students with no current course progression. We use these list to remind the students about the situation and encourage them to resume the work. [NKI: Self-developed SESAM]

The Competence Network has a function that allows the administrator to assign tasks and courses to individual users. It is possible to schedule the tasks with time limits and monitor the progress via standard reports or via an individual student's user profile. Whenever a student is assigned to a task, an e-mail message is automatically sent to inform the student. When the deadline is reached, the company's system manager receives a report that says whether the task was completed or not. In addition, NKN provides an opportunity to define a certificate based on a syllabus with assignments and deadlines. Everyone

required studying for the certificate receives an automatic message via e-mail or fax whenever they are set up to study for the certificate. NKN advises the companies to utilize these tools together with their traditional strategies for human resource management. [NKN: Saba]

3.5 User-friendly Administrative Systems between Tutor and Institution

What provision does the LMS make for successful tutor to institution communication?

The contact between tutors and the institution could be supported by special contracts, separate discussion forums, support services, face-to-face seminars, and training:

It is possible to dispatch messages to a group of users, for example all tutors. [Nettgymnas: CourseKeeper]

The tutors sign a contract that includes an overview 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 PaintShop Pro for design of graphic material. [Globalskolen: FirstClass]

In my opinion, the most important issue is how we organize the services for our more than 100 online tutors. NKI has a long tradition of organizing a discussion forum for the tutors, providing them with tutor training; face-to-face seminars, and various support services. [NKI: Self-developed SESAM]

Other comments:

This is not applicable for NKN. It is the responsibility of our partners, the course providers. [NKN: Saba]

No specific communication tools for that, but Profiler can import student lists (user account lists) from administration's systems. [Oulu: LC Profiler]

Administration (Student Database and Records)

4.1 Enrolment Procedures and Fee Paying

What facilities does the LMS provide for student enrolments, course allocations and payment of fees?

Some institutions have no need for integration with the economy system:

I see no need for integrating WebCT with our economy systems. [Midthögskolan: WebCT]

The employees do not pay anything for the courses. [Skandia: LUVIT]

A few have fully integrated systems:

Whenever a student enrolls in a course, one of the staff members registers all necessary student information in STAS. This includes name, address, and e-mail information. The system then automatically generates an e-mail to the student with the user ID and a personal password. Then an invoice, textbooks and other learning material are sent to the student. SESAM is integrated with the economy system AGRESSO. As a result of this, students who not pay the tuition fees will automatically lose access to the online course resources. The students may choose to pay the tuition fees up front or in installments. [NKI: Self-developed SESAM]

Online payment could be implemented:

The textbooks are included in the tuition fees and we have established a system for online payment via credit cards. The economy system we use for tuition fees is not integrated with our LMS. [CFU: TopClass]

Most of the institutions have separate economy systems with no integration with the LMS. Some, do however, express ambitions and needs for such integration:

ClassFronter does not provide any economy support, and it is not integrated with Nettskolen's economy system. The company behind ClassFronter has signed a framework agreement with the Norwegian colleges and universities in which they have pledged to integrate ClassFronter with the two student administrative systems (MSTAS and FS) that are most common in Norwegian higher education. [Nettskolen: ClassFronter & CourseKeeper]

Students buy textbooks in a local bookstore. Laboratory equipment is shipped from the main office. Invoices, salary, and other economic transactions are handled by a separate system, which is not integrated with CourseKeeper. We do not provide online credit card payment. [Nettgymnas: CourseKeeper]

FirstClass is not integrated with our economy systems. Tuition fees etc have to be handled by a separate economy system. [Globalskolen: FirstClass]

There is no integration between our LMS and our economy system. One of the reasons for this is security; hacking students should not be allowed to access the economy system. An integration of the two systems could reduce the workload and enhance the data quality a little, but I don't regard this as important. [Danmarks Netskole: Self-developed]

There are no economy functions integrated in SSVN2000. The students only pay for the course material, they do not pay any tuition fees. The tuition is financed by the Swedish state and paid by the local school authorities. The Swedish authorities are discussing a reform that will provide all employees with a personal account for further and continuing education. According to the discussion, the employees will accumulate some money that they are entitled to use on further and continuing education. [SSVN: Self-developed SSVN2000]

NKN has special needs:

NKN has several enrolment procedures. It includes online enrolment to face-to-face courses with information about alternative dates, locations, available seats, and waiting lists. If there are many alternative courses, the search function could be useful. Customers with special privileges will be recognized during online enrolment. When NKN receives the enrolment, a message is sent to the course provider. The course provider must confirm the enrolment. Course providers that rely on approval of applications and need to check the student's qualifications cannot accept automatic enrolment. The customers and the students pay all fees to NKN. They receive an invoice from NKN. Then NKN pay the course providers for their courses and services according to a contract that defines NKN's course commission. The enrolment procedures and payment is described in a detailed contract between NKN and each course provider. [NKN: Saba]

Look 3.5. There is user account (license) counter etc. [Oulu: LC Profiler]

4.2 Passwords and Security

How successfully does the LMS handle student access to the system and the security of all student interactions with the system?

Most of the institutions provide students with individual passwords. There are, however, some exceptions:

All students in a course share one common password. [SSVN: Self-developed SSVN2000]

Most institutions seem to be pleased with their password systems:

As far as I know, ClassFronter handles passwords and security without any problems. Initially, all students in a course receive the same password, but they are required to register an individual password the first time they log on. [Nettskolen: ClassFronter & CourseKeeper]

CourseKeeper supports individual passwords. We have not experienced any problems with the password system. [Nettgymnas: CourseKeeper]

There are diverging opinions on the workload generated by students who forget their passwords:

I generate individual student the passwords and distribute them via e-mail. I have few requests from students who forget their passwords. [Globalskolen: FirstClass]

We have more than 3000 online students, and we have had too many questions from students who forget their user ID and password. We believe that the number of questions could be reduced improving our password information and routines. [NKI: Self-developed SESAM]

It is also necessary to have a strategy for terminating accounts:

Each student has an individual password that is valid for 18 weeks. After 18 weeks, the password is automatically void, unless the student has applied for an extension. The password provides access to all course resources associated with all courses a student is enrolled in. [Danmarks Netskole: Self-developed]

Other security issues that were mentioned are listed here:

Unfortunately, a discussion forum could be an effective channel for distribution of virus. To reduce this menace, the users can only enter comments in a forum via a web-interface; it is not possible to enter a comment via an e-mail message. For the same reason, we usually not accept file-attachments in the discussion forums. [NKI: Self-developed SESAM]

SSL encrypted HTTPS connection and personal user ID + password, firewall, no direct access to database...[Oulu: LC Profiler]

User management presents a heavy workload. The tutors seem to do as little as possible with this. I receive a record of registered students via e-mail and convert it to a WebCT compatible file via an Excel program. The program generates user Ids and passwords. I suppose our administrative staff could have handled this. The procedure is manageable as long as we support fixed enrolment dates. But we discuss if we should allow individual enrolment dates, which will require a more efficient system. [Midthögskolan: WebCT]

All users receive personal user identification and a password that must be changed periodically. Individual users are registered immediately. Registration of a large group of users in a company can be handled automatically through a migration process. The users have restricted access to functions and courses when they log on. Only the NKN system administrators have permission to change these. The system security is good. The course providers usually handle the access control and security related to courses. But when a course follows the AICC standard, user identification and password information is shared between NKN and the course application. If a course does not follow the AICC

standard, the user needs two passwords, one for NKN and one for the course. AICC-integrated courses can be moved between LMS-systems. Saba is committed to the AICC-standard. Alternative standards are SCORM and IMS. [NKN: Saba]

4.3 Student Records Database

How successful is the system's student database, especially for data storage and data retrieval?

Some systems seem to have well integrated student records databases:

NKI has an excellent student records database. We do for example know the exact number of enrolled students in any course on any day. As another example, we can get demographic reports on students in all courses in any period of time. [NKI: Self-developed SESAM]

We do not issue any diplomas or certificates. CourseKeeper provides a logging function. It is possible to create an individual progress plan. Whenever a task is completed, it is transferred from the progress plan to the CV-file. This functionality is of special interest to the corporate sector. [Nettgyrnas: CourseKeeper]

In general, all data about the students and their competency record is included in the database. The data we record about a student's course progression is: course description, time spent on course, status (active, not started, passed, and failed). The availability of the data depends on whether the actual course is AICC integrated or not. NKN also records self-assessment, supervisor-assessment, and peer-assessment that are conducted to assess the company's competency profile. All course enrollments are recorded and available in various reports. It is not possible for me to give a comprehensive answer with regard to which data we record and whether they can be recollected. It is a significant difference between the data the individual user can access and the data NKN can access. We enter and log much information about the users that we later may access. It is important to realize that we have three levels of access to the data: Users, company administrators, and NKN administrators. Each category has access privileges that define their capabilities and the data they may access. [NKN: Saba]

Other institutions had to develop separate databases:

We have developed an Access database, which is not integrated with FirstClass. It holds information such as Names, addresses, telephone numbers, passwords, tutor names, enrolment dates etc. Unfortunately, I have to work with two different systems that are not integrated since FirstClass cannot handle the data in the Access database. [Globalskolen: FirstClass]

We have developed a separate database system for logistics, student registration etc. The system is accessible via a web-interface, but not integrated with the LMS. We are also required by the Ministry of education to use some additional student administrative systems that are not integrated with our LMS. [CFU: TopClass]

Some want to integrate the LMS with the student administrative systems:

Our student administrative systems are not available via the web, but we have established a project to see what we could do with this. [Mithögskolan: WebCT]

We see it as a major challenge to integrate LUVIT with our other administrative systems such as for example our personnel administration system. [Skandia: LUVIT]

Other issues:

When course ends it is possible to export user's products (texts) from Profiler e.g. archiving purposes on HTML-format. (e.g. to burn to CD-R) [Oulu: LC Profiler]

4.4 Examination and Certification Records

What structures are provided for recording of data and results leading to examination and certification?

Some systems do not include examination and certification records:

No such tools. Assumption is that there is always some kind of face-to-face parts and other activity involved. [Oulu: LC Profiler]

The tutors provide individual feedback to the students via e-mail. [Nettgymnas: CourseKeeper]

The interviewees are concerned about privacy issues and how much information the systems can handle with regard to examination and certification records:

In Denmark, we are not allowed to present final grades on the Internet, so we have to print and mail the grades to the individual student. [Danmarks Netskole: Self-developed]

The tutors may register grades for individual assignments online, and the students may view their grades online. [NKI: Self-developed SESAM]

The results achieved by the class are available in WebCT. Final grades can be entered, but this is not integrated with our student administrative system. I have heard that WebCT has been integrated with student administrative systems in the US, but the integration is not available with the student administrative system that is used by most of the Swedish universities and colleges. [Mithögskolan: WebCT]

The results from AICC-integrated courses will automatically be logged and entered in our database. The results from face-to-face courses are entered manually. The recorded results are available for the individual user and the company administrators if the user agrees. [NKN: Saba]

4.5 Course, Class and Tutors Database

What facilities are provided for administration of courses, classes and tutors?

Positive statements:

The SESAM database is excellent and holds all necessary information about courses, classes, students, and tutors. The NKI staff access the database via special administrative interfaces where they enter data and find information. Many standard reports are available, and special reports may be defined with SQL requests. [NKI: Self-developed SESAM]

CourseKeeper provides a number of search and sort facilities. It is based on meta tagging according to the SCORM standard. See inspera.no for more information on standards. [Nettgymnas: CourseKeeper]

Negative statements:

ClassFronter is not good for administrators that need an overview of data related to all courses, all students, all tutors etc. [Nettskolen: ClassFronter & CourseKeeper]

TopClass is not especially suitable if we want to get an overview over all courses and resources associated with the courses. Our CFU-database, you may call it a help-desk, is developed to present the additional information we need. [CFU: TopClass]

Other statements:

This is a very complex issue. Registration of courses, classes, and tutors are handled according to various models. A face-to-face course is registered different from an online course since they represent two different models. For a face-to-face course, we need to register information about venue, date, number of seats etc. This is not applicable for online courses. There are also differences between a CD-ROM based course and online courses even though the content could be exact the same. A CD should be shipped via land mail and so we need

data related to a provider, an address database, and an economy system. The system has convenient features for cutting and pasting that support efficient data entry. This is especially handy when for example identical courses are offered at several locations. In addition, a registration is linked to resource planners, waiting list features, and cancellation options. Every registration may have an attachment. A course description can for example be attached as a word document. This functionality makes the system very flexible. [NKN: Saba]

Profiler's basic structure supports certain web-based study model. (sub-groups, milestones for project work...) [Oulu: LC Profiler]

We have three employees who are responsible for development and administration of all our courses. In addition, we have more than 50 part-time engaged specialists who teach the courses. We are responsible for training of 1000 employees in Sweden and some more in Norway and Denmark. The course content may need some national adaptation due to national legislative differences. [Skandia: LUVIT]

Technology

5.1 Server - Hardware and Software Options

What is the quality of server hardware and software options? How is the system integrated with existing software?

There seems to be three categories of server solutions:

- A. Access to a commercial service provider that hosts the LMS for the institution
- B. The institution itself hosts the LMS for internal use
- C. The institution itself hosts the LMS for internal use and as a service for other institutions

The institutions that have access to a commercial service providers that hosts the LMS.....

Here are some examples of their experiences:

We access ClassFronter from a host computer at the University of Oslo. This is satisfactory for the users, but our ICT department is not rally happy with the solution. [Nettskolen: ClassFronter & CourseKeeper]

We have remote access to CourseKeeper via Boxer's service wich is hosted by Telenor. We experience some problems with this limited access. There are for example some problems related to fire walls and file transfer via FTP. [Nettgymnas: CourseKeeper]

We have chosen to use the FirstClass provider as a host for our system. The server is situated in Oslo. This is suitable, since they are responsible for the operation of the hardware and software solutions. We experience only a few limitations because we are not running the server ourselves. Our mother organization, Norsk Nettskole, is developing PedIT, a tailor-made LMS. This is hosted on our institutions server in Ålesund. Norsk Nettskole will probably offer PedIT as a host system for other providers of online courses in the future. At the moment, we use PedIT for their online school journal and some other resources and we will probably migrate Globalskolen to PedIT as soon as it is as good as FirstClass. In my opinion, PedIT is already better than FirstClass with regard to student administration and publication of course content. [Globalskolen: FirstClass]

The Competence Network could be integrated with external software applications. But if an application is not AICC-compatible, it is necessary to make the necessary adaptations to the standard. For many applications, this means that it is necessary to write a script for data exchange. [NKN: Saba]

SKANDIA-data, which is now acquired by IBM, is operating our LUVIT-server. So, we need to communicate with both the technical support staff at IBM and our users. [Skandia: LUVIT]

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.

Here are some statements about the commercial systems:

We have installed TopClass on a local CFU server. It has been extraordinary stable, with very little need for special attention. We will also install BlackBoard on a local CFU server. [CFU: TopClass]

Our ICT-department is responsible for the operation of the WebCT host, but they do not provide technical support. There is a Help Desk function in WebCT that we could use for technical support. Ove.Olander@mh.se is in charge of the host system operation. In my opinion this works very well. There is no common policy or strategy on LMS systems in at Midthögskolan. As a result of this, the college also utilizes FirstClass as a general information channel for the Department of Media and Communication and LUVIT for five courses in miscellaneous courses provided by other departments. It is possible that newly established Swedish Network University organized by DISTUM (<http://www.distum.se/>) could impose a common strategy on LMS systems in the Swedish universities and colleges. [Midthögskolan: WebCT]

Here are some statements about the self-developed systems:

We have an internal server that runs SESAM. In addition we have a separate server for system development. The system has been stable and reliable. The

most serious problems we have experienced have been related to the firewall and to virus attacks. [NKI: Self-developed SESAM]

All our server systems are hosted and managed in-house. We experience few operational problems. We have no technical support services available during weekends or in the evenings. [SSVN: Self-developed SSVN2000]

A few institution hosts the LMS for internal use and as a service for other institutions. Here are some of their experiences:

We have just recently installed a local server for our new LMS system. The server is located at Fredericia-Middelfart Tekniske Skole, but it serves all three partners. We are now discussing if we can provide service and support 24 hours a day. At the moment we offer full service and server support on weekdays from 0800 to 2000. In addition we have a user support service, which is available weekdays from 0800 to 1500. The service and support cost is shared among the tree partners. [Danmarks Netskole: Self-developed]

- LC Profiler is (now) offered as service. User (student/tutor/teacher) needs just www-browser. No specific integration or restrictions, use of file formats etc. depends on a course.
- There is always some bugs on systems, but Profiler as been on use several years now and it is working quite good and smoothly. [Oulu: LC Profiler]

5.2 Client - Hardware and Software Options

What is the quality of client hardware and software options? Does the system permit metatagging?

The institutions seem to differ on how much they rely on necessary client software. Several institutions seem to minimize the need for additional client software:

Most of our courses do not require any special client software. Some of the courses, such as for example computer programming courses, require the students to install special software for programming etc. [Danmarks Netskole: Self-developed]

There is no TopClass client that should be installed on the students PCs. Neither do we rely on other software or plugins that students have to install on their local PCs. [CFU: TopClass]

We want our courses to be accessible to as many students as possible, so we develop courses that can be used with the low-end PCs with no more software requirements than common e-mail and browser software. When we use multimedia elements that need special software or hardware, it is usually as an

optional extra, not a required part of the course readings. [NKI: Self-developed SESAM]

The students are required to use up-to-date web browsers with cookies activated. We have no special requirements on bandwidth. The students may use ordinary modem lines. [SSVN: Self-developed SSVN2000]

LC Profiler is (now) offered as service. User (student/tutor/teacher) needs just www-browser. No specific integration or restrictions, use of file formats etc. depends on a course. [Oulu: LC Profiler]

Some courses and subjects obviously needs additional client software:

WebCT does not require any client software, but some courses may require special software for statistics etc. I teach courses in statistics that rely on statistical PC-software such as SPSS and MiniTab. The students must buy student licenses and download the software from the Internet. [Mithögskolan: WebCT]

And other systems and courses rely with more or less success on additional client systems:

All software is located on our servers. This is sometimes inconvenient, since our employees are not always able to connect to the system. The sales people are for example not yet online when they visit our customers. [Skandia: LUVIT]

We have varying experiences with client software. We taught, incorrectly, that everyone could read Word and PowerPoint files. We have also experienced some problems with PDF-files, ShockWave plugins, and large files. [Nettskolen: ClassFronter & CourseKeeper]

The students need to install plugins for CourseKeeper, Authorware player, and Flash Player. They also need a relative new PC and at least ISDN capacity. [Nettgymnas: CourseKeeper]

We recommend that the students install and use the FirstClass client software. Without it, FirstClass does not work well. Installation of the client software introduces technical problems and we loose potential students that are not able to install the client software. A few students use MacIntosh computers, which has resulted in technical problems for us. [Globalskolen: FirstClass]

The Competence Network uses client software that is installed on local PCs for system development and management. We use the client software to communicate with the database. The clients enhance the security, but reduce the flexibility. Kometansenettet adheres to the AICC-standard for meta

tagging. That is with regard to exchange of information between course applications that are developed in different systems. Meta tagging is more important for the course content than it is for the LMS. [NKN: Saba]

Currently no meta tags on use. (No need for those yet. Technically it is possible to build and utilize meta tags (Profiler is based on a SQL-database system). [Oulu: LC Profiler]

5.3 Flexibility of Didactic Structure; Updating, Adaptability

Is the didactic structure flexible or is it determined by the technology? How adaptable is the technology to updates and to new technology that becomes available to the market?

The course content has to be updated regularly:

The course content will be updated every semester, but simple updates of links etc. are handled during the semester. [Nettgymnas: CourseKeeper]

Profiler has a certain pedagogical approach and idea. Company's other product LC Team is "modular based" and it is more like "neutral tool". Profiler is a typical web-based service and there are (minor) updates regularly (net connection improvements etc.). [Oulu: LC Profiler]

Templates and standards influence the flexibility:

Our courses are based on a template that gives all courses a common look and feel. The use of templates reduces the course development time and sets a standard for acceptable course quality. On the other hand, it is not easy to deviate from the standard template if the designers need any special features or elements. But if a request for changes to the template is widely supported, we may improve the templates and even the SESAM system, since we develop and maintain the system in-house. [NKI: Self-developed SESAM]

In general, one may say that technology that adheres to e-learning standards should be both flexible and adaptable. Proprietary solutions, on the other hand, could be hard to integrate and adapt to other systems. Saba or NKN does not define the didactic structure. We assume that it is not easy to update the technology Saba is based on. We know that an updated version of Saba will imply a large challenge for us since we have made many local adaptations and changes to meet the needs from Norwegian companies. Updating to a new version of a commercial LMS system is probably much easier for institutions that don't need to conduct any local revisions. [NKN: Saba]

5.4 Limitation of Size (Number of Students, Courses, and Tutors...

How satisfactory is the LMS for handling varying numbers of students, courses, and tutors? How does it cope with 100, 1000, or 10000 students and large course databases?

The interviewees did not seem to be concerned about how the systems effectively could organize the administration of large numbers of students, courses, and tutors. One mentioned, though, that large-scale operation could impose some pedagogical challenges:

Courses pedagogical idea (usually) limits sensible number of students, not technology. [Oulu: LC Profiler]

The interviewees are confident that the systems can handle a large number of users without special technological problems. The following statements provide the evidence:

We have a site license for 1,500 users. The number of licenses may be changed when needed. This is a result of a standard contract between ClassFronter and the Norwegian higher education sector. [Nettskolen: ClassFronter & CourseKeeper]

We have not experienced any technical problems. [Nettgymnas: CourseKeeper]

The system capacity is not a problem. I cannot see that we will reach any significant capacity limitations in the foreseeable future. [Danmarks Netskole: Self-developed]

We have paid for a TopClass license that can handle 200 simultaneous users. This is more than enough to handle 1000 students. [CFU: TopClass]

SESAM was developed as a system that should handle thousands of students and hundreds of courses. As a result of this, we will not experience any capacity limitation in the foreseeable future. [NKI: Self-developed SESAM]

There are no limitations with regard to the size of the system, as long as the server has the necessary capacity. I believe the University of British Columbia had 30,000 users. [Mithögskolan: WebCT]

We have no technical limitations with regard to the number of courses and students we can support. [SSVN: Self-developed SSVN2000]

Saba and NKN can easily handle several thousand students. This is because the course content usually not is located at our server. NKN is designed as the students' entry point, but they are diverted to the course provider's server as soon as they access the actual course content. This shows that we handle this very differently from a traditional course provider. We may say that NKN primarily handles management of courses and learning material. Course development and teaching is usually not handled in our learning management system. [NKN: Saba]

There are thousands of users accounts on a (same organizations) database with no problem. Server system is clustered with load balancing and response time on many simultaneous users is good. [Oulu: LC Profiler]

5.5 Speed of System

How is the speed of the system and student satisfaction? How does it cope with downloading courses and high bandwidth materials?

The speed of the LMS system does not seem to be any problem. The bottleneck seems to be the network bandwidth and local lines:

We recommend that the students at least should have ISDN bandwidth. [Nettgymnas: CourseKeeper]

The required bandwidth is a minimum of a 56K modem or ISDN. [Danmarks Netskole: Self-developed]

We have experienced some technical problems due to unreliable Internet services in some underdeveloped countries. [Globalskolen: FirstClass]

We state that our users may use any kind of Internet connection. We experience that some users have problems with firewalls, and it is often difficult to find out how to handle the firewall problems. [Nettskolen: ClassFronter & CourseKeeper]

Due to the bandwidth limitations, several of the institutions limit their use of high bandwidth content:

Our courses are developed so that modem users can access them. We do not rely on multimedia elements etc. that requires much bandwidth. [CFU: TopClass]

Since we are not relying on heavy multimedia elements that require high bandwidth, we experience few problems and little dissatisfaction related to speed of the system. [NKI: Self-developed SESAM]

We have no courses that requires more bandwidth than you can get from a modem. [Mithögskolan: WebCT]

- Usually the bottleneck is “on the way” and if course uses high bandwidth material or special multimedia it is good to store this to local server (near students) and make “internal” links to Profiler. – So, Profiler is the place to study, comment etc. and one can e.g. watch net video from local server.
- In my opinion same thing in use of any Internet environment. [Oulu: LC Profiler]

The Competence Network does not require much bandwidth. It may take some time to see the complete course catalogue if it comprises several hundred courses. But few companies subscribe to so many courses. The courses vary a lot with regard to bandwidth requirements. The variation is so broad that it is difficult to give a clear answer. In general, this is not a problem since we check that the companies have the necessary bandwidth to match the course requirements. It is also worth to mention that it could take much time to download plugins and players the users must install on their local PCs. But this is only necessary the first time they access the course, and it does not apply to all courses. [NKN: Saba]

Price

Inst	6.1	6.2	6.3	6.4	6.5	Total
Nettskolen	NOK 250,000- 300.000 per year					
Nettgymnas	Restricted		NOK 4,000 per course	Restricted		
Globalskolen	NOK 98.000 per year		NOK 1- 2,000 per course			
Danmarks Nettskole	DKK 400.000	DKK 50,000 per year for support	75% free DKK 1000- 1500 per course			
CFU	DKK 28,000 per year	???	DKK 850 – 1,350			

			per course			
NKI	0	0				
Midthögskolan	SEK 40,000		0			
SSVN	0	0				
NKN	Confidential	Confidential				
Skandia						
Oulu						

Company can offer training e.g. via partners.

Rough estimate (average prices):

NOTE: Prices are for Profiler service. No extra costs to user for own servers and maintain. It is good to remember TCO in this area also.

Pricing is “progressive”. More you use cheaper it is / user.

<i>User account:</i>	<i>30 EUR / year</i>
<i>Start course space:</i>	<i>400 EUR</i>
<i>Tech. and pedagogical on-line support for a course teacher Profiler]</i>	<i>800 EUR / year [Oulu: LC</i>

6.1 Cost of the LMS

What is the cost of the LMS to the institution?

The price we pay depends on the number of users. It totals about NOK 250,000 – 300,000 per year. It includes both the LMS software and all necessary server hardware and software. This is a good price for what we get, but the economy section at Gjøvik College thinks it is expensive. The distance education students must pay NOK 2,000 – 3,000 per credit for a course at Gjøvik College. Nettskolen operates with other tuition fees, since they sell their courses to companies and organizations. [Nettskolen: ClassFronter & CourseKeeper]

Restricted information [Nettgymnas: CourseKeeper]

We pay NOK 98.000 per school year for our use of FirstClass. This includes:

- Establishment fee: 10.000

- User fee (max 400 users): 27.000
- Web-structure and web-publication: 25.000
- Training: 24.000
- Misc.: 12.000

All in all, we perceive this as a reasonable price for the services we receive, but the training and web-structure components should maybe be less expensive. In comparison, we only have development costs associated with PedIT. Two part-time system developers handle most of the development internally.
[Globalskolen: FirstClass]

The total cost for our LMS is DKK. 400.000. [Danmarks Netskole: Self-developed]

We pay 28.000 DKK per year for TopClass. In addition we use less than that amount on internal resources such as training and systems operation. [CFU: TopClass]

Since SESAM is developed by NKI, the only significant cost is related to server hardware and software, and to the six-person development team. In addition to systems development, they work with maintenance, support, course development etc. [NKI: Self-developed SESAM]

I guess the site license is about SEK 40,000 per year. We expect some income from our Swedish translation. [Midthögskolan: WebCT]

Altogether we have 75 full-time employees. Three of them are web-technicians and three others are working in the ICT-department. [SSVN: Self-developed SSVN2000]

The price NKN pays for Saba is confidential information. The price a company pay for the NKN services mainly consists of three elements: A one-time implementation fee, a fee per course, and a yearly fee per user. The implementation fee depends on the implementation model. For maximum flexibility, we normally charge NOK 1000 per hour for implementation. Then a company can decide how much functionality they want to implement. But a minimum implementation will take 20 hours. Since NKN is an intermediary for other course providers, the fee per course varies a lot. The customer companies pay for the courses they want and a large volume results in rebates. NKN has negotiated contracts with the course providers that regulate the commission NKN receives when our customers buy courses. The yearly fee per user depends on the volume, but generally it is about NOK 300 per year. [NKN: Saba]

We pay SEK 200 per user per year for a LUVIT-license. The total sum is SEK 200.000 per year. In addition we spend much more money on adaptation and administration of the system. [Skandia: LUVIT]

6.2 Annual Fee

What fees have to be paid annually for the system by the institution?

It is free of charge, but we must support it. I guess the support costs us about DKK 50.000 a year. [Danmarks Netskole: Self-developed]

The tuition fees are DKK 850 per course for the PC Drivers license courses are, DKK 1,350 for the economy courses. This gives us a small surplus after we have paid the wages for 1.5 fulltime employees and 2-3 part-time employees. Some externally funded development projects, such as the Virtual Library project, give us extra income. [CFU: TopClass]

We do not pay any annual fee since we have developed SESAM in-house. [NKI: Self-developed SESAM]

The courses are free, but the students must pay for the software they need. [Mithögskolan: WebCT]

We have a self-developed LMS system, so we do not pay any annual fee. [SSVN: Self-developed SSVN2000]

This is confidential information, which we cannot provide. [NKN: Saba]

6.3 Student Enrolment Fee

How do fees to use the LMS vary when the student base is 100 students, 1000 students, and 10000 students? Is online invoicing available?

Online invoicing is not available. [Nettskolen: ClassFronter & CourseKeeper]

The students pay about NOK 4,000 per course. In addition they pay about NOK 500 for the textbooks included in a course. [Nettgymnas: CourseKeeper]

The students pay NOK 4000 per year for 3 courses. They may also enroll in individual courses. Then, the prices are NOK 2000 for the courses in Norwegian, NOK 1000 Social studies, and NOK 1000 for Religion and ethical subjects. In addition to the student fees, we receive NOK 1 million per semester from governmental project grants, but we need to find other sustainable sources of income when the project grant discontinues. The external grant covers the wages. [Globalskolen: FirstClass]

About 25 percent of our students pay tuition fees. They typically pay somewhere between DKK 1000 and 1500 per course. The Ministry of Education pays the entire tuition fee for the remaining 75 percent of the students. All students have to pay for textbooks and other course material. [Danmarks Netskole: Self-developed]

Since we have developed SESAM in-house, there is no additional cost for more students unless the system requires more bandwidth or additional hardware upgrades. [NKI: Self-developed SESAM]

NKN does not use online invoicing. All fees are registered manually and the invoices are printed and mailed to the customer companies. Saba has an option for dispatching invoices via e-mail, but we have not utilized it and not explored how it could be applied. [NKN: Saba]

6.4 Maintenance Costs: Staff Involved in Management, IT Specialists, Trainers, etc

What is the maintenance course to the institution of the LMS and what staff resources are need to maintain it and keep it functioning?

Restricted information [Nettgymnas: CourseKeeper]

This is very hard to estimate since SESAM is integrated in the daily work of everyone at NKI Distance Education. [NKI: Self-developed SESAM]

Maintenance cost is a very complex issue since there are people working with maintenance in NKN, Saba, and sometimes a small company named Apt. NKN does not provide teaching and consequently has no expenses on teachers, course designers, etc. [NKN: Saba]

6.5 Training of Teachers, Learners and System Users

What costs are involved in staff and student training to use the LMS system?

There are no external costs associated with training of learners or tutors. The tutors must complete the online course Tutor in distance education before they can start teaching online. The course is developed and taught by NKI. [NKI: Self-developed SESAM]

We have no inventory of the time and money spent on training. We have however spent much time building our internal competence on operation and management of our implementation of the Saba system. And we cannot claim that the training period is finished even though we have worked with the system for more than a year. [NKN: Saba]

Overall Evaluations

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 book selves. [Nettskolen: ClassFronter & CourseKeeper]

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 vice, if we had chosen LMS 2 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. [Nettgymnas: CourseKeeper]

In my opinion, the three important LMS-functions are: publication, administration and collaboration. In addition, the system should be easy to use. [Globalskolen: FirstClass]

We have an economical 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 an 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. [Danmarks Netskole: Self-developed]

We have been very satisfied with TopClass. The graphic layout is somewhat old-fashioned, but it provides most of the functionality we need. I recommend the KISS-model, Keep It Simple S....[CFU: TopClass]

SESAM is 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 administrative systems and economy systems. [NKI: Self-developed SESAM]

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 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. [Mithögskolan: WebCT]

We focus on distance education, which is not necessarily the same as web-based education. [SSVN: Self-developed SSVN2000]

The questions were difficult to answer, since we use the LMS different 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, the questions are hard to answer because it is necessary to distinguish between the Saba system and NKN's application of the system. Finally, it is important to understand how e-learning standards may influence on your options and decisions. The standards provide both opportunities and restrictions. It is therefore important to find the right balance between standards and freedom. [NKN: Saba]

As a user (teacher/tutor) I think that Profiler is good for longer “academic style” studies for adult learners. ‘Cause of it’s pedagogical idea. (open and flexible learning/ project pase learning”). Teacher must know (and accept) what is the basic idea for the course structure and after that Profiler supports work very good. - If one uses Profiler very differently, there is some “unnecessary “ functions what may confuse users. As it is offered as service starting a course is easy. As well as “building” own course to a system. [Oulu: LC Profiler]

The LUVIT tools are not especially developed for corporations like SKANDIA. It is 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 past material in LUVIT. [Skandia: LUVIT]

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

Features in Future LMS Systems

What features would you like to see included in this LMS in the future?

Some would like to include new features:

I would like to see a better integration between the 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. [NKI: Self-developed SESAM]

Some would like more flexible solutions:

My vision is that colleges should not become provider 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. [Nettskolen: ClassFronter & CourseKeeper]

I would like to see a more flexible system. We sometimes feel too dependent on Boxer's structure and thinking. [Nettgymnas: CourseKeeper]

In the future, I hope we will have less complex LMS-systems with better solutions for exchange of data between other systems. [Globalskolen: FirstClass]

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 to exchange learning units between courses, programs and companies. [NKN: Saba]

Several would like more use of multimedia:

In the future, I would like to see better voice chat and video conferencing services – useful for end users with limitation of ISDN-connections. [Danmarks Netskole: Self-developed]

In the future, I would like to see that all users have more bandwidth so that we can provide more advanced multimedia material. [CFU: TopClass]

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. [Midthögskolan: WebCT]

Others wanted more user-friendly systems:

Actually, I would like to make some things simpler to use logically and technically. As I belong to group what is developing Profiler and it's new versions, there is direct way to development. [Oulu: LC Profiler]

LUVIT provides many more opportunities and features than we actually can or need to include. But, 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. [Skandia: LUVIT]

Other comments:

To inform you right, I'd like to say that I am related to the company LC Prof, but I wrote my evaluation based on my experiences as user of the system. [Oulu: LC Profiler]

Discussion and Conclusion

There are indications in this preliminary analysis that the following issues are important:

- Scandinavian institutions seem to prefer LMS-systems developed in their home country.
- The institutions seem not to be especially faithful to one system. Several of the institutions had changed system, planned to change system, or operated secondary systems.
- Several of the institutions preferred self-developed systems.
- The integration between the LMS systems and the student administrative systems were relatively poor.
- The integration between the LMS-systems and the economy systems were very poor.
- E-learning standards do not seem to have had much impact on online education in Scandinavia so far.
- There is some evidence that related or collaborating institutions tend to choose the same LMS system.
- LMS systems do not seem to be used much for content creation. A host of other tools are used for content creation.

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Appendix A. Interview Guide

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