

COMPREHENSIVE ANALYSIS OF EXISTING LEARNING MANAGEMENT SYSTEMS (LMSs)

Name of institution:	NKI Distance Education
Type of institution:	Distance Educations Institution
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Name of training manager:(Optional)	Morten Flate Paulsen
LMS used:	In-house SESAM 4.0
URL of LMS:	Not available.
Language of LMS:	Norwegian
Number of years in use:	This is the fourth generation of a system that has been developed by evolutionary systems development over 15 years.
Other LMSs used:	None
Number of students in the system:	About 3300
Number of courses available:	About 250
Typical duration:	6 months
Number of tutors in the system:	About 125

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 recognised 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 was probably the first European online college, and it has offered distance education online since 1987. Few, if any, online colleges in the world have been longer in continuous operation. NKI 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 characterised 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.

This analysis is divided into six parts.

1 Course development tools

2 Student support tools

3 Tutor support tools

4 Administration (student database and records)

5 Technology (quality of software)

6 Price

1 Course development tools

1.1 Course creation. How satisfactory was the LMS for course creation?

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. 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]

1.2 Structure and didactic flexibility - openness. In the creation of course materials did the LMS permit didactic flexibility? Was the structure open to differing didactic possibilities?

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]

1.3 Teacher userfriendliness. How easy was the LMS to use by teachers and course developers?

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]

1.4 Support for graphics, audio and video, moving image. Did the LMS support the provision of graphical materials, moving images, audio and video in the course content?

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]

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

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

2 Student support tools

2.1 Interactivity possibilities. What provision does the LMS make for student interaction?

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]

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

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]

2.3 *Online student to tutor/institution communication (synchronous and asynchronous).* What facilities does the LMS provide for student communication 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?

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]

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

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]

2.5 *Feedback on work and assignments.* What is the quality of provision of feedback to students on their work and assignments?

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]

3 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?

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]

3.2 *Group management tools.* What facilities are provided by the LMS to the tutors for managing their group(s) of students?

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]

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 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]

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?

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]

3.5 User-friendly administrative systems between tutor and institution. What provision does the LMS make for successful tutor to institution communication?

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]

4 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?

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 loose access to the online course resources. The students may choose to pay the tuition fees up front or in installments. [NKI]

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?

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. 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]

4.3 Student records database. How successful is the system's student database, especially for data storage and data retrieval.

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]

4.4 Examination and certification records. What structures are provided for recording of data and results leading to examination and certification?

The tutors may register grades for individual assignments online, and the students may view their grades online. [NKI]

4.5 Course, class and tutors database. What facilities are provided for administration of courses, classes and tutors?

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]

5 Technology (quality of software)

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?

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]

5.2 Client - hardware and software options. What is the quality of client hardware and software options? Does the system permit meta tagging?

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]

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?

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]

5.4 Limitation of size (number of students, courses, tutors..) How satisfactory is the LMS for handling varying numbers of students, courses, tutors? How does it cope with 100, 1000, or 10000 students and large course databases?

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]

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?

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]

6 Price

6.1 Cost of the LMS (Learning Management System). What is the cost of the LMS to the institution?

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]

6.2 Annual fee. What fees have to be paid annually for the system by the institution?

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

6.3 *Student Enrolment fee (100 students, 1000 students, 10000 students.)* How do fees to use the LMS vary when the student base is 100 students, 1000 students, 10000 students? Is online invoicing available?

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]

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?

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

6.5 *Training of teachers and 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]

Conclusion: Overall evaluation:

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 365days 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]

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

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]