

COMPREHENSIVE ANALYSIS OF EXISTING LEARNING MANAGEMENT SYSTEMS (LMSs)

Status: Accepted by Gro-Anett Olsen Nov 21.

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| Name of institution: | Næringslivets Kompetansenett (NKN) is the name of the company Kompetansenettet (The Competence Network) is the name of the online services. |
| Type of institution: | 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 the 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). |
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| URL: | www.nkn.no |
| Name of training manager:(Optional) | |
| LMS used: | The Competence Network (www.nkn.no) is a customized version of Saba version 3.2.5.2 (www.saba.com) |
| URL of LMS: | www.kompetansenettet.no |
| Language of LMS: | Saba is originally in English, but translated to Norwegian by NKN. |
| Number of years in use: | NKN has used Saba since it was officially launched last year on August 16, 2000. |
| Other LMSs used: | We used WebLear Pluss, from InforMania in San Francisco during a six months pilot period. |
| Number of students in the system: | NKN has signed contracts with 50-60 course and content providers. |
| Number of courses available: | The course providers that NKN collaborates with offer 850 courses to NKN customers. |
| Typical duration: | The duration of the courses offered via NKN varies considerably. Some courses takes 3 hours to complete, others are equivalent to a 6 months full-time program. Some courses have individual start-up and progression. Others have collective start-up and progression. |
| Number of tutors in the system: | There are hundreds of tutors that teach the 850 courses in our catalogue. But they do not teach via SABA, and we are not responsible for the teaching. I cannot give you the exact |

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| | number of teachers since our partners and customers engage them and are responsible for the actual teaching. None of the tutors are engaged or employed by NKN. |
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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

Course development tools

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

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]

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?

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

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?

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

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]

2 Student support tools

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

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]

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?

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]

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?

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]

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?

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]

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

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

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?

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]

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

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]

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?

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]

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?

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]

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

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

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?

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]

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?

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]

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

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]

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

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]

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

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 an online course 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.

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?

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]

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

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. The Competence Network 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]

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?

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]

5.4 Limitation of size (number of students, courses, 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?

SABA and The Competence Network 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 different 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]

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 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]

6 Price

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

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]

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

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

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, and 10000 students? Is online invoicing available?

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]

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?

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]

6.5 *Training of teachers and learners and system users.* What costs are involved in staff and student training to use the LMS system?

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]

Conclusion: Overall evaluation:

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]

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

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]