

LATVIAN EDUCATION INFORMATIZATION SYSTEM LIIS

ABSTRACT

The Latvian Education Informatization System (LIIS) project covers the whole information grid: education content, management, information services, infrastructure and user training at several levels – schools, school boards and Ministry of Education and Science. The initiative started in 1997.

The strategy for education content creation for 2001 – 2004 is to cover all forms of cognition – rational, empirical, emotional, modeling – and several levels of skills for all levels of education.

The Current LIIS results as at 2002 have been:

- developed teaching aids are being used (workbooks, interactive software, tests etc), approx. 20% of the total amount of high school program can be taught using information and communication technologies,
- about 1000 sites are using school management software,
- 66% of all teachers were trained on ICT usage,
- 97% of schools have dial-up connection to the Internet in year 2002 (44% - permanent connection).
- Number of pupils per computer has decreased from 67 (year 1997) to 20 (year 2002).

On June 13, 1997, the Ministry of Education and Science of the Republic of Latvia and the University of Latvia signed an agreement, "On the Latvian Education Informatization System". The goal of the project is to prepare students of primary, secondary schools and universities to life and work in Information Society.

INFORMATIZATION PROJECT

The mission of this project is to create the conditions for successful continuation of education system informatization during the following years. The project covers the whole informatization grid: education content, management, information services, infrastructure and user training at several levels - schools, school boards and Ministry of Education and Science. The project is being coordinated by the University of Latvia. Because the project is very labor-intensive, the entire educational society is being involved in its implementation, as is any other person who wants to and can provide assistance in the realization of the project.

In 1997, the project entered its pilot phase. In 1998, informatization of regional support centers was carried out. In 1999 educational content was developed and tested, teachers, educational staff and students were trained, and management functions were automated through the provision of at least one computer with a dial-up Internet connection to every school; computer equipment was purchased and information service products were tested. Between 2000 and 2003, the results of work from previous years will be compiled, and in cooperation with local governments there will all encompassing informatization of the Latvian educational system. After 2003, work will be aimed at maintaining, improving and supplementing products and infrastructure.

BACKGROUND

- The Latvian National Program "Informatics"

The Latvian National program "Informatics" has been originated according to the order of the Cabinet of Ministers in April 1997. The fundamental goal of the Program is to form information society in Latvia and to integrate Latvia into Europe. The priorities of Latvia are similar to those of EU.

- The "Latvian Education Informatization System" – an essential part of the Latvian National Program "Informatics". Process was originated in 1996, when Ministry of Education and

Science established the first specialized industry IT Council in Latvia. Strategy of Latvian education system informatization was developed. LIIS project was started in June 1997 and is defined as one of the main priorities of the National Program.

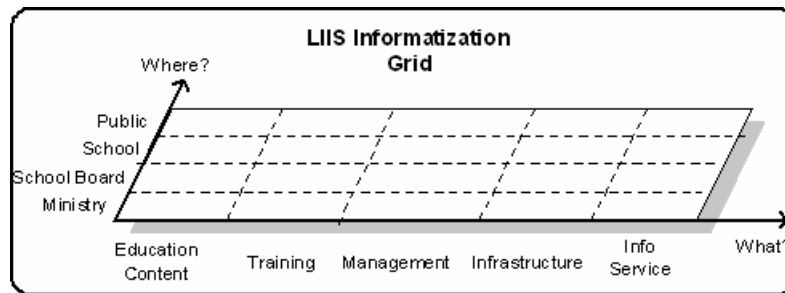


FIGURE 1. LATVIAN EDUCATION INFORMATIZATION GRID

In Latvia the informatization of education process was already happening before the LIIS on the basis of individual initiative and support from several foundations. Most distinguished examples are the IEARN projects and Soros Foundation-Latvia grant programs.

LIIS STRATEGICAL SOLUTIONS

CONSIDERATION OF INFORMATIZATION PRIORITIES

The project supports the following priorities for education system informatization: first priority (highest) - education, second priority - management, and third priority - information services. Through planning the stages of the education system informatization one principle is taken into account "equipment bundled with functional applications for the educated user". Experience all over the world presents evidence that it is absolutely necessary to follow this principle, because placing hardware in education system without certain functional applications and without training of users significantly delays proper usage of investments.

USE OF EXISTING EDUCATION SYSTEM RESOURCES

The project broadly involves the *intellectual resources* of education system and the existing *infrastructure*. Teaching staff from several higher education institutions, researchers and students (undergraduates, postgraduates); broad educational society - teachers, educators and pupils are taking part in the project. Collaboration projects with corresponding foreign organizations and individuals are created. This approach provides an efficient solution of the problem, because large group of participants has good knowledge of various aspects of the education system and its informatization problems. It follows that there is no need to waste additional time and resources to investigate education system and to understand its functioning. The project makes broad use of the existing education system infrastructure. This made it possible to channel sufficient financial resources during the first stage for development of priority functional applications. It also supports effective usage of the existing infrastructure.

A MODERN AND PROMISING TECHNOLOGICAL SOLUTION

The project is supported with promising information technologies such as:

- Platform independent software Lotus Notes is being used at all levels of education system informatization thus supporting unified approach to document storage and management, based on original developments and adapting third-party products. ORACLE is being used for effective maintenance of software (CASE tools, database management system) and for linking with state level registries;
- Usage of system level software such as NetView and the software which supports NetworkComputing compatible solution;
- Usage of state-of-the-art data transmission technologies.

RESULTS OF LIIS

EDUCATION CONTENT

The informatization of the content of education has been among the priorities of state-investment project LIIS from its starting point in 1997. It was expected that following main goals will be achieved through it:

- The teachers will receive additional possibilities in teaching various disciplines, especially considering topics which are dealing with dynamic processes; this should considerably improve the quality of teaching,
- New teaching aids, especially in the areas where was a lack of them, will be created and made easily accessible to broad educational community; this should make possible the differentiation of teaching process according to the interests and abilities of students,
- Being distributed free of charge these teaching aids should equalize the possibilities of students in various regions of Latvia,
- The students will receive additional training on PC and Internet using electronical teaching aids in traditional disciplines. It was decided from the very beginning of LIIS project that Internet based teaching aids will be priority in comparison with floppy discs, CD-ROMs etc. The underlying considerations were as follows:
 - Internet based teaching aids can be easily and quickly improved, corrected and adapted to the needs of each individual teacher/student,
 - They can be analyzed and discussed by users and reviewers in a simple manner,
 - They can be created by a team of authors who are distant from one another,
 - There is a short period of time between creating them and introducing them into praxis.

The implementation of LIIS has shown that all these expectations proved right.

Teaching aids cover all forms of cognition - rational, empirical, emotional, modeling cognition. Since the beginning of LIIS in 1997 the teaching aids have been developed in the amount equivalent of 92 000 printed pages. Using these materials together with original educational software ensures that approx. 20% of the total amount of high school program can be taught in a computerized way. In some disciplines, e. g., Latvian language and mathematics, this percentage reaches 75% of the whole syllabus.

The following products appear to be extremely popular among high school teachers and students:

- **A review of mathematical materials in Internet for students and teachers** (J.Klusa, L.Ramana) consists of two parts: review of educational software and review of on-line materials. They are classified accordingly to the needs of Latvian high school curricula.
- **A Latvian sign language dictionary** (A.Jankovska et al.) is an interactive teaching aid to hearing-impaired children and their relatives.
- **Geography and history of Latvia** (J.Sedols, G.Jonins) is interactive software, which helps to learn the location of most important places in Latvia and the main facts about them.
- **Multilingual interactive vocabulary on school mathematics and informatics** (M.Abel, A.Kluss, R.Kasuba et al.) allows translations in all directions between six languages of about 3000 words and expressions. Other languages (mostly from the Baltic Sea region) will be added in future.
- **History of Latvian and world culture for higher schools, part 1** (A.Spektors et al.) covers some of the basic topics from earlier periods. The product will be developed further.
- **Astronomy on the Web** (I.Vilks et al.) covers such topics as "Astronomical news", "Latvia from the outer space", Internet survey, "This is for you, teacher", "Astronomical vocabulary", etc.

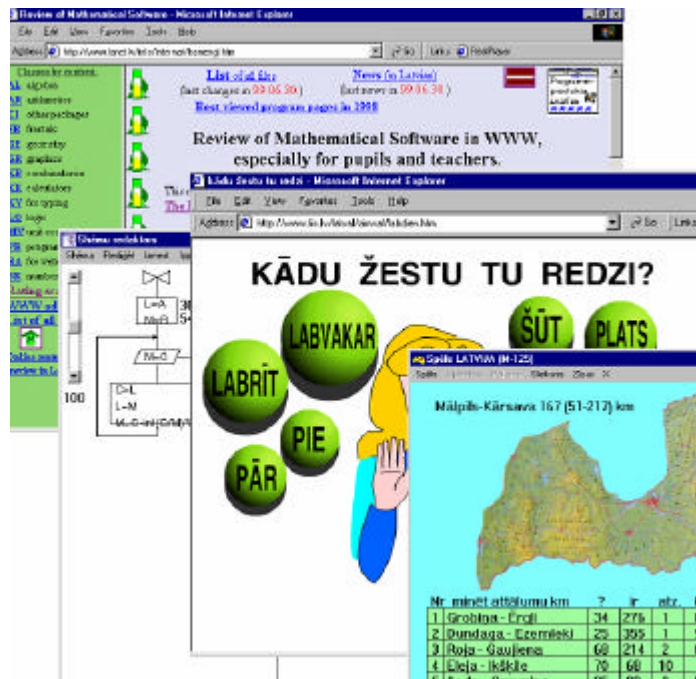


FIGURE 2. CONTENT INFORMATIZATION PRODUCTS

Further development

LIIS project doesn't intend that computers will replace teachers in schools. Information technologies are considered as powerful tools for supplying information to teachers and students. They also will serve as effective means of communication within education society.

In future special attention will be paid to interactive forms of teaching aids, including servers for automated learning (also distance education environments). The project will expand the coverage of aids for primary schools and universities. Strategy for education content creation for 2001 - 2004 is to cover all forms of cognition - rational, empirical, emotional, modeling - and several levels of skills (handicaped, weak, average, excellent) for all levels of education.

MANAGEMENT

The implementation of school management information system (MIS) is based on the fact that in Latvia teachers are paid by the state. It makes necessary the creation of centralized database of teachers, students and financial accounting. Potential users of the system are persons responsible for management of education system - from the Minister of Education and Science to clerks of the ministry, school boards and administration of the schools. Students - present, former or future, parents and other interested persons must be taken into account, too. Range of subjects covered by LIIS MIS is broad and varies from registration of grades to financial accounting and keeping catalogues of libraries. Main subsystems of LIIS MIS are shown in the figure.

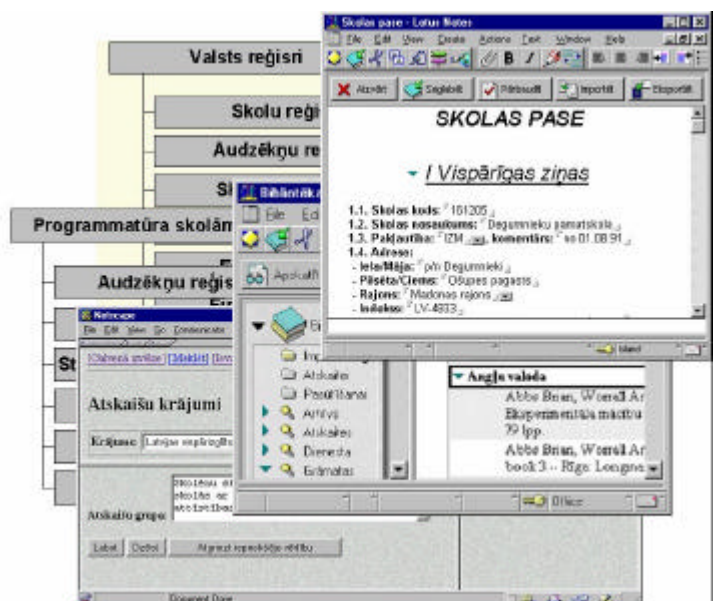


FIGURE 3. SCHOOL MANAGEMENT PRODUCTS

The underlying principle of LIIS is that it must be distributed and cannot be enclosed within the walls of the ministry; therefore LIIS MIS consists of a number of databases spread over the country. There is one central database in the Ministry of Education and Science, where data from all the country is accumulated. This is a large Oracle database, which is used mainly for queries and reporting. Data is pumped into this database from regional sites. Regional databases are much smaller (they are based on Lotus Notes), and accumulate data from one region. Regional databases are mostly used for gathering and control of data, and only seldom for data input or correction.

Regional databases have been installed in technically more capable schools of the regions or in school boards. In most cases these databases are electronically connected to the central server. This infrastructure is based on the replication mechanism of Lotus Notes.

All subsystems are ready for use; however, during deployment we must use the step-by-step approach. There is no sense to talk about financial accounting having no registry of schools, and it is waste of money to introduce an automated timetable planning while there is no registry of students. Therefore, the first goal of the LIIS MIS was to build complete registries of schools, teachers and students. The registers were set up in 1999 - 2001 and contain information about 2 300 educational establishments, 400 000 students and 50 000 teachers (general, vocational and higher education).

The total number of sites using LIIS software is roughly about 1000. The first goals have already been achieved, but there are still a lot of challenges and most of them are related to installation, support and maintenance. A long-term financial support will be necessary to use the system. Educated technical personnel are needed in regions. Teachers, school administrators and ministry clerks must learn how to use the system. Strong and mobile staff of system administrators must be organized in the ministry to solve urgent problems both in ministry and in regions. The tasks for 2003 and beyond include support of exchange of electronic documents; integration with other state level registers, thus enabling e-management at every education institution.

INFORMATION SERVICES

The informatization of information services involves application of the information technologies, which are needed in information services. To informatize information services means to systematize the information resources and to give the tools for use, creation and maintenance of information resources to various categories of users.

An essential part in informatization of information services is the creation of the unified environment of information resources where users at all levels can access the necessary services. Each particular service is supplied by a corresponding component. It is possible to use the tools that allow the creation of new services.

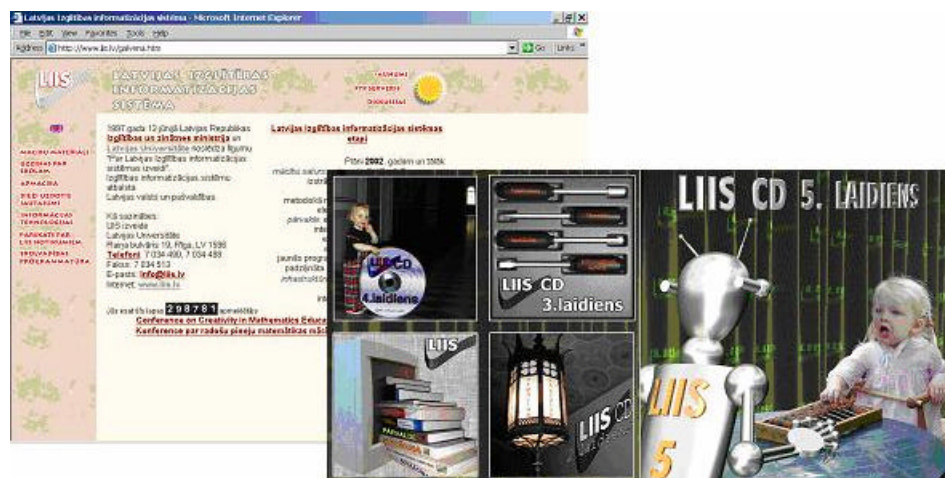


FIGURE 4. INFORMATION SERVICE PRODUCTS

TRAINING

In 1998 - 2001 various training programs were designed, updated and implemented for the regional centers of LIIS. In 2001 these programs were tied with the content of the European Computer Driving License (ECDL), but taking into account the specific needs of teachers. Results in user trainings are: 22 306 teachers are trained at the end of 2002. 66% of total number of teachers in Latvia have got the basic computer literacy skills. About 190 informatics teachers are trained at advanced level (computer lab maintenance, MS Windows NT administration, database development, MS Visual Basic). About 300 tutors-trainers are trained at the end of 2001. In 2002 the emphasis is put on school network administrator training, teaching to apply computer in subject teaching (including school librarians) and on the training according to the ECDL content. In 2002 and beyond there will be an expansion of distance education, advanced teaching of informatics teachers.

INFRASTRUCTURE

Internet connectivity data of Latvian schools (end of 2002): Permanent connection - 44% of schools, dial-up connection - 97% of schools. But only 79% of schools have reported real use of Internet (due to high price of Internet usage - mainly phone costs). In 2002 and beyond the plans are to provide Internet connections for every school and informatization of all state level subordination institutions.

Indicator/Year	1997	1998	1999	2000	2001	2002
Pupils per computer	67.3	49.5	39.3	32.3	26.3	20
Internet connectivity of schools	9%	21%	35%	97%	97%	97%
Real use of Internet					67%	79%

TABLE 1. INFRASTRUCTURE INDICATORS

COOPERATION

Several LIIS products could be of interest internationally:

- Products developed for advanced education at the secondary school and higher school level (especially in mathematics),
- Products dealing with Latvian folklore, ethnography, culture, history, language, etc.
- School management software covering school, school board and Ministry levels.

Also support and cooperation in the development of informatization processes could be beneficial for both sides in the areas of:

- Education of disabled children,
- The study of foreign languages.

Contact: Prof. Janis Bicevskis, Director of LIIS project, University of Latvia,
Raina bulvaris 19, Riga, LV1586, LATVIA
Phone: +371 7034490; Fax: +371 7 225 039;
E-mail: info@liis.lv
WWW: <http://www.liis.lv>