Advantage for the Future
Project plan of the Ministry of Education, Science and Culture for e-Learning
2001-2003

New ways of study and teaching

Information and communications technology (ICT) offers diverse opportunities in schooling. It opens previously unknown avenues of study and teaching, opens schools to the rest of the world and provides new possibilities in communications. Computer technology and the Internet have changed education over a brief period along with the ways of work and people's lives – and will shape the school system still more in the future.

Studies will be less and less bound to a certain place and time inside school buildings. The Internet now plays an ever-greater role in the dissemination knowledge and builds new bridges between students and teachers. Concomitant with this trend, it is necessary to formulate a new framework for use of the Internet in schooling to strengthen access to appropriate content, open new paths of communications and train students for participation in the knowledge society.

The Ministry of Education, Science and Culture's future vision entails utilising the features of the Internet as an information utility for schooling. There educational content shall be disseminated purposefully and communications established between students, teachers, school administrators, parents, employers, and all those who are connected with education. This vision entails that traditional teaching practices develop into what may be called distributed education, with students engaging in studies in distributed education schools.

A distributed education school is an institution not necessarily requiring traditional buildings; it does not have a fixed schedule of classes, and teachers and students are not always in the same place at the same time. In these schools, the student is the centre, pursuing studies in various ways and from different directions. In a distributed education school, a distinction is not made between local teaching and distance education. Rather these ways of teaching are intertwined in distributed teaching, where equal use is made of traditional teaching and knowledge imparted using the Internet. A student can thus engage in distributed learning in one or many schools at a time, be enrolled in local studies and distance studies or a mixture of these two. A student can pursue most studies in a local school using either teaching in the community or distance education in certain parts of the studies. Other parts of the student's studies can be pursued through distance education from specified schools or the distance learning school.

It can be assumed that schools will specialise in specified fields where they offer courses that students everywhere can utilise. A market can thus develop for courses in different branches where schools share courses, and students find suitable courses.

In the fall of 1999 distributed learning was launched at the upper secondary school level in the Town of Grundarfjördur. Until then, young people had to move away with the accompanying cost and burden. There are instances where families have moved at the same time as the young people, or where the young people could not pursue upper secondary school studies because of the cost. Now students engage in distance studies at the Akureyri Higher Secondary Vocational School, coming at certain times every day to a computer lab where a supervisor monitors studies. Particular courses, like sports, were taken at the West Iceland Higher Secondary Comprehensive School in Akranes. http://www.ismennt.is/vefir/grundarfjordur/ One can imagine the studies in Grundarfjördur being further connected to nearby upper secondary schools so that students would attend courses once a week while completing other parts of them through distance studies. Thus, studies in the community and distance studies would be mixed. Distributed learning is based on the possibility of combining traditional ways of study and choosing courses in other schools depending on suitability for students and the supply of schools.

The distributed education school will not come into being all at once but will involve development, based on the interaction of different components that will be worked over the next several years. The social component of schooling is always important, and most students will therefore probably continue to attend local schools along with their cohorts. On the other hand, the supply of studies will increase, and new opportunities for study will open up. Thus students from small schools in the countryside will increasingly be able to attend a certain part of their studies in other schools, and schools will be able to share courses.

The distributed education school will develop variously at different school levels. The greatest number of possibilities for distributed studies is at the university level, and there are also many opportunities at the upper secondary school level. For compulsory schools, there are also new avenues for changed teaching methods, and distributed learning will be utilised at small schools and by students not able to attend schools because of sickness or other reasons.

In continuation of the Ministry of Education, Science and Culture's policy on ICT, "In the power of information", (http://www.mrn.stjr.is/mrn/mrn.nsf/4b495f69ea39cdb9002567bc003a9b70/a8aac831367e34d800256974006ffe64?OpenDocument&Highlight=0,_gk4_,krafti,upp) purposeful efforts have been made to fortify the foundation for the use of ICT in schooling. The project plan for education now presented entails an extension of the policy, while new emphases are also introduced in response to changed times. There, priority is given to utilisation of the Internet's advantages. To achieve the goals of a distributed education school, efforts to increase Icelandic content on the Internet, especially of educational materials, must continue. Accessibility to this content must also be ensured. The

measures aim at the purposeful presentation of this material so that it serves students and teachers' needs and is related to the curricular goals. The content shall fulfil quality requirements, be well defined and demarcated, so that it can be related to study goals each time.

It is important for the content's presentation on the Internet to be shaped by diverse study and teaching practices. Support must be provided for the teacher's function as a mentor and adviser for students on paths to knowledge. Students' independence in putting together and organising their studies must be promoted as well as flexibility in the choice of studies, their pace and manner.

Information on the studies offered and the registration of students must be accessible. The evaluation of studies between schools ought to be easy, so students can attend courses in different schools. Connections to the Internet must be fast so that individuals and schools can retrieve and send materials requiring great bandwidth, regardless of residence. It must be easy to connect to the Internet with convenient equipment that is accessible and simple to handle. Thus, students and teachers shall be able to retrieve and disseminate educational materials, study and teach on the Internet, independent of time and place.

The State's sale of the Icelandic Educational Network was a departure from the policy that the State should provide schools with comprehensive ICT services. Instead the current policy is toward greater flexibility, where different projects will be the responsibility of different parties. Thus, companies now offer schools service in the fields of telecommunications, Internet access, the operation of computer systems, the production of teaching material on the Internet, etc. Institutions for teacher education and other parties under the auspices of the State also provides schools with services, such as continuing education.

The Ministry of Education, Science and Culture will continue work on defining objectives and requirements and funding projects, such as the manufacture of teaching software and Internet content, continuing education for teachers, the build-up of equipment, etc. These projects, on the other hand, will not all be delegated to one party, but rather an attempt will be made to allocate them as suitably as possible, whether to private companies, the State, or municipalities. The focus will be on collaboration agreements with companies (public-private partnership) on projects in the field of education, and an attempt will be made to support the initiatives of different parties concerning innovation and service to schools in the field of ICT. Efforts will also be made to create a forum of collaboration for the Ministry of Education, Science and Culture and municipalities on ICT and education.

This project plan explains the points of focus for education and ICT that the Ministry of Education, Science and Culture will to work toward over the next several years. Some of these projects, such as continuing education for teachers and the development of teaching software are long-term projects that have been worked on in accordance with the former policy, "In the power of information". Such projects attempt to develop new emphases

and draw lessons from experience. In other projects, such as metadata cataloguing and the Educational Gateway, new paths are blazed.

Underlying all projects is the vision that Iceland shall continue in the forefront in the utilisation of new technology in schooling. Clearly the nature of the plan presented here is that it will never be final. The Ministry of Education, Science and Culture will promote continual efforts in research and development of the use of ICT in education. The project plan is published only on the Internet and will be a living publication, so that new focuses and changes will appear there.

I. Learning and teaching

I.1. Teacher education

Teachers' knowledge of ICT pedagogy and their training in applying the technology is a basic prerequisite for the progress of innovation in educational affairs. At all levels school, basic teacher education must ensure that, at the end of the curriculum, teachers are capable of using ICT in teaching.

Effort has been made in classrooms to adapt studies to the use of ICT in teaching. The Iceland University of Education has reorganised undergraduate and graduate studies for teachers, where there is now special focus on the use of ICT. The University of Iceland has placed increased emphasis on ICT in its teacher certification curriculum for upper secondary school teachers. It has also established a Teaching Centre for university teachers, to provide assistance and instructions on the use of ICT in teaching, and courses in this field are offered.

A major effort in teachers' continuing education has been made. About half of upper secondary school teachers have received grants from the continuing education funds for upper secondary schools and attended courses in the field of ICT. Such courses have often been held under the auspices of the upper secondary schools and professional associations.

Funds have been allocated to the Centre for Continuing Education of the Iceland University of Education to organise courses for compulsory school teachers. In addition to this, many municipalities and private parties have organised courses that hundreds of compulsory school teachers have attended. Some schools have held courses where the schools' teachers knowledgeable about ICT have taught their colleagues and also disseminated knowledge to others through distance education. Teachers in schools experimenting with portable computers have attended courses in the utilisation of portable computers and changed the ways of teaching. Some municipalities have organised ICT courses and support for compulsory school teachers. Emphasis must be

laid on reaching more compulsory school teachers with organised courses and increasing the offering of relevant courses in ICT for pre-school teachers.

Most universities have received grants for the continuing education of their teachers in the field of ICT. The Iceland University of Education has organised programs in undergraduate and graduate studies in the field of ICT and adopted ICT in most subject areas. The University of Iceland has established a new teaching centre with the goal of supporting teaching in the field of ICT. University teachers in most universities have received grants to utilise teaching in the field of ICT. The University in Akureyri, which has organised diverse courses on ICT with foreign lecturers, may be mentioned. Well-attended conferences have been held under the title "UT99" (ICT99) www.ismennt.is/vefir/ut99, "UT2000" www.mennt.is/ut2000, and "UT2001" www.mennt.is/ut2001

Objectives:

- All upper secondary school teachers shall have an opportunity to attend courses in the use of ICT and changed ways of teaching before 2003.
- In co-operation with municipalities, continuing education for primary and pre-school teachers shall be organised to facilitate their attendance at courses on ICT and changed ways of teaching.
- Counselling and support for teachers shall be organised so that they receive information on innovations in the field of teaching and ICT, and assistance shall be provided on utilising them in teachers' work.
- Service shall be available to all schools at the university level on the utilisation of ICT in teaching.

Means to goals:

- A collaboration committee of teacher institutions, municipalities and the Ministry of Education, Science and Culture shall be established that shall formulate proposals on how ICT can be organised in the continuing education of compulsory school teachers.
- The Ministry of Education, Science and Culture, in co-operation with centres for continuing education and municipalities, shall support courses for project managers in ICT in compulsory schools who can support their fellow teachers in using the technology in teaching and schooling and in changing the ways of teaching.
- At the upper secondary school level, courses in demarcated fields shall be established for teachers, such as in the use of portable computers in teaching, the creation and use of teaching software, interactive examinations and changed ways of teaching.
- All schools at the university level shall receive support for the build-up of support services for teachers.
- Annual conferences shall continue to be held on the use of ICT in schooling.

I.2. Specialised education in ICT

The Icelandic business community has a great need for people educated in the field of ICT. Despite the increase in the studies offered in the field of computer science and systems analysis, the current developments make it clear that the corporate demand for manpower with knowledge in this field will not be met. A comparison with other Western states reveals that proportionally fewer students in Iceland engage in science and technical studies. Much fewer women than men engage in computer science studies. On the other hand, an overemphasis on technical studies must be guarded against when considering the education of the workforce of the future. Consideration must be given to the fact that information and communications technology will gradually become a part of all studies, and in the knowledge society of the future, the various academic areas will contribute to the dissemination of information and knowledge with new technology. In this regard, it can be mentioned that education in the visual arts is important in designing the appearance of content; education in Icelandic is important in the dissemination of text on the Internet, as well as language technology, the rhetoric of content presentation on the Internet, the psychology of perception, etc.

The selection of studies in ICT has greatly increased in recent years. A Master's program in computer science has been initiated at the University of Iceland. At the Iceland University of Education, a graduate program in ICT has been established, and this subject area will be strengthened in the undergraduate program for teachers. In co-operation with the University of Iceland and Ármúli Upper Secondary Comprehensive School studies have been organised in ICT for students enrolled in teacher certification studies for upper secondary school teachers at The University of Iceland. Reykjavik University, Reykjavik's Tækniskólinn (Technical School) and the University in Akureyri have all organised studies in ICT. The selection of studies in private schools in the field of ICT has also increased greatly.

The new curriculum guides of primary and upper secondary schools set out objectives for the utilisation of ICT in all branches of teaching and provide for specialisation in this field.

The Vocational Council in Mass Media and ICT has organised a program of study in ICT at the upper secondary school level. The curriculum for this program is short and job-related but also keeps the door open to an upper secondary school diploma.

Objectives:

- Diverse studies in the field of ICT shall be offered.
- The needs of the business community for people trained specially in the field of ICT shall be met.
- An increased number of girls in ICT studies shall be promoted.
- Follow-up shall be done on the pursuit of curricular goals for ICT in all branches.

Means to goals:

- Strengthen undergraduate studies organised in connection and co-operation with the business community.

- Beef up educational counselling on ICT studies and promote the increased awareness, especially of girls, of the selection of studies.
- Increase co-operation with foreign parties on the build-up of studies and the dissemination of experience in this field.
- Mobilise young people by offering ICT courses appealing to them.

I.3. Distributed learning and teleprocessing

To a great extent, initiative in the field of distance education has been in schools at the university and upper secondary school level, but experiments have also been done with distance education at the compulsory school level. The Ministry of Education, Science and Culture has tried to support initiative in this field since it deems it important for schools to have opportunities to shape distributed teaching procedures. Most universities have adopted distance education and developed different methods for disseminating education on the Internet. Universities and continuing education centres have been building up co-operation on distance education. A comprehensive distance learning curriculum for a upper secondary school diploma has been developed. Continuing education centres have organised diverse courses in the distance learning mould, and rural areas have thus obtained access to multifaceted studies. A study on the foundation for distance education at the compulsory school level has been made with an experimental project. Innovations in distributed teaching at the upper secondary school level have developed. Better connection to the Internet is required to utilise the latest technology and software for distance education and increase teleprocessing in rural areas.

With a grant from the Ministry of Education, Science and Culture the University of Iceland and IUE Centre for Continuing Education have started preparing distance education in Icelandic on the Internet. The goal is to make it possible to engage in distance learning in Icelandic from anywhere in the world. These studies will be built on ideas about distributed education because a part of the curriculum will be local. It is thus possible to imagine that Icelandic children abroad take parts of the curriculum on the Internet with teachers providing distance education but other parts of the curriculum with teachers or parents abroad. The student is in the same group as students in other parts of the world, and they are in the studies together. Part of this is not subject to time and place; part is local, and one can also assume that part of the curriculum will be scheduled in the sense that the students and teacher "meet" on chat channels, through text, sound and picture transmissions as permitted by technology.
Adult individuals engaging in Icelandic studies on the Internet at the University of Iceland will also be able to form local groups or be tied to classes with pertinent technology. The studies would conceivably be evaluated at other universities, or taken as part of local studies at universities all over the world.

Objectives:

- To promote changed ways of teaching, so that opportunities for distance learning increase along with the increased offering of studies.
- To establish distributed education schools, so that students in sparsely populated areas can engage in distance learning where they live with support and assistance

as required, based on their age and subjects. Research and development efforts in the field of distance education shall be intensified.
- The amount of complete distance learning curricula must be increased, where students can complete degrees at the university level.

Means to goals:
- With tender offers for telecommunications service for upper secondary schools, the centres for continuing education and sparsely populated areas, it shall be ensured that a shortage of bandwidth will not inhibit distance education and teleprocessing.
- Schools in sparsely populated settlements shall be supported to increase their offering of studies to their students in specialised fields with distance studies from other schools.

I.4. Foreign collaboration

The Ministry of Education, Science and Culture has emphasised foreign collaboration to strengthen development efforts in the use of ICT in education and changed ways of teaching. Iceland has become a member of the European Ed-network. Iceland has also participated actively in Nordic collaboration in the field of ICT, such as the Nordic ed-networks Odin and Idunn. Iceland has obtained grants to participate in foreign projects and led a collaborative project in the field of ICT.

Discussions have taken place with the US Department of Education and other foreign parties on collaboration on and dissemination of knowledge in the field of ICT. Iceland has participated in ICT projects under the auspices of the European Union, OECD and UNESCO.

Many Icelandic schools have participated in foreign collaboration, communication projects, courses and diverse innovation. In modern international society, such collaboration opens new gateways in communications and understanding of the links between nations in addition to forging a foundation for collaboration on an increased offering of studies and mutual recognition of studies.

Objectives:
- Promote more purposeful co-operation with other countries in the field of distributed education
- Mobilise individuals and schools to participate more in foreign collaboration on the utilisation of ICT.
- Increase diversity in foreign collaboration by forging links with countries outside Europe that are in the forefront of the field of ICT, such as the United States, Canada, New Zealand and Australia.

Means to goals:

- To define fields that Iceland will emphasise in foreign collaboration on distributed education, such as mutual exchanges of courses, metadata cataloguing and the production of digital educational materials.
- Mobilise teachers to apply for grants or participate in grant applications because of foreign projects and encourage them to participate with direct support.
- Promote Iceland's more effective participation in foreign school collaboration and its acceptance of leadership in foreign projects.
- Disseminate the results from foreign co-operation and extract lessons from it.

II. Educational materials on the Internet

II.1. Digital educational materials

Over the last two years, the Ministry of Education, Science and Culture and the Information Society Task Force have provided considerable funding for the production of software. Most of the funding has gone to the National Centre for Educational Materials. Under the auspices of the National Centre for Educational Materials (namsgagnastofnun.is), software has been published for teaching at the compulsory school level, and several programs are also aimed at upper secondary schools. Most of these programs have been issued on CDs, but publication has increasingly shifted to the Internet. Funds have also been granted for the production of educational materials through funds for secondary and compulsory schools and with grants for the production of educational materials.

Private parties have increasingly offered access to teaching software and educational materials on the Internet. A large part of teaching software offered to schools in Iceland has been developed abroad and then translated into Icelandic and adapted to the country's circumstances and curricula. It is clearly difficult to develop teaching software solely for the Icelandic market because of its smallness, but offsetting this is the development of programming equipment for the production of educational content makes this easier. The basic prerequisite for the adaptation and development of digital material for teaching, on the other hand, is that pedagogical knowledge be utilised, and that the material conform to Icelandic curriculum guides. Much foreign material, such as those for languages and the sciences, can be used for teaching in Iceland, and purposefully aiming at adapting them to Icelandic circumstances and utilising them in Iceland is important.

Examples of educational content on the Internet:
The School-web (skolavefurinn.is): a project and interactive teaching software for different branches of teaching and levels of study in compulsory schools.
School Plaza (skolatorg.is): a communication forum for schooling

SaloXml (prim.is): an interactive database of examinations and electronic teaching material
Distance Learning Web VMA (www.vma.is/fjarkennsla) has content linked with subjects

It is not enough for teaching software to be produced; it must also be promoted so it is utilised in studies and teaching. Efforts must be made to promote and increase the use of teaching software. The amount of content for upper secondary schools must be specially increased. Much of the content created is not accessible on the Internet. More effort must be channelled into development of teaching software for the Internet.

Agreements have been made with Microsoft for software from the company for schools, and a large part of primary and upper secondary schools and all universities in Iceland have become parties to the agreement. With this agreement, the schools get access to the latest versions of the most common software from Microsoft on advantageous terms. In most universities, students also have access to the software.

The SITES survey, which is an international survey on ICT in education (www.mscp.edte.utwente.nl/sitesm1), inquired into schools' access to 21 kinds of different software, such as word processing, math programs, drawing programs, models, etc. The findings show that Iceland, along with Denmark, is highest among the countries of W-Europe, while Canada is at the top in this field. It therefore seems that Iceland is doing well, compared with more populous nations, but Iceland is clearly weak regarding software in its own language.

The Ministry of Education, Science and Culture has appointed a project steering committee on access to electronic databases and electronic journals, which has worked on the preparation of agreements on national access for Iceland to such databases. An agreement has already been made on free access to the *Encyclopaedia Britannica* and the ProQuest database that provides, among other things, access to a number of electronic journals. Much of this electronic content is well-suited to teaching and learning and equalises Icelanders' facilities for obtaining information and engaging in distance learning.

Objectives:

- For each subject in primary and upper secondary schools, teaching materials and software shall be available through Internet access.
- Universities shall disseminate digital material for teaching on the Internet suitable for each course.
- The ministry shall support agreements on access to electronic content, and these shall be made accessible to schools.
- Digital content available from parties outside the educational system, such as from government administration, museums and the mass media, shall be adapted to the needs of the educational system.

Means to goals:

- Grants shall be made to make educational materials and teaching software for the Internet.
- The basic requirement for such grants shall be that schools get access to the materials on favourable terms.
- Information about all educational materials shall be available in one place (see Educational Gateway).
- A campaign shall be conducted to acquaint schools with the electronic content, on which agreements on national access have been made.
- Instructions shall be prepared on the use of electronic content for teaching and learning.
- Grants shall be made for pedagogical adaptation of electronic content.

II.2. Quality control

It is important that the content disseminated through educational and curriculum gateways be professional and suitable for learning and teaching. The content now presented on the Internet is diverse, but metadata cataloguing makes it possible to better qualify what search engines find. Plans call for metadata cataloguing to provide information on the quality of content and its relation to curriculum guides. For information on quality to be creditable, an impartial party must verify and update it. The objective of quality evaluation is not to preclude content but to provide information on its type and utility for schooling.

- The Australian Educational Gateway builds in part on metadata cataloguing of content http://www.edna.edu.au/EdNA
- The New Zealand Ministry of Education does metadata cataloguing of content and is developing powerful quality control of content related to education, http://www.tki.org.nz/

Objectives:

- There shall be easy access to information on the requirements for educational materials on the Internet.
- The connection between educational materials and curricular goals shall be as clear as possible.
- There shall be standards on how educational materials on the Internet can be utilised for teaching.
- Users of educational materials shall be informed of quality evaluation.

Means to goals:

- In co-operation with teachers, the quality of educational materials will be evaluated.
- The experience of other nations in this field will be taken into account and collaboration with them will be sought.

- Workgroups will be established to make proposals on standards on the connection between educational materials on the Internet and curricular objectives.
- Information will be published informing users of quality evaluation.

III. Equipment

Through increased possibilities for high-speed and wireless connections along with developments in mobile technology, the premises of accessibility and the build-up of equipment in schools have changed. This development along with changed arrangements in learning and teaching will have impact on the organisation of buildings and new construction.

The Ministry of Education, Science and Culture has organised experiments with portable computers and wireless networks in upper secondary schools, and several municipalities have also installed such equipment in compulsory schools. High-speed networks have opened up opportunities to transfer computer processing to central servers where software is stored and computer processing run. It is thus possible to utilise simpler equipment in studies and teaching. It can also be supposed that less expensive network terminals will, to some extent, replace PCs, and that new equipment related to networks, such as e-books, will offer new possibilities in schooling and support new teaching practices.

See about e-books generally at: www.openebook.com Programs for e-books are obtained free on the Internet, for example, from Barnes and Noble: http://ebooks.barnesandnoble.com There are also books that can be downloaded at no cost, and e-books can as well be purchased for downloading. The selection of e-books on the Internet is steadily increasing.

Changed teaching practices call for fast access for students and teachers to the Internet, both in and outside classrooms. For this purpose, easy-to-use terminal equipment is needed and fast connections making it possible for students and teachers to retrieve and send educational materials, projects and examinations and communicate among themselves. One can suppose that in the near future, each student and teacher will have equipment making this possible. This will therefore probably reduce the use of expensive PCs with great processing capacity in schools.

A committee under the auspices of the Ministry of Education, Science and Culture has submitted proposals on the build-up of distance education networks for upper secondary schools and centres for continuing education. The proposals include the idea that there shall be high-speed connections between these institutions with at least 100MB connections, based on the Internet Protocol (IP), that will facilitate the transport of data

and visual information. Also, universities and research organisations are now working on establishing a high-speed research network.

Ideas about a distributed education school provide that considerable changes shall be made to schools' physical plants, and that the need for buildings will even decrease. For buildings to be adapted to new technology and changed study arrangements, it is necessary to view school buildings in a new light. Thus, the need for traditional classrooms will probably decrease, but there will be more need for flexibility in the structure of space for project work and co-operation in distributed learning. This must be considered when older buildings are to be refurbished or a new building constructed.

Objectives:

- At the end of 2002 upper secondary schools, centre for continuing education and universities in Iceland shall be linked together on a high-speed network with a bandwidth of at least 100MB.
- In 2002 all upper secondary schools and universities shall have established wireless networks, and students there shall be able to connect to the Internet quickly with portable computers or other equipment.
- Buildings shall be adapted to new technology and changed study arrangements.
- The use of diverse equipment in schooling shall be promoted, such as portable computers, e-books and cell phones.
- At the end of 2002, experiments shall have been done with central processing of computer systems at all school levels.
- In 2003 all classrooms in schools in Iceland shall be connected on a network.

Means to goals:

- Experience from experiments in pilot schools with portable computers and wireless networks shall be utilised to find realistic and efficient ways in these matters for other upper secondary schools.
- The universities and compulsory schools that have already adopted this technology will be encouraged to share their experience with other schools on these school levels.
- In 2001 ways will be investigated to build up a high-speed telecommunications service for upper secondary schools and centre for continuing education as well as a powerful research network for universities and research organisations.
- Collaboration will be sought with companies on experiments with terminal equipment in schools.
- Experiments will be done with alterations to school buildings to support distributed education and reduce the need for constructing new buildings.

IV. Educational gateways

IV.1. Educational gateway

As the offering of Internet content grows, it is becoming more important to demarcate content suitable for teaching and learning so that it shall be accessible. A new kind search engine building on cataloguing and description of content is becoming established. It makes it possible to find content in a well-defined and purposeful manner. Metadata cataloguing of content (see Procedure IV) makes it possible to make content accessible through the Internet and disseminate it to users. Thus, the producers of educational materials can catalogue the content so that it is found and present conditions for its use. One can suppose that payment will be made for some content, while other content will be disseminated free of charge. So that all producers of educational materials can present them, the Ministry of Education, Science and Culture will exert efforts to have them catalogued and make the information about them available on the Educational Gateway.

Educational Gateway (www.menntagat.is) is a web site on the Internet that will be based on a database with catalogued educational content and searches defined according to users' needs. There, teachers and students can find content related to curricular goals, teaching instructions, pictures, interactive examinations, etc. The Educational Gateway will also provide information on other databases, domestic and foreign, with content meeting the search criteria.

The Educational Gateway will have only basic information on content and access to it. Dissemination of content will be the responsibility of those producing it. It is also important for information about the quality of content to be included. The gateway menntagat.is makes it possible to obtain education-related content in one place. There, students, teachers and others can retrieve information, based on a defined search.

Objectives:

- At the end of 2001 an educational gateway shall be opened: A web site based on information in a database that provides access to defined educational content, with a powerful search engine that finds catalogued education-related content.
- It shall also be possible to find content related to the goals of new curricula, and there shall be information on how the content and the goals are connected.
- In 2003 there shall be an assortment of catalogued education-related content in Icelandic databases.
- The accessibility to education-related content shall be fast, thereby facilitating distributed education

Means to goals:

- The ministry shall set standards making it possible to catalogue content purposefully. (see Procedure VI).

- The focus will be on cataloguing content according to curricular goals. An interface with instructions on searching and handling content will be established.
- A new library system (see Procedure V) will link together different databases and content on the Internet with a search engine.
- Experiments will be done with e-commerce involving educational materials.

IV.2. Curriculum guide gateway

With new curriculum guides the Ministry of Education, Science and Culture has laid the foundation for new emphases in schooling with detailed goal setting. For the best utilisation of the curriculum guide in schooling, it is important that it be accessible in a database, and that it be possible to work with its objectives in diverse ways. Schools shall be able to utilise ICT to develop their curricula and shall have the option of preparing curriculum guides for individuals. With new expert systems, it is now possible to link educational materials and teaching instructions with curricular goals and disseminate this to students and teachers. The Ministry of Education, Science and Culture has experimented with cataloguing examinations, based on curricular goals, and ways to make them accessible on the Internet.

Objectives:

- In 2002 there shall be a database and expert system for curriculum guides for nursery, primary and upper secondary schools. The systematic recording of goals shall also be finished.
- The database will be linked with the Educational Gateway (see Procedure I) with a suitable interface (namskra.is).
- The database shall be interactive, and it shall be possible to work with objectives and obtain content related to them. It shall be easy to update and change information in the database.

Means to goals:

- A study will be made of whether curriculum systems developed abroad can be utilised as well as the options for adapting them to Icelandic circumstances.
- In 2001 content will be catalogued in terms of curricular goals; experiments in linking the records to curriculum systems will be done.

IV.3. New library system

Plans call for a new library system serving all libraries in Iceland to come on line early in 2002. In 2001 the system will be installed, employees trained and data transferred. Modern library systems are powerful information utilities that are not confined within the walls of the libraries. They can disseminate information from databases as well as Internet content. The new system includes a very powerful search engine possible to utilise in searching the content of different databases. Thus the library system will link together information about books in libraries, electronic journals and diverse content in digital form. With one search word, information can be obtained on where content related to it can be found. The library system will revolutionise the public's facilities for engaging in studies and working without regard to residence. Students in distance studies

will have access to scholarly journals and other content, on equal footing with students in local studies.

Objectives:

- The features of the new library system for the public shall be utilised to the utmost. Special attention shall be paid to the needs of sparsely populated areas regarding the accessibility to information and data.
- The first libraries shall be connected to the new system in January 2002.
- An attempt shall be made to beef up digital libraries
- An attempt shall be made to link as many data sources as possible to the system, such as museums, art museums, databases of mass media and government administration.

Means to goals:

- An arrangement for management and operations will be established that suits the interests of different libraries.
- The system will be adapted to the needs of different kinds of libraries, such as school libraries, public libraries and libraries for specialists.
- Employees at all libraries shall receive training so that they can provide instructions on the use of the system.
- An evaluation shall be made on how to improve accessibility to the system in libraries.

IV.4. Metadata cataloguing of education-related content

In the broadest sense, "metadata" are information about other data. The word most commonly means a standardised description of data in electronic form. A good way to understand the concept is to imagine a card catalogue in a library where searches can be made by author or title to obtain information on a book's location. Similarly, metadata provide information about content on the Internet, e.g., HTML documents, and point to where to find it. Numerous metadata formats have been made, many for special needs. There are ongoing efforts in the international arena to make standards for metadata cataloguing of education-related content. Some of these standards are based on precise recording, where many aspects of the content are detailed. Other standards are simpler, being based a few recorded factors.

A detailed summary of metadata formats and references on metadata can be found on the metadata page of IFLA (International Federation of Library Associations and Institutions) htttp//:www.ifla.org/II/metadata.htm

Considerable work has been put into making harmonised standards for metadata on education-related content. Both international organisations and individual countries have organised such efforts. The following parties can be pointed out:

- **Dublin Core: Education Metadata** http://purl.oclc.org/dc/groups/education.htm
- **EdNA Schools:** Metadata Group http://www.edna.edu.au/edna/aboutedna/metadata/index.html
- **European Schoolnet:** Metadata Handbook http://www.no.eun.org/news/metadatabook-en.html
- **IMS:** http://www.imsproject.org/metadata/index.html

- **LTSC: LOM** http://ltsc.ieee.org/wg12/index.html

The Ministry of Education, Science and Culture is now preparing the publication of the Dublin Core standard for metadata cataloguing of education-related content. This cataloguing greatly facilitates searches for content and makes it possible to link them with defined goals. The cataloguing includes conditions for use of the content, copyright, payments for use, etc.
A key-word chart for education-related content has been translated
and will be utilised for metadata cataloguing.

Objectives:

- Accessible cataloguing instructions and a suitable form for the task shall enable content producers to record their content according to standards.
- Regular metadata cataloguing of education-related content shall start in 2001.
- At the end of 2002 the recording of curricular goals and their connection with educational content shall be available.

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Means to goals:

- Instructors will be hired to assist teachers and other producers of education-related content with cataloguing.
- Agreements with institutions and publishers will be made on the metadata cataloguing of educational content.
- Work will continue with the recording of examinations, and they will be made accessible in an examination database.
- The condition will be set that all those receiving grants from the Ministry of Education, Science and Culture to produce educational materials shall catalogue metadata on the content.
- A campaign to introduce the cataloguing of content on the Internet to teachers will be organised and grants made for cataloguing.

IV.5. Information utilities for studies and schooling

Distributed education requires that everyone shall have fast access to information on the studies offered by schools and their organisation. This means that the processing and dissemination of information in schools must be transferred as much as possible to the Internet and become accessible from there for students, teachers, parents and others. Compulsory schools have begun to utilise the Internet increasingly to disseminate information to students and parents. It is important to encourage them to continue development in this field.

The Ministry of Education, Science and Culture has completed agreements on a new information system for upper secondary schools that will go into operation this year. There, information will be disseminated on the organisation of studies, the recording of

students, class schedules, examination schedules, courses taken and grades, buildings, employee information, etc. Strict security rules must be followed to ensure privacy.

At the university level, information utilities have taken into account the needs of each school. It is important that universities see to harmonisation in the cataloguing and dissemination of information on studies so that the goals of distributed education where students engage in studies in more than one school at a time will be attained. Comparable information on study possibilities must be accessible on the Internet both for those planning continuing education and for those engaging in lengthier studies.

Under the auspices of Menntar (mennt.is), a collaborative forum of the business community and schools, work is now in progress to build an information utility on continuing education and job-related studies in Iceland. The information utility is intended to provide the public with an overview of the studies offered at the upper secondary school, university and continuing education levels. All the parties offering studies or courses will be able to publish information on the utility, which plans call for to be accessible in electronic form on the Internet. The project is done with support from the Job Education Fund and in collaboration with the Ministry of Education, Science and Culture.

Dissemination of information between schools must be fast so that the recording of students and evaluation of distance studies is easy. The recording of schools' course descriptions, recording of students and unit evaluation during studies must be co-ordinated.

Objectives:

- All schools at the primary, secondary and the university levels shall utilise information utilities to disseminate information about studies, teaching and other activities.
- Co-ordinated recording of studies shall be promoted as well as mutual recognition of courses at the upper secondary school and university levels.
- Efforts shall be made to standardise units in university studies according the European model (ECTS).

Means to goals:

- In the fall of 2001 a new information system will be opened for use in upper secondary schools. The system will be utilised to disseminate information on the Internet to students, teachers and the public.
- A workgroup with representatives from upper secondary schools will be formed to work on the co-ordination of recording and dissemination of information.
- A collaborative committee for the university level shall be directed to work toward recognition of studies at the university level, co-ordination and standardisation of study units at Icelandic universities, where international models shall be taken into account.
- Private parties will be supported in establishing and operating information utilities on education where relevant.

Dreifnám í Grundarfirði

Verkefnið

Veturinn 2000 - 2001 heldur dreifnám í Grundarfirði áfram en í fyrra unnu Menntamálaráðuneytið, Grundarfjörður, FVA og VMA að tilraunaverkefni um fjarkennslu fyrir framhaldsskólanema í Grundarfirði.

Póstlisti

Póstlisti sem sendir bréf til tengiliða verkefnisins: grundarfj@ismennt.is

Myndir

Fréttir

Frá nemendum

Punktar

Grundarfjörður er 950 manna bæjarfélag á Vesturlandi.

Fjölbrautaskóli Vesturlands á Akranesi er eini fjölbrautaskólinn á Vesturlandi.

Verkmenntaskólinn á Akureyri býður upp á fjarnám á framhaldsskólastigi.

Ransóknarráð Íslands styrkir tilraunarverkefnið.

Menntamálaráðuneytið veitir styrki til nýbreytni í skólastarfi

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Umsjón: Jóna Pálsdóttir Síðast uppfært: 2001-02-01 Vefur: Íslenska menntanetið - Vergo

Mennt.is - framtíðin er hér

Uppspretta verðmætasköpunar í nútíma þekkingarþjóðfélagi eru menntun einstaklinganna og mannauður þjóðarinnar. Menntun og aðgengi að upplýsingum um námsframboð er því sá grunnur sem við byggjum framtíð okkar á. Með tilkomu mennt.is er aðgengi almennings að upplýsingum um nám og námskeið auðveldað, á sama tíma og skólum og aðstandendum námskeiða er gert kleift að miðla upplýsingum til viðskiptavina á einfaldari og markvissari hátt.

Hvernig leita ég eftir námi?

Þú finnur nám við þitt hæfi með hjálp öflugrar leitarvélar. Framsetning á upplýsingum er stöðluð sem gerir allan samanburð á því námi sem í boði er mjög einfaldan. Leitarviðmótið er fjórskipt:

1. Almenn leit
2. Leit að námi í framhaldsskóla
3. Leit að námi í háskóla og sérskóla
4. Leit að námskeiði.