Risk with responsibility

Policy for ICT in education,
science and culture
2005 – 2008

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We live in a society where knowledge is a resource of utmost importance. Information technology is an integral part of knowledge acquisition, creation and mediation in all spheres of society. The generation now growing up are accustomed to computers, and take the Internet and communications technology for granted in education and for participation in cultural activities. Computer technology is ingrained in scientific research and technological development so computer skills will be crucial in the jobs of the future. Coming generations' understanding of their heritage will be shaped by the new media technology that is emerging. Therefore it is the obligation of those who are involved in education, culture and

science to follow the development of information technology and seize the opportunities it offers. For that end boldness is required to explore new avenues and changed old habits. However, that does not mean that good principles and demands of quality should be abolished. On the contrary, responsibility must be taken to act well.

The vision for the future in information technology outlined in this document extends to education, culture as well as science. It maintains that all people should be offered the opportunity to acquire necessary skills and participate in the information society on their own terms. Educational and cultural institutions shall lead the way in utilizing high-speed networks and computer technology. Icelanders shall have access to abundant resources of digital content in education, culture and science. Schools, cultural institutions and centres of science shall innovate and adapt their practices to the possibilities of information technology to improve service. Finally the document outlines a vision where Icelandic youth can use computer technology and the Internet in a responsible and safe way.

Icelanders are already advanced users of information technology and are ready to meet the challenges ahead. The Ministry of Education, Science and Culture presents in this document the objectives it will emphasize and seeks wide cooperation from individuals, businesses, institutions and other organizations in implementing them.

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INTRODUCTION

The Ministry of Education has twice before, in 1996 and 2001, published policy papers outlining the use of ICT in education, culture and science. The objectives put forward in those policy papers have been carried through systematically in cooperation with the Iceland's governmental IT task force. In the past five years half a billion Icelandic krona have been spent on the Ministry's ICT projects.

At this juncture it is important to pause and evaluate what progress has been made and use the experience of recent years to chart a course forward. A great deal has been invested in infrastructure and information systems and ICT is becoming more widespread in education, culture and science. While there is more experience and knowledge in ICT there is also a growing understanding that investment in technology does not automatically lead to progress and benefits in living standards. ICT is a tool and a means that needs to be wielded in an appropriate way to reach the goals set out for education, culture and science. New technology demands new approaches and it is important to meet these demands by considering innovative practices and organizational change.

The ministry's policy on the information society, Risk with Responsibility, shapes a vision for education, culture and science until 2008. These categories are dealt with as a whole and an attempt made to relate them to each other as far as possible. Policy objectives are presented in five different subject categories: access to the information society, infrastructure, digital content, innovative practices, and net safety.

The Ministry will implement the policy in various ways. By ensuring a legal framework that takes into account the development of the information society. By working out a plan of action, and seek funding for clearly defined projects that relate to policy objectives. The Ministry will take steps to establish cooperation between partners to work towards policy objectives and by seeking partnerships between public and private enterprise. International cooperation in the use of ICT and participation in multinational projects will be supported. The Ministry will make efforts to adapt its organization and that of related institutions to the possibilities of information technology. Consideration will be taken to the government's general policy on ICT, Resources to Serve Everyone. Innovation will be encouraged and development projects initiated within education, culture and science. The Ministry will also work systematically towards monitoring and evaluating the success of using ICT and support research and multinational comparative studies in that area.

Vision

Everyone should have the opportunity to acquire the necessary knowledge to participate in the information society on their own terms.

TO THE INFORMATION SOCIETY

Status

Information literacy means the ability to utilize computers and information technology to acquire information and knowledge as well as the ability to work with information in a critical and creative way.

Icelandic homes and businesses have embraced information technology at work and leisure. Most homes have computers and online access, and information technology has become an integral part of all professions in one way or another. Computer skills and intelligent handling of information has become a necessary job requirement on the labour market. Public institutions are providing online services to the public and citizens are increasingly using information technology to communicate with government agencies. Children and young adults who grow up with computers in the home and in schools are in many cases more adaptive to new technology and quicker to acquire computer skills than their parents. For them the internet and information technology is more a platform for leisure activities, games and communication, than a tool for mining information or for study, which is reflected in an observed decline in newspaper and book reading.

The growing importance of information literacy in general education was taken into account during the revision of the National Curriculum Guide for compulsory school and upper secondary school, and in recent years schools have based their education on the guidelines defined in the curriculum guide. Computer use in schools has increased dramatically and in upper secondary schools, for example, students are using laptop computers on a daily basis. Efforts has been made to make teacher training in ICT available, and a large majority of teachers have used the opportunity to take ICT and computer courses. Libraries are providing computer services and nearly every library in urban areas offers visitors online access.

Icelanders are well prepared to participate in developing an international knowledge industry in coming years. To further prepare the nation for this task further efforts are required to increase computer skills and information literacy so that Icelanders can seize the opportunities for their own benefit.
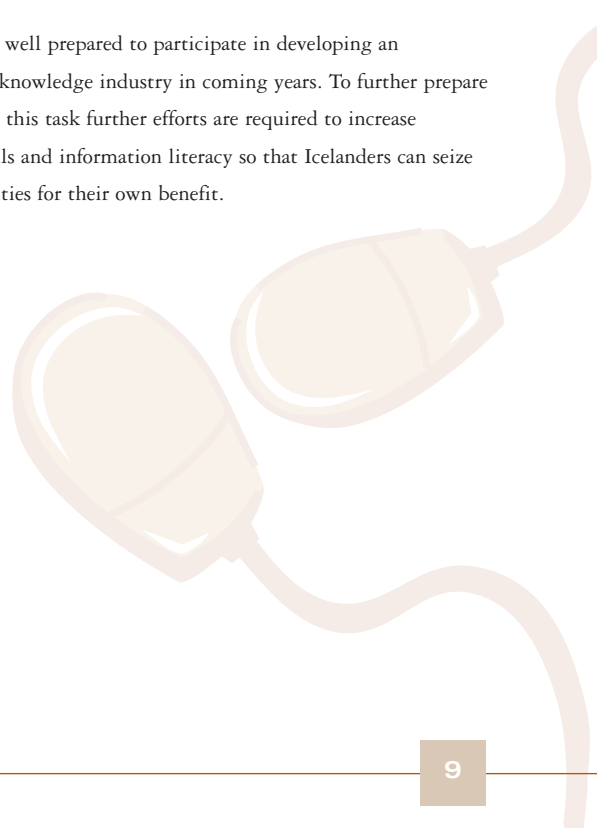
Objectives

- Open access to computers and internet in schools and libraries.
- Effective information services and assistance available in schools and libraries.
- Systematic education in information literacy across all school levels, to enable students to develop necessary skills for critical and creative use of information.
- A wide selection of educational choices provided to prepare students for specialised jobs in ICT.

- All teachers acquire the requisite skills to use ICT at work.
- Specialised training for teachers so that their expertise can be utilised for innovation and development in schools.
- Libraries provide the public with effective assistance in the use of digital resources.

Action

- The success of ICT teaching in schools evaluated and results used for a review of curriculum guidelines.
- Pedagogical models developed to meet objectives set in the curriculum guidelines for ICT.
- Teacher education in ICT strengthened with emphasis on more specialisation and innovation in the use of ICT for learning.
- Teachers encouraged to develop their ICT skills with awards and the possibility of gaining certificates as qualified teachers in the use of ICT in education.
- Continuing education in ICT for librarians strengthened with regard to the educational and pedagogical role of libraries.

- Promote closer cooperation of libraries, schools and lifelong learning centres to develop ICT education.
- Improve ICT services for learners and the public by cooperation between lifelong learning centres and libraries in rural areas.
- Develop analytical tools in ICT for schools to evaluate ICT competency among teachers and students.
- Seek cooperation of government agencies, trade unions and the business sector to enhance the public's and labour market's awareness of the importance of ICT.
- Establish active cooperation with local authorities for increasing the opportunities of primary and compulsory school teachers for continuing education in ICT.

Status

A frequent cause for concern is the widening gap between different sectors of society with regard to computer skills and access to the information society, with age, gender and disability most commonly cited as determining factors. General participation in the information society in Iceland indicates that fewer people are affected here than in most countries, but there is still reason for stay alert. Surveys among the public and businesses in rural areas show strong interest in increasing computer skills and information literacy, which suggests that there is demand for basic adult education courses in ICT in rural communities and that ICT is considered important for business.

Researchers, both in Iceland and abroad, have found that girls approach ICT differently than boys and there are indications that the different ways in which boys and girls are introduced to ICT and the different attitudes among boys and girls to ICT influences educational and career choices later in life. Surveys show that boys are quicker to acquire computer skills than girls and they are more likely to own computers at home. According to statistics from the National Statistics Office there where three times as many men in engineering and technology related subjects at university in 2003. The situation has improved from 1990 when the ratio was one woman in every ten. On the other hand there has been a decline in the number of women in computer subjects.

ICT opens up many opportunities for people with handicaps, such as hearing and visual impairment and other disabilities. Different kinds of software solutions have been developed to make life easier for the disabled to participate in the information society. The Ministry has supported projects that use ICT for the benefit of people with disabilities.

The number of students of foreign descent has been increasing rapidly in recent years. In 1998 747 students spoke foreign languages at the compulsory level, rising to 1.340 in 2003, or 3% of all students

Objectives

- Increased participation of women in ICT education
- More choices available to the disabled and sick for participation in educational and cultural activities.
- Citizens of foreign descent given more choices in education and cultural participation through ICT.

- Equal opportunity between people living in the city and rural areas for education and cultural participation.

Action

- The different interests and approaches of boys and girls taken into account when reviewing curriculum guidelines and steps taken to encourage the interest of girls in ICT.
- Educational and cultural establishments take into account the needs of people with visual and hearing impairment when designing digital content and publishing information online.
- New digital media used to increase the participation of people with disabilities, invalids and the elderly in cultural life.

- Promote closer cooperation of educational establishments in the use of ICT for the benefit of people of foreign descent and bilingual children.
- Public libraries take into account the needs of people of foreign descent when developing their information services.
- Increase the rural population's access to ICT education.

ICT for youth and sports

Status

Sports and youth clubs, and youth community centres have been picking up on the internet to communicate with youths and their parents, as well as publishing information on their activities. These efforts are still sporadic and scattered across the net and no coordination among the various clubs. Cooperation between clubs and schools can be improved in order to make information more effective for participants and their parents. Youth clubs are an ideal forum to encourage and nurture the participation of youths in democratic discussion.

The risk of excessive use of computers and television, leading to lack of physical exercise and health problems, has frequently been pointed out. Research in Iceland on the effects of computer use and computer games on youths is still lacking.

Objectives

- ICT used to deliver information about healthy living.
- ICT used more effectively to communication to parents and participants about sports and youth activities.
- ICT use compatible with the objectives of a healthy living.
- Schools, sports and youth clubs use ICT to improve awareness of the democratic process among young people.

Actions

- ICT used to improve information services to parents and participants on the activities of sports and youth clubs, e.g. in collaboration with schools.
- ICT used to spread information about the importance of healthy living and encourage participation in sports and youth club activities.
- The Ministry of Education cooperates with the Ministry of Health to raise awareness of the health problems that can result from excessive computer use.
- A competition on e-learning teaching materials about diet and physical exercise in relation to the national curriculum guidelines.
- ICT used to get young people to participate more actively in democratic discussion, e.g. through discussion forums and online elections.

Icelandic language as a priority

Status

Language technology projects, supported by the Ministry, have laid the foundation for further research and software development in the years to come. Large projects, which involve the construction of a corpus of written text and spoken language, have been completed and will pave the way for Icelandic speech recognition and voice control in computers. The Ministry's language technology programme finished in 2004 and work is already underway to use ICT for the benefit of the Icelandic language.

The government has announced that software localised for Icelandic will be given preference in public tenders. Progress was made with the release in 2004 of Icelandic translations of Windows XP and Microsoft Office software.

A large part of software, electronic user interfaces and user manuals are in English, which can be a significant disadvantage in the use of computers and ICT for those who are not native speakers of English. Reports on internet traffic indicate that Icelanders use of the internet is mostly directed to Icelandic websites and Icelandic content even though the internet connects the whole world and offers an almost inexhaustible source of information.

Vision

The Icelandic language will be thriving in the information and knowledge society of the 21st century.

Objectives

- Icelanders can choose from a wide choice of digital content and software in Icelandic.
- Icelanders will be leaders in the development of language technology.

- The most common types of software and user interfaces will be available in Icelandic

Actions

- Software in Icelandic will be given priority in projects and tenders on behalf of the Ministry and other government agencies under its jurisdiction.
- Development of language technology further supported.

- Support for cooperation between universities, research centres and companies in language technology.
- Research in Icelandic language technology and ICT strengthened.

Vision

Icelandic educational, cultural and scientific institutions will be leaders in adopting information and communication technology and adapting it to their own needs.

ICT INFRASTRUCTURE

Status

Telecommunications technology is developing fast and the speed with which data can be transmitted is increasing steadily. High speed data networks are one of the backbones of a strong information society, and businesses, education and the homes demand ever more powerful network connections.

Universities and research centres are leading the use of high speed networks for research and development designed to meet the requirements of international scientific collaboration. The use of high speed networks has great potential for the educational system and the requirements will no doubt follow technological innovation in the next few years. Already two thirds of upper secondary schools and all the universities offer wireless connections for students and staff.

High speed networks have had a considerable influence on scientific research and technological innovation and paved the way for international cooperation. Advanced scientific research requires powerful computers to handle massive streams of complex data compiled through international projects. To participate in distributed computer networks, called grids computing, which has become widespread in the global academic community, Iceland needs powerful transatlantic cables to connect to the global network.

It is difficult to predict how telecommunications will develop in coming years. Digital television will increase its market share, at first through DSL or broadband connections used for to the internet, but before long fibre optic cables will take over. Wireless technology will no doubt also be widespread and lead to increase in the use of mobile equipment.

Objectives

- All schools in Iceland connected to the internet by fibre optic cable.
- Integration of communications networks on all school levels.
- Libraries and cultural institutions in rural areas connected to high speed networks and offer a wide variety of information services.
- Icelandic scientific research centres with access to international research grids, which will enable them to become active partners in international research projects.
- Innovation in the use of high speed networks for schools, cultural institutes and scientific research centres.
- High speed and wireless networks in schools used for innovative pedagogical purposes.

Actions

- Support cooperation between Icelandic universities and research centres to join projects through international computer grids.
- Cooperate with foreign schools and computer grid projects to connect Icelandic educational, cultural and scientific institutions.
- Cooperation among Lifelong educational centres and libraries in rural areas to run and service high speed networks for the public.
- Establish cooperation between governmental agencies and high speed university networks to integrate and share high speed network resources and overseas connections.
- Support the installation of wireless networks in all the major public libraries.

Status

Digital technology has transformed equipment used by educational, cultural and scientific institutions by integrating them and making it easier for computers, phones and cameras to interoperate. It is now possible to communicate and distribute information in many different ways. The work place of teachers and students is now increasingly populated with digitised equipment such as laptop computers, digital projectors and computer whiteboards. The focus of ICT has been gradually shifting from the desktop computer, with laptops becoming more popular and in some schools already a commonplace among students. About two thirds of upper secondary schools offer wireless networks for laptops. Progress has been slower among cultural institutions in adopting computers and using ICT for the benefit of the public. In urban centres most public libraries offer online computers, but in rural areas such services are rare.

A similar development is taking place in software. Until recently most software was tied to the desktop but is now being gradually replaced by centralised and personalised web-services. Most schools use administrative systems, have their own web site, and publish information for students and parents. At the upper secondary and university level learning management systems are gaining ground. Within the cultural sector many different kinds of software and information systems have become an integral part of the way institutions operate, e.g. by publishing information and cultural content on the web. For example, an information system for heritage sector, Sarpur, connects regional heritage museums into a central repository for documentation, and the Icelandic library consortium, gegnir.is, provides a single web access to library collections across the country, both public libraries and specialised collections.

As a consequence of this development the demand for better public services and computer administration has grown. More complex technology requires technological expertise and a growing need for public organisations to seek professional services from high tech companies in their field.

Objectives

- A wide selection of digital equipment and software made available to schools, cultural institutions and research centres, which meets their demands.
- Schools, cultural institutions and research centres actively exploit equipment available to the public, such as mobile devices, for communication and educational purposes
- Active innovation and development in the deployment of new technology and computerized equipment.

- A safe and reliable technological environment for schools with the requisite technical assistance and consultation for students and teachers, which takes account of pedagogical considerations.
- School actively use ICT for vocational and arts education.
- Support for efforts by students and teachers to adapt new technology in hardware and software.
- Schools and cultural institutions become more active in the development of software and adapt them to the needs of students and the public.

Actions

- The Ministry of Education initiate cooperation with local government and companies on development projects aimed at using technology in schools and cultural institutions.
- A review of technical services available to students and teachers in upper secondary schools and plans made for improvement in cooperation with schools and companies.
- Plans made to enable schools to offer students of lower income families to acquire necessary equipment by cooperating with businesses.

- Review ways to improve efficiency and safety of computer systems in schools and cultural institutions.
- Support cooperation between schools and businesses in running and servicing computer systems.
- Initiate development projects on innovative uses of software at all school levels.
- Create a permanent basis for cooperation between schools, teacher training institutes and private companies to develop standards and interoperability between information systems.

New media and digital television

Vision

Digital content for education and culture mediated by effective and progressive use of new media.

Status

Access to information, communication and digital content is becoming increasingly ubiquitous through different media channels. The next big step is digital television, which has already started to appear in Iceland. The current technology used to broadcast radio and television will be replaced in the near future.

Television reaches much more people than the internet, since television sets are in most homes. Surveys in countries where digital television is most advanced show that television reaches people who would otherwise be marginalised by the information society since television is more widely used by the general public. The significance of television will not diminish with digital technology because computer, television and telephone technology are gradually converging.

The state broadcasting station, RÚV, reaches most homes in the country and uses its own broadcasting network. With the changing landscape of telecommunications it is necessary to reconsider how RÚV can best meet its legal obligations to serve all the population.

Technological development in digital media, digital video, multimedia, computer games and virtual reality has been rapid. Neighbouring countries have invested in research and development programmes in new media and established special media labs for this purpose. In Iceland the main source of innovation has come from private business and the public sector has not done enough to foster a constructive environment for research and development in this field.

Objectives

- A wide variety of Icelandic material made available through digital media.

- Icelanders take an active part in the development of new media and their adoption.

Actions

- Initiate a policy review of role of the Icelandic National Broadcast Service, RÚV, in light of technological changes.
- The Icelandic National Broadcast Service adopts digital television to broadcast material from its archives.
- Governmental agencies, both national and local, examine closely how they can use digital television for e-government and e-democracy.

- Support the cooperation of universities, companies and creative artists and designers for research and development in new media and innovative uses of ICT.

Vision

A wide variety of digital content in education, culture and science made accessible.
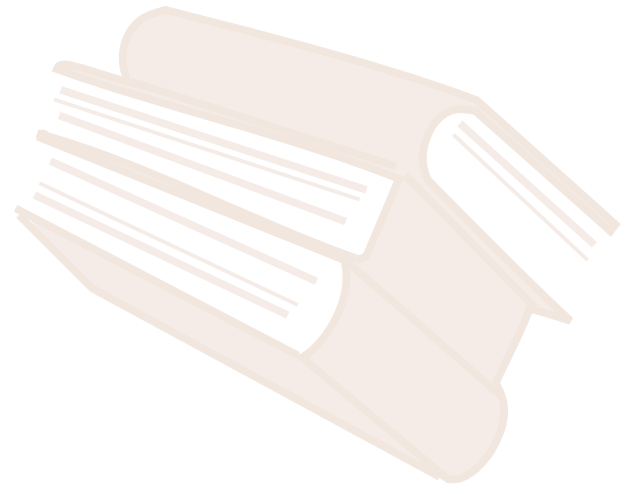
3 DIGITAL CONTENT

Status

Teaching material and learning resources have become increasingly diversified. With schools adopting ICT for course work new ideas about learning resources have been gaining ground. By publishing resources online they are not just being transformed into a new form and medium, new possibilities for teaching and learning open up. Teachers can adapt lessons to their students' different needs by utilising online resources. Students gain access to a wide choice of learning resources and course work that can be modified to reflect individual students' learning progress, capabilities and interests.

The Ministry has provided grants to e-learning resources and software projects from the school development funds and learning resource funds at the upper secondary level. The Icelandic Education Gateway, menntagatt.is, is an online portal initiated by the Ministry in collaboration with a private software company, Hugur. The gateway is intended to promote the use of e-learning resources among teachers, students and parents. Until now teachers themselves have made their own e-learning resources. In higher education there is growing demand for online resources because of an increase in distance learning. Teachers at the primary, compulsory and upper secondary level have published a variety of material online, and these resources are now available through the education gateway and assessed according to the national curriculum guidelines.

Private enterprise has tried to gain a foothold in the e-learning business and steps need to be taken to make their participation in the market for e-learning easier. Promoting innovation in e-learning resources is also important. More learning resources from museums and research centres that can used for education can be provided through better cooperation with schools.

Objectives

- A broad selection of digital content available that is assessed according to curriculum guidelines.
- Digital e-learning resources comply with quality standards and support progressive pedagogical practices.
- Digital content used effectively at all school levels.
- Active development and innovation in digital e-learning resources.
- Competition in the e-learning market.
- Creative partnership between public and private publishers of digital resources.

Actions

- More funds made available for e-learning resources.
- Cooperation between private enterprise, public institutions and schools given priority when awarding grants to e-learning projects.
- Initiate quality reviews of e-learning material and its use in schools.
- Public recognition and awards to authors and publishers of e-learning material for excellence and innovation.
- Support research and development in learning materials.
- Support cooperation between universities in online e-learning resources.
- A policy review of the National Centre for Educational Materials' role with regard to increased emphasis on e-learning resources and an increased involvement of private business.
- Cooperation with foreign publishers to make, translate and adapt e-learning resources to the needs of the Icelandic educational system.
- Research centres and cultural institutes encouraged and rewarded for mediating digital resources to schools and the public.

Digital libraries and databases

Status

The Icelandic countrywide access portal to electronic databases and e-journals, hvar.is, and the Icelandic Library Consortium's union catalog for Icelandic libraries, gegnir.is, have opened up vast repository of digital resources to the public. A new law requires the National and University Library of Iceland to collect online digital material. The growing practice of publishing material online or in digital form requires libraries to change their practices. Libraries worldwide are seeking means to adapt their services to deal with digital material and meet the demands of the information society.

Publication of scholarly journals has been transformed by digital media. 800 of the 1500 journals purchased by the National and University Library of Iceland in printed form are available online on the university network. The countrywide portal, hvar.is, provides access to 8.000 online journals and 31 databases. It is safe to assume that in the future scholarly journals and data resources will almost exclusively be published in digital form on the web.

The Icelandic government's science and technology policy emphasises the need for access to research data and results that are financed through public funds, which is in line with developments within the European Union. Access to databases of public organisations in Iceland has until now been limited. An example of efforts to increase access to research data is ICERIS, the Icelandic Current Research Information System, which provides access to information on Icelandic research projects and R&D results.

Objectives

- The scientific community, scholars and the public provided with open online access to research data and results of public research centres and scientific institutions.
- Libraries adapt their services to handle digital collections.

- The use of scientific data be improved and innovation encouraged, e.g. among private enterprises, by developing interoperable databases in many fields of science and scholarship.

Actions

- Support cooperation among research centres for online publication of research data.
- Develop metadata guidelines for describing research data.
- The Icelandic Library Consortium used to increase the public's access to scientific and scholarly research databases.
- Develop guidelines for publication of research data from public research centres.
- Establish a working group to make recommendations regarding standardisation, publication and preservation of digital collections, and review the role of public libraries, archives, the Icelandic Library Consortium, specialised scholarly libraries and other public institutions.

- Develop a single web based search interface for foreign databases.
- Raise awareness among the public about the possibilities of digital collections.

Digitisation of cultural content

Status

Digital technology is now pervasive throughout all cultural activity, from author to publisher, in the organisational practices of cultural institutions and participation of the public. With the proliferation of new the possibilities for mediation and communication new forms of digital cultural content have appeared.

Official cultural institutions are obliged to offer the public educational programmes and services, and many of them have been considering how they can use new media for this purpose. In recent years cultural institutions have initiated ambitious projects using ICT to mediate information and knowledge about the Icelandic history and culture online and with multimedia. As the projects have grown in size and complexity it has become clear that to harness digital technology for the benefit of the public new avenues of cooperation need to be examined between partners with different expertise in the fields of education, heritage, and technology.

The computerised documentation of collections and archives within cultural institutions is a long way from being completed. The public still has limited access to information and archives of cultural institutions. The first steps towards standardisation of procedures between institutes have just been taken but there is a long way to go before they can fully utilise computer technology for data processing and online sharing.

The internet is an international medium and Icelandic web pages are open to the whole world. Even so, the supply of content on Icelandic culture in foreign languages is very limited. The internet is a powerful medium that gives learners, scholars and enthusiasts from overseas the opportunity to learn about the Icelandic nation's culture and communicate directly with the Icelandic people. However, relatively few online projects are available in foreign languages.

Objectives

- Open access to a variety of quality digital content about Icelandic heritage and contemporary culture.
- Open access to digital content on Icelandic culture online and through new media for the educational system.
- Cultural institutes use digital media in their public services.
- The public will have open access to integrated information about museum and heritage collections and documentation.
- The public's access to public information in cultural institutions will be guaranteed.

Actions

- Increase funds for digitisation of cultural content.
- Cultural digitisation projects prioritised with regard to the needs of the educational system.
- Support cooperation between cultural institutes, companies and teachers in digitising cultural content for education.
- Stimulate innovation and the use of new digital media, e.g. digital television, for production of digital content.
- Support cooperation between cultural institutions to publish clear guidelines for the use of open standards in digitisation projects.
- Databases of public cultural institutions made interoperable and public information from them made accessible online.
- Cultural institutions encouraged to cooperate in order to make computer records more compatible and connect information systems in accordance with international standards.
- Continue development of the heritage information system Sarpur to meet the requirements of local museums.
- Continue the development of an online portal with a searchable access to public records of cultural institutions.
- Make available online digital content of Icelandic heritage in foreign languages that can be used as learning resources in foreign universities.

Digital preservation

Status

Awareness is increasing of the importance of preservation of digital resources and measures have been taken to ensure the preservation of cultural content for the future. A new legislation for the National and University Library requires the library to collect web-pages and digital content on the web and similar legislation is being prepared for the National Archives. More and more databases with e-learning resources, scientific data and cultural content are appearing, which makes the need for systematic preservation more pressing than ever. With rapid changes in technology there is growing risk that digital content will be lost as it becomes locked in obsolete formats and equipment.

To a certain degree digital reproduction is a good method for preservation and there is an urgent need to transfer analog content (e.g. recordings on tape and gramophone records) to digital media for preservation.

Objectives

- Guarantee the preservation of digital resources in education, science and culture.

Actions

- A campaign to inform and raise awareness among professionals about the importance of digital preservation and its methods.

Vision

**Better services and more
varied opportunities to
pursue education, enjoy
culture and participate in
science with the rational
and innovative use of ICT.**

Status

Increased use of ICT has led to new ways to improve public services. Students have more choice, it is easier to adapt teaching to individual development, and learning is less dependent on the restraints of place and time. The public has greater access to the country's heritage and scientific knowledge and has more opportunities for participation in cultural events. The public knows more about public institutions and their services, can communicate with them in more ways and has greater opportunity to influence their practices.

Schools are increasingly tailoring their services to the individuals' needs and offer differentiated teaching. ICT has led to new possibilities for schools to offer students more choice in the curriculum and create the necessary flexibility required to adapt to individual needs. This development has made it possible to meet the growth in distance learning in recent years. The way in which schools operate can be expected to change considerably in the next few years and with higher level of cooperation.

There are a number of examples of cooperation aimed at building capacity and utilizing ICT, both within the educational and cultural sector. One of these examples is the Icelandic Library Consortium's online portal where almost all the country's libraries joined forces to build and operate a nation wide library system. The portal is run by the consortium, which is a limited company owned by the state and municipalities. Plans are underway to establish knowledge centres in three rural communities with the participation of universities and national research institutions. With the establishment of a new upper secondary school in a rural town in the west of the country a significant step was taken toward a school based on new practices, emphasizing cooperation with other educational institutes to offer students a greater variety of learning opportunities.

In recent years efforts have been made to develop distributed learning in Iceland, with centres of continuing education, research centres and development projects in compulsory level and upper secondary level schools in rural communities. Distributed education involves the cooperation of schools in providing education that makes the student the central focus and where he can choose from services offered by educational establishments. This development demands new practices and the breaking down of traditional boundaries separating organisations. Networks of cooperation between schools and teachers, both locally and internationally through joint projects, has grown and led to innovation in school practices. The business community has actively participated in various projects in collaboration with public authorities and contributed valuable expertise and experience.

ICT based projects are in most cases on a large scale and demand expert knowledge. Increased service through ICT is expensive both in terms of initial investment and operational costs. The rapid development of technology requires constant alertness and adaptability to changing circumstances. Experience in recent years has shown that organisations that do not change their practices will not reap expected benefits from ICT in terms of better services, success or effectiveness. Icelandic organisations are generally small and cannot gain adequate return on investment except by sharing knowledge as well as human and financial resources.

It is important to follow up increased ICT investment with regular monitoring and research. Participation in international research and development projects can provide a good indicator of where Icelanders stand in comparison to neighbouring countries in the use of ICT.

Objectives

- The possibilities of ICT used to give the public opportunity for participation in and influence on the services of educational, cultural and scientific institutes.
- Increase cooperation between educational, cultural and scientific institutes and private companies in the use of ICT for the benefit of the public.
- Continued development of distributed learning, freeing education from the constraints of location and time.

- ICT used to strengthen distance learning and increase cooperation in general between schools, business and homes.
- ICT used to improve the practices of schools, cultural institutes and science centres.

Actions

- Collaborative projects between schools, cultural institutions and companies given priority when awarding grants.
- Schools offering distance education at the upper secondary and higher education level encouraged to publish information of course descriptions, manage student e-portfolios, and provide necessary support services for distributed education.
- Support cooperation across school levels on distributed learning to offer learners more choice and flexibility at every school level.

- Provide special courses and consultation on ICT management to leaders in educational, cultural and scientific institutions.
- Improve the relation of schools and lifelong education centres to homes by using new media, e.g. digital television, to provide information and better education.
- Leaders and managers of educational, cultural and scientific institutions encouraged to show initiative and leadership in the use of ICT and organisational change management.

Vision

Widespread and legal use of copyright material among the public and within the educational system. Young people use ICT and the internet in a responsible and safe way.

5 ETHICS AND SAFETY

Copyright

Status

Digital technology has led to fundamental changes in the way content is distributed, which has caused confusion in the minds of the public about what is protected and what kind of use is in breach of copyright. This confusion has hampered progress in the spread of digital content and access to knowledge and cultural content. For instance, the Icelandic heritage information system, Sarpur, and other important national heritage databases, are inaccessible to the public, in part because of copyright issues.

Teachers, students and school administrations are still not well informed about copyright. Online copyright piracy among young people has caused concern. Teachers, who make and use digital online content, are uncertain about what protection their own work enjoys and what conditions apply to the use of material from others.

Educational and cultural organisations in other countries have in some cases reached general agreements with the representatives of copyright holders on the use of copyright protected material. Icelandic copyright law is being reviewed to adapt it to directives from the European Union, which will clear the way for similar agreements with Icelandic copyright associations on the use of protected works.

Free communication and open mediation of knowledge is fundamental for the future development of the information society and a precondition for innovation and rational decision making, both for citizens as well as the authorities. Therefore it is important to prevent unnecessary obstacles being erected that could hinder the flow of information and knowledge. The interests protected by copyright law need to be considered in context with the national interests that are part of an open information society.

Objectives

- Public be well informed about copyright and responsible use of the internet.

- Support for active use of copyright material by educational, cultural and scientific institutions.

Actions

- Determine public domain information within public institutions.
- Raise awareness of copyright issues with regard to online and digital material, and the information required by authors for the use of online content.
- Arrangements made with copyright associations on the use of copyrighted material for education and within cultural and scientific institutions that encourages active use of copyright material.

- Public cultural institutions set clear guidelines on copyright of digital material and make arrangements with copyright associations about its use.

The wellbeing of children

Status

Parents are concerned that their children are vulnerable to offensive material and other dangers lurking on the internet. This is compounded by the feeling of most parents that their children are in many ways quicker to adopt new technology, such as web pages, blogging, online messenging and mobile phones. Surveys have shown that there is a considerable difference between how children use computers and the internet, and what parents think they are doing. How well parents keep an eye on what their children use the internet varies and in many cases they are not in a position to be able to track what appears on computer screens at home. Children are more vulnerable than their parents realise. Many children that are online have visited web pages with obscene material by accident. A surprising number of children that use online messenger services or discussion forums have met in person someone they have come into contact with online.

The dangers and problems facing children online are:

- Children can access offensive material, e.g. with pornographic and violent content, which they are otherwise not exposed to.
- Computers and mobile phones can be used to spread slander and persecute youngsters.
- Privacy can be violated by inadvertently spreading personal information online, such as home and email addresses, where it can be abused for instance for advertising purposes or to establish undesirable contact.
- Children and youngsters can loose control of their use of computers and the internet, which can lead to addictive behaviour and cause psychological problems and social isolation.
- Children have little understanding of the significance of copyright and have difficulties seeing the difference between illegal and permitted copying, which can lead to violation of copyright.
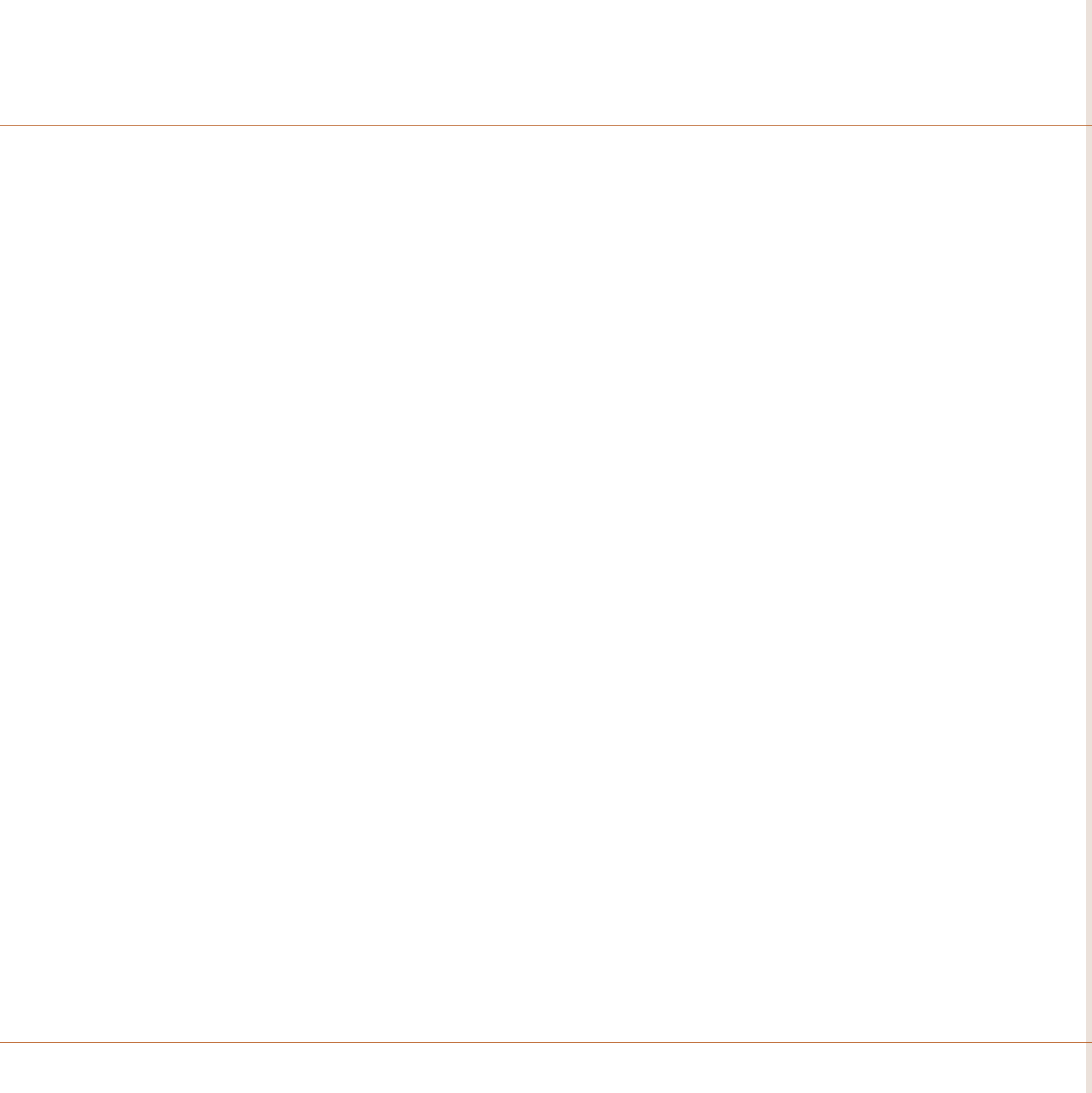
Objectives

- Icelandic schools will be leaders in the international community in responsible and safe use of ICT and the internet among children.
- Children and their guardians are made aware of responsible use of ICT and how to respond to abuse.

- A solid knowledge base in Iceland of the effects on children of internet and computer games.

Actions

- Students instructed on responsible use of the internet as part of their information literacy and computer skills courses.
- Parent associations and other interested parties consulted on means to raise awareness of responsible use of the internet.
- Support publication of learning aids for parents and children on the effect of computer games and internet use.

- Publish guidelines in cooperation with the Ministry of Justice on correct response to reprehensible conduct on the internet.
- Support research and publish results on the effects of computer use and internet on children.