

Observing how learning is changing...

The EENet Observatory -
an Information Platform for ICT in
European School Education Systems

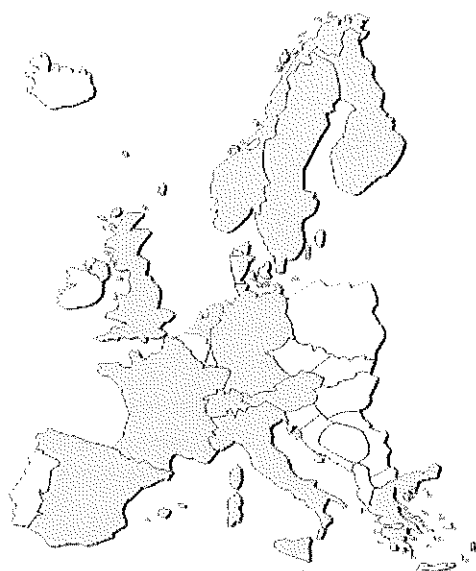
February 2001

About this booklet

This booklet describes basic assumptions and methodological issues in the work of EENet, the European Experts' Network for Educational Technology.

On the basis of a general overview of key factors and developments, it summarises underlying parameters and assumptions in EENet's work of observing and interpreting Information and Communication Technology (ICT) in European school education. The core tool for EENet's data distillation and reflection tasks in this field is a European Web-based information site named "EENet Observatory" (www.eenet.org), which is explained in more detail in Chapter 3.

EENet member states (April 2000)



As of April 2000, EENet has 13 active members: Austria, Denmark, Finland, France, Germany, Great Britain, Greece, Italy, the Netherlands, Norway, Spain, Sweden and Switzerland. Member organisations should be recognised as central or national focal points of ICT in education. They manage significant projects, are experienced in disseminating information and advice to schools and colleges – as well as to users in general – and they are close to their education ministries, though not necessarily part of them. Negotiations with other countries, EU and non-EU member states, have already taken place. The work of EENet has been presented to the European Commission.

In January 2000, EENet successfully submitted an application within the framework of the EU Socrates programme. With a complementary measure named “EENet Observe – The EENet Observatory, a basis for synergy and transparency between initiatives at national and international level in the area of ICT in education”, EENet’s work has been officially recognised.

In the future, EENet will be focusing on a continuous reflection and evaluation process at policy level, supported by a sustainable information platform named “EENet Observatory”. Before describing the observatory in detail, general underlying assumptions about the relations between ICT and education will be outlined.

- Concepts such as “life long learning” and “learning to learn” are highly valued due to the necessity for constant adaptation and the demand for flexibility. Fixed qualification schemes and the concept of a stable lifetime job qualification are losing importance, while open concepts such as competence are gaining importance.
- Outside the existing institutionalised forms of educational services, ICT can offer more flexible learning opportunities beyond limitations of time and space.
- ICT is increasingly becoming an integral part of everyday life and an important working tool. Every citizen must have the skills and competencies to communicate, to inform and express himself, and to work with multimedia and ICT. This ability includes knowledge of and critical reflection on the background of media and new technologies.
- ICT and multimedia can play an important role in the transformation of the education system. These new media technologies can enrich the learning process. Their educational potential can only be exploited when they are responsibly implemented in the overall learning situation and organisation. Many educational institutions go through an organisational restructuring process and open up for new relations to other organisations and institutions.

2.3 Developments of ICT in School Education

The introduction of computers in schools started in the 1980s. At that time, programmes to equip schools and educational institutions were being initiated in most European countries. Using word processing programs, spreadsheets or databases and learning the basics of computer science were the first steps towards acknowledging the educational role of ICT.

After a period of basic computer training schemes, the network paradigm entered the educational sphere. The Internet with the World Wide Web (WWW) and online services have grown exponentially, becoming an integral part of public educational policies and private activities in the educational market. Ambitious objectives to connect all schools to the Internet and to set up teacher training programmes can be found in almost every national policy paper and strategy plan for the information society. National school networks, educational servers and global co-operative learning projects indicate this new shift in educational use of technology.

the information society, it is often mentioned that seeing the school as an open and learning unit becomes a crucial factor for successful organisational development. A further step in differentiating the social system of the school focuses on social interaction in the classroom. ICT can support more learner-centred learning environments, and can have an influence on the shift of roles taken by teachers and pupils. All communicative and social actions transcending the mind world of the individual belong to this level.

- c) At the micro level, all cognitive and emotional aspects of learning and teaching are summarised. This refers not only to the level of qualification, skill and competence of teachers or pupils, but also to emotional barriers which prevent them from using ICT in new learning settings. Initiatives on meso and macro level have to take these issues into account by including awareness-raising and supportive measures as well as targeted qualification schemes. Effects and impacts at this level are very difficult to measure or even to observe. They have to be converted to an observable level to allow us to judge the effectiveness of ICT in education.

2.5 Forces of Restructuring at Macro Level

When elaborating on the societal level (a), a list can be made of several “imperatives” which have an impact on the actual situation of ICT integration in education. They give grounds for pushing through a restructuring process and – to a certain extent – can be found in most of the strategy plans and policy papers on education in the information society.

- Pedagogical imperative: ICT and multimedia can enrich the learning process by providing a multi-sensory impression of the content, by introducing new communication experiences, or by stimulating project-oriented learning in teams. As cognitive research studies have shown, multimedia may increase the effectiveness of learning under certain conditions. These new technologies have a large pedagogical potential for developing learners’ abilities if they are implemented in an adequate communicative, social, organisational and technical context. In practice, however, this implementation makes it difficult to measure the effectiveness of ICT in education despite many best practice examples.

- Technological imperative: this imperative is often explained as the opposite of pedagogical responsibility: the driving force should not be the available technical possibilities or potential, but what is socially and pedagogically reasonable and desired. Nevertheless, new technology inevitably changes the ways of storing, organising and distributing information. With the arrival of the computer, technology even processes information, which provokes pedagogical questions about whether certain skills should be taught and learned with or without the support of information technologies. This debate started with the pocket calculator in mathematics, but nowadays more complex cognitive processes can be executed by computers. It is the “mediality” of all communications, be it oral speech, printed books or multi-media, that needs to be reflected upon in concepts of a “new literacy”.

These imperatives are not isolated, but interrelated and linked. Learning takes place in a specific environment, be that institutionalised in a school or in a virtual space on the Internet accessible from home or from school. To a certain extent, existing structures such as curriculum content, the integration of media in the curriculum or the inner organisation of schools can be regarded as effects of these imperatives.

2.6 A Holistic Approach to Analysis

The three interrelated levels – a) the societal, b) the organisational and social, and c) the individual-cognitive level – should help to illustrate the complexity of ICT in education: the learning process itself is implemented in a setting determined by the competencies of all participants (pupils, teachers, headmaster), by the pedagogical content and materials used, by the organisational structure of the school, by the possibilities of access to ICT, by the educational policy, and by many other factors at all levels.

3. The EENet

Observatory

This chapter deals with EENet's approach of reducing the described complexity to a set of parameters used to observe developments of ICT in education in Europe.

In EENet's first working phase, country status reports were written in a common structure, then distributed to the members for discussion before being used as a basis for the first EENet report *"How learning is changing: information and communications technology across Europe"*, which was published in 1998. It soon became clear that strict formalisation and standardisation does not yield an adequate depiction of the status of ICT in the field of education, where education systems and settings vary from country to country or even from region to region.

Due to the rapid developments in the field of ICT in education and the complexity of interweaving and interdependent factors such as accessibility of ICT, teacher qualification or policy issues, EENet members decided to set up a dynamic "Observatory" with descriptive parameters on the Internet to complement the written reports.

This virtual Observatory is a pool of information consisting of data items structured for a standardised matrix. The parameters, explained in more detail below, are a result of an extensive discussion process among the EENet members. They reflect a compromise between comparability and individuality.

The overall concept of an "EENet Observatory" consists of three different parts:

- a) The Observatory on the Internet with decentralised information on ICT in education, maintained by each EENet member. This collection of data is structured according to a standardised set of main and sub-parameters (see below).
- b) The reflection papers and transnational reflection papers, which are part of the internal "members' only" Web site. These documents comment on the raw data modules of the Web Observatory (a).
- c) The printed reports published by EENet on the basis of the EENet public and internal discussions and reflection papers.

To sum up, the EENet Observatory

- focuses on ICT and multimedia developments in general school education in European countries from a policy-oriented point of view;
- has a holistic approach in depicting these developments and observes with a standardised set of parameters arranged in a matrix;
- is maintained by EENet members on a decentralised basis;
- serves as an information platform for conclusions and recommendations;
- is an open platform for promoting international discourse in this field.

3.2 Structure of the Virtual Observatory

about EENet
members
observatory
news
links
members' area

observatory

[observatory] - methodology - publications - discussion - newsletter

EENet Observatory

General educational facts and figures

Policies and policy making bodies

ICT initiatives and programmes/projects

Expenditures on education and ICT funding

ICT infrastructure and usage

Teacher education and training

Co-operation with private sector

Content development

Evaluation and research

School practice, models and projects

Summary

	Austria	Denmark	Finland	France	Germany	Great Britain	Greece	Italy	Netherlands	Norway	Spain	Sweden	Switzerland
General educational facts and figures	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Policies and policy making bodies	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
ICT initiatives and programmes/projects	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Expenditures on education and ICT funding	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
ICT infrastructure and usage	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Teacher education and training	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Co-operation with private sector	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Content development	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Evaluation and research	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
School practice, models and projects	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Summary	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Aus	Den	Finl	Frar	Ger	Gre	Gre	Ital	Ned	Nor	Spa	Swe	Swi

The Information Network on Education in Europe.

- Structure of the national educational system
- Numbers of schools (in each sector)
- Numbers of teachers (in each sector)
- Numbers of pupils (in each sector)
- Links and sources

b) Policies and policy making bodies

This row identifies policies and policy making bodies relevant to ICT in education. Ranging from centralised in one national ministry to decentralised in federal states, European educational policies are defined in different ways.

In general

- Are there national aims, policies and strategies for ICT in education?
- Where are they defined?
- Links

Policies and policy making bodies

- Main bodies
- Key documents
- Addresses
- Links

c) ICT initiatives and programmes / projects

So far, all EENet member countries have introduced special initiatives, programmes or projects for promoting ICT in school education. These programmes are usually linked to national action plans describing strategies for moving towards the information society.

- Description of national and/or regional initiatives, programmes and/or projects
- Research and evaluation
- Key documents
- Partners
- Funding
- Links

d) Expenditure on education and ICT funding

Financial figures on ICT in schools are separated into a national level and a local school level. Figures may differ greatly between different types of schools, and even between regions in one state. Some figures may not be available for certain types of schools. Furthermore, the costs for telecommunications and Internet providers have an impact on the diffusion of ICT in education.

Software

- Types of available applications (word processing programs, databases, spreadsheets, Internet, E-mail, CD-ROM, games/edutainment, video conferencing, other programs)

Usage

- Time spent with specified applications and infrastructure at home and at school
- The use of ICT in different subjects (integrated into the whole curriculum, ICT used in parts of the curriculum)
- The use of ICT at different class levels
- Technical maintenance and support (by teachers, by external partners, managing services)

Budgetary items

- Amount of money allocated for
- Investment in new hardware and software
- Maintenance and technical support
- Staff development
- School tariffs for Internet use or educational software

f) Teacher education and training

In general, initiatives and programmes for ICT in education also include teacher qualification schemes ranging from courses of a few days to extended long-term qualification programmes. Both teacher education (pre-service training) and in-service training should be covered.

Pre-service training

- Initiatives and programmes
- Bodies and partners
- Statistics on pre-service training
- Duration
- Costs and funding
- Evaluation
- Links

In-service training

- Initiatives and programmes
- Bodies and partners
- Statistics on in-service training
- Duration of training
- Costs and funding
- Evaluation
- Links

Databases of school projects

- Sources

Illustrations of school practice, models and projects

- Key factors for selecting the following schools

Illustration 1.3

- The school community and setting
- The school as an organisation
- Background to development and projects
- Physical setting
- Technical setting
- Competence development and knowledge
- Project description and activities
- Contact and address

k) Summary

This row sums up all the previous ten parameters and presents an overview of the national status of ICT in school education. The sub-categories are identical with the headlines of the main rows.

- General educational facts and figures
- Policies and policy making bodies
- ICT initiatives and programmes / projects
- Expenditure on education and ICT funding
- ICT infrastructure and usage
- Teacher education and training
- Co-operation with private sector
- Content development
- Evaluation and research
- School practice, models and projects

5. Contact

EENet members as of March 2001:

Austria

Austrian Federal Ministry of Education,
Science and Culture

Mr. Helmut Stemmer

helmut.stemmer@bmbwk.gv.at

<http://www.bmbwk.gv.at>

Denmark

Learning Lab Denmark (LLD)

Ms. Susanne Panduro

spa@lld.dk

<http://www.learninglabdenmark.dk>

Finland

National Board of Education (NBE)

Ms. Ritva Kivi

ritva.kivi@oph.fi

<http://www.oph.fi>

France

Ministère de la Recherche

Direction de la Technologie

Sous-direction des technologies éducatives et des

technologies de l'information et de la communication

Pôle International

Ms. Odile de Chalendar

odile.de-chalendar@education.gouv.fr

<http://www.educnet.education.fr>

Germany

ecmc European Centre for Media
Competence

Mr. Harald Gapski

gapski@ecmc.de

<http://www.ecmc.de>

Greece

Lambrakis Research Foundation (LRF)

Mr. Nikitas Kastis /

Mr. George Tsakarissianos

kastis@lrf.gr / gtsaka@lrf.gr

<http://www.lrf.gr>

Italy

Istituto per le Tecnologie Didattiche -
C.N.R.

Mr. Vittorio Midoro

midoro@itd.ge.cnr.it

<http://www.itd.ge.cnr.it>

The Netherlands

Ministry of Education, Culture and
Sciences

Mr. Ron van der Kooy

r.vanderkooy@minocw.nl

<http://www.minocw.nl>

Norway

National Board of Education

Ms. Vibeke Thue

Vibeke.Thue@ls.no

<http://www.ls.no>

Spain

Programa de Nuevas Tecnologías

Ministerio de Educación, Cultura y
Deporte

Mr. Agustin Quintana

aquintan@platea.pntic.mec.es

<http://www.pntic.mec.es>

Sweden

Swedish Agency for Distance Education
(Distum)

Mr. Carl Holmberg

carl.holmberg@distum.se

<http://www.distum.se>

Switzerland

Centre Pédagogique des Technologies
de l'Information et de la
Communication (CPTIC)

Mr. Raymond Morel
morel@uni2a.unige.ch
<http://www.wedu.ge.ch/cptic/>

United Kingdom

Becta - British Educational
Communications and
Technology Agency
becta@becta.org.uk
<http://www.becta.org.uk>

Chair:

Mr. Carl Holmberg,
Distum (Sweden)

Vice Chair:

Mr. Vittorio Midoro,
C.N.R. (Italy)

Secretary:

Mr. Harald Gapski,
ecmc (Germany)

For further information about EENet
please contact:

EENet Secretariat

c/o ecmc European Centre for Media
Competence

Bergstr. 8
D-45770 Marl
Germany

Phone. +49 (0) 23 65 - 94 04-0 / -66
Fax: +49 (0) 23 65 - 94 04-29

<mailto:info@eenet.org>
<http://www.eenet.org>

© EENet 2001

Printed in Norway
by GAN Grafisk 2001

3.2.3 Internal EENet Members' Area

Apart from these ten categories and a summary row, EENet uses additional information files for preparing printed reports which focus more clearly on conclusions and recommendations.

Two types of internal information modules are currently in use:

- The internal column “transnational reflection papers” contains a horizontal cross-section of all national data referring to one parameter. Transnational editors are appointed by EENet, and summarise major developments in each parameter row. Conclusions drawn from this transnational perspective will be discussed in the EENet group before being integrated into the published reports.
- “Reflection papers” belong to a members’ column and contain thoughts and reflections in progress. When published in the internal EENet members’ area, they are open to comments from other EENet members.

Furthermore, there is an EENet e-mailing list and a discussion forum only accessible to the members of EENet. These virtual tools support and document EENet’s work and are used in between the physical working group meetings.

4. Outlook

With the completion of the virtual Observatory, EENet has installed a working and documenting tool which can be used by policy and decision makers on all levels of ICT in school education.

EENet will update and develop all data regularly. Transnational reflections and topic-oriented reflections based on the information gathered in the Observatory will flow into the writing process of the second report which will be published by EENet.

Already, it can be stated that power shifts will play an important role in this next report. Societal and technological changes move and transform relations between teacher and learner, between school and society, between global and local, between centre and periphery, between individuals and groups, and between the public and the private.

g) Co-operation with private sector

The development of educational markets and products, the ICT skills needed in the future and limited financial resources are often cited as arguments with regard to co-operation between the public and private sphere. Possible relations range from one-time sponsorship to long-term co-operation of mutual benefit. In every case, the management of these relations requires sensibility in terms of the different imperatives involved (pedagogical versus economical imperatives).

- Types of co-operation (national agreements and/or initiatives, regional projects, foundations, etc.)
- Description of public-private partnerships
- Links

h) Content development

Content, regarded as one of the bottlenecks in the successful integration of ICT in education, is especially challenging for smaller language markets. The development of content in digital format merges cultural, educational and economic imperatives.

- Policies
- Programmes and/or initiatives and financing
- Language versions
- Private content providers
- Public content providers and/or educational servers
- Educational software market and/or facts and (financial) figures
- Key and critical factors
- Links

i) Evaluation and research

Results of evaluative studies and research programmes provide important feedback on the effects and problems regarding the introduction of ICT in schools. This row indicates larger programmes without going into methodological details, and provides links for further reading.

- Large research programmes concerning ICT in schools
- Partners
- Publications
- Links

j) School practice, models and projects

While the previous nine parameter rows describe information at the macro level of developments, this last row provides examples of school practice, models and projects. The first sub-category features links to existing national databases of schools and projects. Before presenting illustrations of individual schools and projects, the reasons for selecting these are given.

National

- Educational budgets
- ICT funding
- Links

Local

- School budget and authorities
- Expenditure on ICT – hardware and/or software
- Expenditure on networking and/or telecommunications
- Expenditure on teacher training
- Expenditure on support and/or maintenance (personnel)
- Links

Networking and telecommunication costs

- Companies and providers
- Rates
- Special rates for education
- Links

e) ICT infrastructure and usage

Although a figure such as the pupils-per-computer ratio is only one parameter among many others, it often occupies a dominant position in status presentations of a successful integration of ICT in education. The diversity of existing statistics on ICT in schools throughout Europe makes it hard to define one unified framework. EENet has tried to identify some parameters which describe the actual accessibility and usage of ICT. It shows that many of the data items listed below are not available in some countries, or that they are not compatible as to school type or specification of technical equipment. All statistical data should refer to usage both in school and at home, since usage in a non-institutionalised setting provides feedback on the usage of ICT in the learning setting at school.

Hardware

- Computers (numbers, explanation of types and operating systems, types of networks (LAN))
- Internet connections, if possible with details of:
 - Type of Internet connection (modem, ISDN, router-LAN / single PCs)
- Location of Internet access points (classroom, library, computer lab, access at home, teachers' room)
- Percentage of schools connected to Internet (from all classrooms and from teachers' study rooms)
- Percentage of schools with a Web site
- Internet Service Providers (ISP)
- Other available technical infrastructure (video projector, server etc.)

The virtual Observatory consists of a table or matrix where EENet members are positioned as columns, and main parameters of ICT in education are depicted as rows. Each member takes care of its own data collation and of the updating and publishing process on the Web. Each star in this matrix represents a block of information relative to its position in the matrix. By clicking on a star, the user can access the relevant information, which is usually structured in further sub-headings. This decentralised matrix can be accessed through the EENet Web site at <http://www.eenet.org>.

3.2.1 Country Columns

EENet members are responsible for the content in their respective country columns. This open and decentralised structure can be expanded with new members' columns. At a lower level, additional sub-columns could be introduced inside a national column to illustrate federal structures.

3.2.2 Parameter Rows

The rows in the matrix of the Observatory contain the main parameter categories. Ten main parameters relevant to ICT in education have been identified by EENet members:

- a) General educational facts and figures
- b) Policies and policy making bodies
- c) ICT initiatives and programmes / projects
- d) Expenditure on education and ICT funding
- e) ICT infrastructure and usage
- f) Teacher education and training
- g) Co-operation with private sector
- h) Content development
- i) Evaluation and research
- j) School practice, models and projects
- k) Summary

These ten content parameters contain sub-categories which will be described in more detail below. All information in these categories should carry a reference and source (WWW link).

a) General educational facts and figures

A basic introduction to the general education system is presented in the first row of the matrix. Most of this information can be quoted from ministerial servers, national statistics agencies and Eurydice –

3.1 Purpose and Use of the Observatory

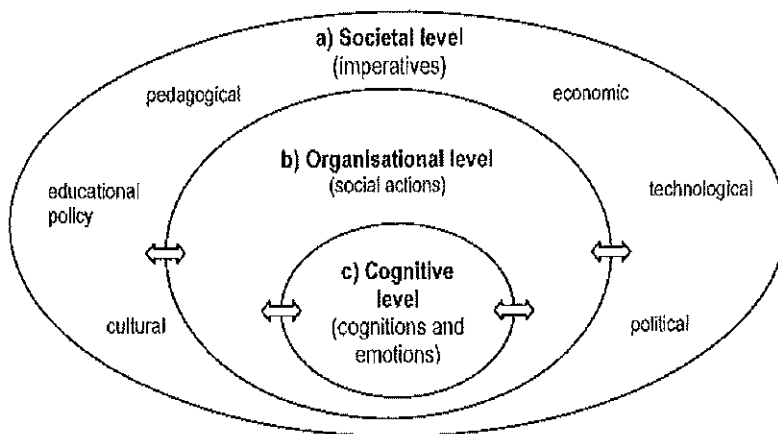
The Web-based Observatory is primarily intended as a working tool for the education community. As mentioned above, it has replaced the static country reports from the first working phase and takes advantage of the new editing and networking possibilities of the Internet. Since all the core country data are publicly available on the WWW, EENet invites policy makers, teachers, authorities and the general public to draw their own conclusions from the Observatory or compare them with EENet's recommendations. The EENet Observatory is intended to promote a public and international discourse on European policy issues of ICT in education by offering a platform with relevant data and information.

It should be stressed that the Observatory itself is not a comparison table, but rather a platform with "raw data" which can be used to draw international conclusions and make recommendations. It is important to remember that "objective" country-to-country comparisons are very difficult to conduct: the inner-political reality may differ from the outside presentation, official statistics and evaluation documents often lag behind the rapid developments, national education systems may not be directly intercomparable, and different cultural backgrounds may hinder a mutual understanding of educational strategies.

The parameters listed in the Observatory are a result of an extensive definition process among EENet members. They are intended to

- reduce the variety of different national educational frameworks in Europe to a common denominator (parameters),
- be specific enough to depict relevant information and developments,
- be adequate for providing a holistic and informative platform for further interpretations and recommendations in the field of ICT in Europe.

EENet members are aware of the fact that most of these parameters strongly depend on the national educational settings, and that some of the statistical figures, in particular, are not accessible. In the latter case, other available information sources which cover the parameter's theme will be considered instead. No additional research will be undertaken by EENet. The EENet Observatory gathers and distils already available information and data. This overview makes it possible to identify "white spots" in the availability of information regarding ICT in education from an international perspective. These observations might then flow into recommendations for additional research necessary to fill these "white spots".



Three levels of observation

This sketch is not intended to be a theoretical model, but a way of structuring the levels of complexity. In order to depict developments in ICT in education adequately, it is not sufficient to focus on individual parameters such as access to equipment or teacher training. From a holistic point of view, several levels – including cognitive, organisational and societal factors – need to be taken into account.

EENet's work on the Observatory is mainly focused on ICT policy and gathers data, information and studies relevant to all three levels. Due to the methodological difficulty of analysing the cognitive level (c) and the lack of consistent and transferable international research results, EENet's methodological priority lies at the societal and organisational levels (a) and (b). By keeping this multi-level complexity in mind, EENet seeks to avoid any unfortunate shortening of interpretations and conclusions. Despite this holistic demand, the availability and diversity of collected data in the actual Observatory shows the need for an intensive interpreting and framing process in order to get closer to the "big picture".

- Educational policy imperative: educational policies determine the conditions under which ICT can be integrated into the learning process. The autonomy of schools, the role of teachers, the policies of using digital content and the extent of ICT integration in the curriculum are relevant factors in a possible educational reform. Media form the way we communicate in an organisation, and they can promote organisational reforms of educational institutions and change administrative procedures.

- Economic imperative: the skills and competencies in ICT and multimedia taught in the education system secure economic competitiveness and employment in the future. If education is to prepare for future life in the information society, ICT and multimedia have to be integrated into the classroom at some point. A strong economic imperative comprises not only the investment in human capital of the future, but also the development of a European and national educational multimedia and ICT market.

Underlying economical interests are also present when introducing distance learning, and computer-based learning offers cost-effective ways of delivering learning content. This imperative may be stronger in vocational training and higher education than in general education. On the other hand, the introduction of ICT in education is not only a large one-time investment, but requires ongoing financial support for maintenance. Zones in which the economic imperative merges with public interests often yield to various forms of public-private partnerships.

- Political imperative: modernising the education system by providing access to new technologies is a topic on every political agenda. From an international perspective, the comparison of national financial efforts and equipment status with those of another "higher ranking" country, has always been a useful political argument for action (charts showing pupils-per-computer ratio by country are typical examples here). Within an education system, the equal distribution of access to ICT is a strong political imperative to avoid social disadvantages for certain geographical areas or school sectors ("digital divide" or "information rich" and "information poor"). Acting against any forms of "knowledge gaps" forms a social-political imperative based on societal values.
- Cultural imperative: culturally specific content has to flow into the world of new media. ICT and multimedia provide new ways of cultural reproduction and of presenting cultural identity. In combination with the economic imperative, this imperative is visible in European ICT strategies and in the establishment of software markets with national and European content.

Due to its universal impact, ICT moves from an isolated subject area taught in a computer room to a cross-subject, methodological and organisational issue in schools. ICT is not only a subject of learning, but can also shape innovative methods of teaching and learning. The level of integration of ICT in schools ranges from applying ICT as a teaching aid to being a fully networked media school where project-oriented learning in a virtual environment transcends subject borders and introduces new places to learn. In this respect, ICT is a “non-subject” and becomes “invisible” when taken for granted in every day usage. Coping with this integration process implies a great deal of organisational restructuring, additional qualification for all participants and continuous technical support. At the start of most ICT diffusion processes in school education, this integration work is conducted by separate enthusiastic groups of teachers.

Meanwhile, it is quite clear that a reliable technical infrastructure is an important precondition for fully exploiting the potential of ICT in schools. The more ICT applications and infrastructure become available, the more a demand arises for merging financial, organisational and technical issues into a strategic and sustainable development plan at school or regional level – involving school authorities, headmasters, teachers and external public and private partners.

2.4 Three Analytical Levels

In order to describe these complex, interweaving relations regarding ICT in school education, three levels can be analytically distinguished.

- a) At the societal or macro level, the integration of ICT and multimedia into the education system is a complex inter-exchange of various needs, interests and pushes. It is possible to identify some of these interrelated “imperatives” (see below, 2.5.) which urge educational policy makers at all levels to introduce ICT and multimedia into the education system.
- b) At the organisational or meso level, the school can be viewed as a learning organisation in the process of restructuring. Observing the school in its environment draws the attention to inner-organisational structures and communication processes. A holistic view on the complexity of using ICT in school education requires an analysis of internal and external communicative structures. This includes the communication between the school management and authorities, teachers and pupils, parents and external partners. With regard to future challenges of schools in

2. Dynamic Changes:

ICT in Education

2.1 Transcending Boundaries

The dramatic shift from the industrial to the information or knowledge society affects all fields of life. As an integral part of our society, the education system is facing new challenges which arise from this societal transformation and transcend various boundaries, for example:

- Spatial boundaries, when global and international networks such as the European Schoolnet or distance learning facilities are established,
- Pedagogical boundaries, when networked multimedia technologies create new forms of teaching and learning,
- Strategic boundaries, when the acquisition of new competencies and (media and digital) “literacies” becomes part of educational objectives and strategies,
- Public boundaries, when public educational institutions face challenges similar to those of private companies with regard to IT management, and
- Private boundaries, when private companies co-operate in public-private partnerships in education.

2.2 Educational Challenges

ICT and new media shape our society, and the society shapes its social and communicative implementation. Digitalisation and global networks change the ways a society creates, stores, manages and disseminates information. Several observations can be made with regard to this interdependent relation:

- The importance of knowledge and competence is increasing in economy and society; both concepts become key factors in the societal transition.
- The education system is starting to react by focusing on issues such as motivation, self-esteem, learning methods, and social competencies. Furthermore, societal changes and new fields of knowledge demand new competencies, for example ecological and networked thinking, ethical, inter-cultural and social reflection skills.

1. About EENet

The European Experts' Network for Educational Technology (EENet) is an independent association consisting of institutions and organisations from 13 different European countries. The network was founded in January 1997.

All member organisations agreed to a series of actions and a framework for working together to generate, gather, distil and disseminate strategic information in the field of Information and Communications Technologies (ICT) in education.

EENet's mission is to create a better understanding of ICT policies in European education and the processes linked to their implementation.

EENet's objectives are:

- to collect, share and analyse information regarding ICT development and pilot projects, and to implement results beyond the core of the network,
- to advise educational establishments and policy makers at local, national, and European level.

The activities of EENet members include:

- developing monitoring and observation strategies in the field of ICT policies in education,
- writing and discussing reflections on developments and recommendations for actions,
- informing each other of important national developments,
- co-operating on international projects,
- maintaining close links with other European networks, activities or partnerships in this area,
- stimulating public discussion through printed and web-based publications and presentations at national and international conferences and workshops.

Content

About this booklet 3

1. About EENet 4

2. Dynamic Changes: ICT in Education 6

- 2.1 Transcending Boundaries 6
- 2.2 Educational Challenges 6
- 2.3 Developments of ICT in School Education 7
- 2.4 Three Analytical Levels 8
- 2.5 Forces of Restructuring at Macro Level 9
- 2.6 A Holistic Approach to Analysis 11

3. The EENet Observatory 13

- 3.1 Purpose and Use of the Observatory 14
- 3.2 Structure of the Virtual Observatory 15
 - 3.2.1 Country Columns 16
 - 3.2.2 Parameter Rows 16
 - 3.2.3 Internal EENet Members' Area 22

4. Outlook 22

5. Contact 23