COMMISSION OF THE EUROPEAN COMMUNITIES

COMMISSION STAFF WORKING PAPER

*e*Learning : Designing Tomorrow's Education

An Interim Report

TECHNICAL ANNEX

As requested by the Council Resolution of 13 July 2001

Contents

1. INTRODUCTION

This document provides a technical annex of actions, projects and initiatives for e-learning in support of the Commission Staff Working Paper: "*eLearning : Designing Tomorrow's Education - An Interim Report*". It uses the rich material provided by the different General Directorates of the Commission, the European Investment Bank, CEDEFOP, Eurydice, Eurostat and others. We would like to acknowledge the active support of these organisations, without whom this report would not have been possible.

2. GENERAL ACTIONS

This chapter describes transversal actions, addressing organisational aspects of the implementation of the eLearning Action Plan, such as the wide range of consultation and co-operation mechanisms with Member States, with European networks, and with European education stakeholders at large, or the calls for proposals concerning the main priorities for eLearning.

2.1. Consultation and co-operation

An important role of the Commission is to consult with experts draw from the members states. This is often achieved through the organisation of working groups, which address a particular focused topic and write a report with their recommendations. Several of such groups are considering e-learning related issues:

– DG Education and Culture has established **an** e-learning **group of national experts**, to support its work on the *e*Learning Initiative. It also has a group examining the use of **ICT in education and training**, in the context of the follow-up to the Education Council's report on 'The concrete future objectives of education and training systems' [4];
– DG Information Society has established a **Working Party**, to advise the Information Society Technologies (IST) Committee on issues relating to research on technology supported learning. It is also undertaking an **open consultation** to advise on the key research issues for the 6th Framework Programme [21];
– DG Enterprise has established an '**ICT skills monitoring group**' with Member States representatives, at the request of the Industry Council and in the context of the GoDigital initiative [22], to analyse and monitor the demand for ICT and e-business skills;
– DG Employment and Social Affairs is involving the High Level Group "**Employment and Social Dimension of the Information Society**" (ESDIS) responsible for monitoring the eEurope 2002 e-Working and e-Participation action lines in discussions on and benchmarking of Member States best practices relating to their strategies for jobs in the Information Society (ICT training and certification, telework, work organisation and social partners role, gender mainstreaming), e-accessibility and e-inclusion [11,12];
– DG Education and Culture has established a **focus group on teacher training**, with national experts;
– Eurostat is discussing issues concerning statistics and indicators on e-learning in its relevant working groups concerned with the Information Society and education and training;
– Following on from the success of the *e*Learning Summit, DG Education and Culture is currently in discussion with the main industrial participants to establish an **Industry**

Group, to advise on how best to take the main recommendations of the summit forward [20].

Within the Commission itself, an **e-learning inter-service group** has been established by DG Education and Culture which meets regularly to co-ordinate activities related to e-learning.

The Commission has also launched a number of activities to increase co-operation within Europe on e-learning, to exchange experience and help establish *Best Practice* (refer to section 3.4).

2.2.   The European *e*Learning Summit

A first *e***Learning Summit** [20] was organised by 25 leading ICT, e-learning and media companies – led by a core group of five including IBM, CISCO Systems, SanomaWSOY, Nokia and SmartForce – in response to an invitation of Commissioner Reding to industry to participate in the e-learning effort, at La Hulpe near Brussels, on 10-11 May 2001. It brought together nearly 350 participants - including business leaders from the ICT sector, education experts, decision makers and public sector officials - in a dialogue on developing education and training provision in Europe.

The report of the meeting suggests 10 recommendations for further action:

(1)   Connect everyone and everything from everywhere
(2)   Adopt and participate in the development of open standards for e-learning.
(3)   Focus e-learning research on pedagogy, eContent and user-friendly interfaces and devices.
(4)   Create the conditions to sustain a commercial market for e-learning content development.
(5)   Increase investment in continuous professional development of educators. Enhance their status. Help them develop an understanding of and a pedagogy for e-learning.
(6)   Develop flexible curricular and assessment frameworks to provide individuals with the skills needed for participation in the Information Age.
(7)   Expand e-learning communities and forums.
(8)   Provide financial incentives to promote the take-up of e-learning.
(9)   Leverage financial instruments to support e-learning.
(10)   Explore the potential of public private partnerships.

The Commission is continuing to work closely with interested parties to see how these points may be addressed effectively. In particular, an **Industry Group** is being set-up to advise on such issues as benchmarking, public-private partnerships, etc.

2.3.   The *e*Learning Initiative's Call for Proposals

Under the auspices of the *e*Learning Initiative, the Commission launched a Call for Proposals on 9 June 2001, with deadlines on 17 August 2001 and 16 November 2001, for "**Preparatory and innovative actions**" [23]. Proposers were asked to focus on one or more of the following themes:

- e-learning European information services
- European laboratory for innovation in e-learning
- New learning environments

- Virtual models of education and training
- Teachers and trainers on use of ICT for learning
- e-learning demonstrators for key areas (science, technology, art, culture, languages and citizenship).

65 proposals were received for the first deadline, of which 4 were ineligible (failure to comply with the formal requirements of the call) and 61 were evaluated by a panel of independent experts drawn from academia, government and industry. The evaluation showed that the proposals are well focused, cover most of the themes of the call and involve many actors from a cross-section of the participating countries (i.e. Member States and EFTA countries). 11 proposals are now being considered for Community funding, for approximately 5 Million €

Proposals from the second deadline on 16 November 2001 will be evaluated in early 2002 and the response shows that the second phase of the call is even more popular than the first one, with around 180 proposals received.

2.4. The *e*Learning Initiative's Call for Tenders

DG Education and Culture issued a Call for Tenders [24] for **four strategic studies** to be carried out in the context of the *e*Learning Initiative. On the basis of the *e*Learning Action Plan, the aim is to carry out investigations on:

(1) models for tomorrow's European universities with respect to the use of ICT
(2) the use of ICT by pupils, teachers and within schools, and on the financing of ICT equipment in this context
(3) on new learning environments for school education
(4) cultural institutions in their role of new learning environments.

The deadline for submitting proposals was 22 October 2001 and tenders are now being assessed for their suitability. A further Call for Tenders is being prepared for next year.

2.5. The IST Programme's Call for Proposals

DG Information Society has launched several Call for Proposals, under its Information Society Technology (IST) Programme, which respond directly to the objectives outlined in the *e*Learning Action Plan. In particular, the action lines '*e***Learning futures**' and '*e***Learning for European youth in a digital age**' (see section 3.1.2). Research in education and training continues to be one of the most popular aspects of the IST programme, with a budget of almost 120 Million € being allocated to these activities so far in the programme.

3. PROGRESS IN ACHIEVING THE ELEARNING ACTION PLAN

In this section we consider activities undertaken and the progress to-date in achieving measures outlined in the *e*Learning Action Plan, using the main titles from that document.

3.1. Infrastructure and equipment

3.1.1. Development of a tool to assist decision making

Several initiatives have been launched to develop qualitative and quantitative indicators to measure the extent of use of ICT in education and training, and the impact on learning:

- Within the context of the follow-up to '**The concrete future objectives of education and training systems**' [4] and the open method for co-operation, **a working group on ICT in education** has been established by DG Education and Culture with experts from Member States to address issues of '**benchmarking'** and possible peer reviews of the situation in Europe. A similar group has been established to look at the subject of **Basic Skills,** such as numeracy, literacy, and basic ICT skills.
- A Commission Staff Working paper "**eEurope 2002 benchmarking - European youth into the digital age**" [10] has been developed based on the Eurobarometer survey Flash 101 "Headteachers" and Flash 102 "Teachers" of February-May 2001. The document reports on the level and quality of computer equipment and Internet Connection in EU schools and shows encouraging progress in teacher training;
- Indicators are being developed within the context of the **European Employment Strategy** - five of ten indicators agreed for Lifelong Learning concern the use of ICT in education and training. The High Level Group "**Employment and Social Dimension of the Information Society**" (ESDIS) is updating indicators relating to ICT in the context of the **eEurope2002 Action Plan** [25]. Data is provided in two Commission Staff Working papers 'Benchmarking report following-up the "Strategies for jobs in the Information Society" [11] and "e-Inclusion - The Information Society's potential for social inclusion in Europe" [12] based on 2 Eurobarometer surveys carried out in November 2000 (ICT and work) and June 2001 (digital divide and eInclusion);
- **Eurostat** is also working on **e-learning indicators** in the broader work on information society statistics in support of the e-Europe Action Plan. In this context a questionnaire, that includes a part on ICT and education, has been developed to collect data/indicators on the information society. The Information Society questionnaire in its current form has been sent out twice since February 2001, (see Appendix B). Eurostat, in co-operation with the Member States is currently examining the results of the 2001 data collection and will propose a new shorter questionnaire before the end of the year. **A Standard Eurobarometer survey** (face to face interviews of a sample of 1000-1500 persons per country) has been developed by Eurostat, examining participation in cultural activities. Information on the use of *e*Learning for education and learning will be obtained from this source. **A household survey on ICT usage** is also under preparation. The fieldwork is expected to be carried out in most Member States in the second quarter 2002, first results will be available in the second half of 2002. Furthermore, an enterprise survey on training provided to employees (**CVTS2-2nd Continuing Vocational Training Survey)** is going to provide some information on participation of employees in ICT training.
- **CEDEFOP** has produced an initial report on indicators: '**The extent of e-learning in Europe**' with statistical data from most of the Member States of the EU.
- **Eurydice** has produced a chapter devoted to ICT indicators in its document entitled "Key data in Education 99/2000" [26]. This chapter is being updated in 2001 with new "qualitative" indicators (reflecting the use of ICT in pupils curriculum and teacher

training – see Appendix C). The new report was published in November 2001 and will be updated each year.

- In order to review progress in incorporating ICT into national education systems, **Eurydice** has carried out a survey of 30 countries, namely the 15 EU member states, the three EFTA/EEA countries and the 12 pre-accession countries. The survey entitled '**ICT@Europe.edu : Information and Communication Technology in European Education Systems**' covers the incorporation of ICT into education systems at all levels, including initial and in-service teacher training. [27]
- The e-Watch project, selected under the Minerva Action, has as its main objective to monitor public policy on the use of ICT in schools at national, regional and local level, across Europe.
- A project for the establishment of a **European Observatory on *e*Learning** is under discussion with the European Investment Bank.

Whilst considerable progress has already been made in benchmarking, much work remains to be done in developing indicators which reveal the real impact of ICT on learning.

3.1.2.   A European research area for new learning environments

The *e*Learning Action Plan proposes a number of measures to increase research in the use of ICT for learning, from an educational, socio-economic and technological point of view.

Development of systems

Six of the proposals being considered for funding from the first deadline of the **eLearning Initiative Call for Proposals** (see section 2.3) address the development of new e-learning environments. Two of these focus on developing systems **for virtual or networked universities**. One focuses on developing a system for the **training of disabled people** and the other on the **training of teachers**. One will develop an innovative delivery mechanism for the **acquisition of ICT skills**, across a broad spectrum of learners, whilst another addresses **language learning for pupils**. It is expected that the development of systems will continue to be an important focus in future calls.

The **Socrates Minerva Action** has launched 43 new pilot projects, involving more than 250 organisations, to explore new approaches to teaching and new learning environments, using ICT. These projects involve co-operation between actors at all levels of the education system: higher education institutions and organisations, schools, adult education institutions, institutes that are in charge of initial and in-service teacher training, and other organisations that are partners of the education system. They collaborate to:

– study and analyse whether ICT improves the learning process, and how;
– develop joint curriculum and common services, that involve the use of ICT;
– define new services, that include, for example, co-operation between schools, universities, associations and cultural institutions outside of the formal education system;
– test and validate new forms of teacher training.

The Information Society Technologies (IST) programme [13] has launched several research measures on e-learning during the period covered by this report [28]:

– '*e*Learning futures' aimed at fostering longer-term research providing significant contributions to insight into next generation e-learning systems and services, leading to enhancement of human learning and cognitive processes;
– '**Self-learning for work**' to provide flexible, adaptable learning support for individuals to manage their own learning for work, in response to the rapidly changing needs of the knowledge-based economy;
– '*e*Learning for European Youth in a digital age' (responding directly to one of the objectives of *e*Europe) research aimed at pulling together a critical mass of key actors, to validate large scale ICT based systems and services for improving learning in schools and higher education institutions in the digital age.

Consultations are currently taking place on the key research issues for technology based learning in the **6th Framework Programme**, due to start towards the end of 2002 [21], where further research is likely to focus on:

• New learning environments and approaches taking into account the growing differentiation of learners' styles, cultures and languages, and to foster, in co-operation with Member States, trans-national virtual campus projects;
• Research, experimentation and evaluation on pedagogical, socio-economic and technological dimension of new ICT-mediated approaches and their adaptation to users needs;
• Disseminating the results of research and supporting the development and promotion of internationally accepted standards and open source software.

Virtual models, campus, mobility and networks

A seminar was held in Brussels on 17th and 18th September 2001, bringing together more than 50 high-level representatives of universities. Following a subsequent Delphi survey, it led to an agreement on a number of recommendations for the management of current changes by traditional universities and the priorities to be established in this sector. The potential of virtual mobility will be further explored as a complement to current student mobility schemes in Socrates Erasmus - e.g. following-up on this year's seminar, and the work done by the European University Association (EUA), a conference on virtual universities will be held in Brussels in November 2002, jointly with the celebration of the 1 millionth Erasmus student.

Three of the proposals being considered for funding from the recent Call for Proposals under the *e*Learning Initiative (see section 2.3) address the themes of virtual European universities, virtual European campus and virtual mobility schemes. They are likely to be launched at the start of 2002.

The recently completed Call for Tenders (see section 2.4) includes a strategic study on the theme of 'models for tomorrow's European universities with respect to the use of ICT'.

Recognising that tomorrow's universities may be very different from those of today and that increasingly virtual institutions will serve a much wider client base, several projects under the IST programme's action line on the Flexible University aim to integrate and demonstrate emerging ICT technologies in higher education. The approach focuses on applications-oriented research involving innovative learning processes and delivery

methods. Moreover, an IST programme call has recently been launched on mobile applications and services, providing an opportunity for further research in the area of mobile e-learning (often referred to as m-learning) [13].

Special needs and inclusion

In the context of the Social Inclusion Strategy adopted at the Nice Summit, the Council adopted on 17 October 2000 the 'Definition of appropriate objectives to Fight against poverty and social exclusion', including "*exploit fully the potential of the knowledge-based society and of new information and communication technologies and ensure that no-one is excluded, taking particular account of the needs of people with disabilities*" [29]. E-inclusion is recognised as an objective towards social inclusion. The **ESDIS** High Level Group has developed a series of recommendations in a report [12], which have lead to the Council resolution of 8 October 2001 on e-Inclusion [7].

In the context of the *e*Europe 2002 Action Plan [25], the **e-Accessibility group** of Member States experts (reporting to ESDIS) oversees the e-Participation action line on creating and networking "Design for All" centres of excellence and curriculum development aiming at a European Masters on Design for All.

Some projects of the IST programme's "**Learning Citizen**" action line are working with the objective to develop new systems and services to support "Life-long" learning, especially for citizens outside of formal learning structures. These projects address, in particular, reducing the barriers between underprivileged, social-excluded people and Information Society.

Moreover, the thematic network SEN-IST-NET is expected to provide IST researchers with direct access to policymakers and practitioners at European and National levels and to NGOs working in the field of **Special Educational Needs** (SEN) for children, young people and adults. The main vehicle for networking will be Special Interest Groups addressing topics such as SEN research, ICT / IST developments related to SEN, supportive technologies, user groups, and successful examples. The networking and dissemination activities will be supported on a web space, containing a comprehensive SEN-IST resource guide and a digital, full-text virtual library, complying with widely accepted accessibility guidelines.

The **Socrates Minerva Action** [30] supported a workshop on special needs in Copenhagen. The workshop was a follow-up to the project entitled SocraTESS, which provides support services for teachers that are integrating students with special needs into ordinary classes. A server was created to provide resources in several languages for teachers that are teaching students with dyslexia.

Within the **Leonardo da Vinci** programme [31], the project EATT (Egalité des chances de bénéficier d'une formation en informatique) is aimed at improving the competence level in IT of the blind and partially-sighted, aged 35 years or more.

At the **IST Conference** in Düsseldorf in December 2001 [32], there was a special session entitled 'Towards and Inclusive Information Society' in which issues concerning special needs were discussed in detail.

3.1.3.   Encouraging the development of infrastructure

Under the "**Innovation 2000 Initiative**" [14], the **European Investment Bank** (EIB) supports projects aiming to provide the adequate ICT infrastructure to sustain the implementation of e-learning across Europe. New developments would be to extend this approach to comprehensive projects including not only infrastructure/equipment, but also content and teacher training programmes since the joint implementation of all various aspects has been identified a key factor for a successful introduction of e-learning into the educational policy of Member States.

The intervention of the EIB for larger projects (i.e. between EUR 20 to 50m and beyond) in e-learning will most likely take the form of medium and long-term direct loans for individual promoters, in particular public administrations.

The draft **Employment Guidelines** for 2002 [6] call upon the Member States to promote the development of multi-purpose local learning centres in order to help improve the quality of their education and training systems. Specific recommendations on the establishment of **multipurpose places of learning accessible to all** are also given in the *Benchmarking Report* following up the 'Strategies for jobs in the Information Society' [11] and the *e-Inclusion Report*-The Information Society's potential for social inclusion in Europe [12] and subsequently in the Council resolution of 18 October 2001 [7]. The latter recommends " *user-friendly **Public Internet Access Points (PIAP) in all local communities",** "***ICT infrastructures in remote or dispersed localities*", "*networks of* e-learning** *centres in particular for disadvantaged people* ".

Several actions related to the use of **emerging technologies** for education and training have been launched under the IST Programme (see section 3.1.2), including the action line '*e*Learning for European Youth in a Digital Age' which, inter alia, encourages the use of broadband communications, satellite, GRID, digital TV, etc for the provision of learning services.

Access to existing learning resources – in a structured and user-friendly way - is being encouraged through the **European Schoolnet** (EUN) [15] and **CEDEFOP's European Training Village** [16]. In addition, the **PROMETEUS** support service [17] is building a multilingual portal to allow a wide dissemination of structured information and knowledge among the PROMETEUS members (more than 1800 people involved).

Several e-learning projects have been launched by other EU programmes related to education and training. This includes the **TEN-Telecom programme** [33], which has the education and training area as one of the priority areas for the 2000 Workprogramme, the **EUMEDIS** initiative in the Mediterranean area [34], which also includes education and training as priority sector.

Work towards the launch of a **European learning opportunities database project** is ongoing in DG Education and Culture. An open call for tender was published in September 2001 with a view to establishing a contract for the development, implementation and initial management of *the European portal on learning opportunities* [35]. The closing date for submitting the tender was on 12 October ; the contract with the selected supplier is expected to be signed before the end of the year, so that effective work can start by the beginning of 2002.

3.2. Training

In order to realise the full potential of the use of ICT in education and training, and in the knowledge-based economy in general, we need to provide adequate training and develop the new skills necessary for a digital world.

3.2.1. New skills and e-learning

Work on the **basic skills** required by everyone to exploit the potential of ICT, is proceeding in the context of the Education Council's report on **'The concrete future objectives of education and training systems**' [4]. A consultation group has been established with experts from Member States to discuss the issues and provide recommendations.

The issue of basic skills is also being explored in the context of the **Task Force on Skills and Mobility,** bearing in mind the interrelationship between skills and employment. The intention is to develop a European opinion on what will be the **package of basic competencies and qualifications** that people should expect to have when they leave full-time education, these including skills such as languages and personal and social skills as well as mathematics or IT skills. Equipping people with the basic skills relevant to the labour market and needed to participate in lifelong learning is acknowledged in the **European Employment Guidelines** [6].

Regarding **digital literacy**, in the context of *e*Europe [25], the IST programme is researching into the skills needed by youth in a digital age, and the extent to which they can be nurtured through e-learning, in the action line '*e*Learning for European Youth in a Digital Age'. There are also a variety of relevant projects funded under the action line 'School of Tomorrow' [28].

Provision of **e-learning** to all citizens and **digital literacy** to every worker is part of the objectives of the **European Employment Strategy** (draft Employment guidelines for 2002) [6] with the view of enhancing their employability, adaptability, skills and participation in the knowledge-based society. e-learning solutions are being explored through the **EQUAL Community Initiative** (thematic field Adaptability - Adaptation to change and NIT) which forms part of the European Employment strategy.

Regarding the problem of the **ICT skills gap**, and the need to increase the level of ICT and e-business skills for strengthening the competitiveness of European enterprises, the Commission established in September 2001 an "**ICT Skills Monitoring Group**" with representatives from Member States, in the context of the **GoDigital** initiative [22]. The group's mandate is to analyse and monitor the demand for ICT and e-business skills, and to monitor the actions aimed at improving the situation, based upon the requirements of industry. Representatives of industry, notably the Career Space consortium [45] and the e-learning **Industry Group** (see section 2.2) are already contributing actively to the activities of the monitoring group.

The **Career Space** project, supported by the Commission, is an example of a successful **Public-Private Partnership**, involving a consortium of industry and universities in the development of ICT skills profiles [45]. Two important Career Space reports were recently published by CEDEFOP: '**Curriculum Development Guidelines – ICT Curricula for the 21st Century**' and '**Generic Skills Profiles – future skills for tomorrow's world**' . The documents were presented at a conference on 6 December

2001 in Brussels, when discussion took place on how to take the results further for exploitation.

In the context of the *e*Europe 2002 Action Plan, the High level Group ESDIS was mandated to 'report and recommend on a **European diploma for IT skills** with decentralised issuing procedures'. To this end, ESDIS considered the suitability of the *European Computer Driving Licence* (ECDL) and formally adopted the following at its meeting of 5th October 2001: *'That the ECDL be accepted as a Europe wide basic IT accreditation scheme, fulfilling the referenced eEurope2002 action line intention, without prejudice to either existing national schemes or the possibility of including other schemes. Moreover, the future direction of a European basic IT skills diploma should be further elaborated under the "eLearning action plan" as envisaged there.'* Discussion on a European diploma for IT skills will continue under the auspices of the *e*Learning Action Plan, together with the consultation group of national experts from Member States.

The **Leonardo da Vinci** programme is contributing to making relevant training available, through a project to provide a European Masters degree in e-Commerce and other projects to offer on-line training. The **IST programme** has many projects supporting the provision of flexible training; 7 in the context of the action line 'Self-Learning for Work', 8 in 'Advanced Training Systems' and 7 in 'Trials and Best Practice addressing advanced solutions for on-the-job training in SMEs' [28].

Discussions on the role of ICT for **Lifelong Learning** have also progressed significantly, with a European-wide debate on the communication 'Making a European Area of Lifelong Learning a Reality' [9]. It places considerable emphasis on how ICT may be used for learning, to allow adults to continue to develop their knowledge and competence throughout their life – for work and for pleasure – and to help overcome problems of access for all and to promote equality, inclusion, etc.

The impact evaluation of the **European Employment Strategy** [11] currently being carried out by the Commission in collaboration with Member States, includes lifelong learning as a central theme, with sub-questions on major initiatives for workers' access to training, access to ICT skills and the matching of young people's education/training with labour market needs. Results of these policy impact evaluations by Member States, together with a macro-economic evaluation by the Commission, will feed into next year's revision of the Guidelines for 2003.

3.2.2. Training of teachers and trainers

DG Education and Culture has established a focus group with relevant experts from Member States to address the subject of teacher training and suggest recommendations.

CEDEFOP's TTnet [19] has launched support work for : (1) dissemination of innovative practices, (2) fostering competences and qualifications of trainers and (3) creating an on-line resource guide for teachers and trainers.

Under the programme **Improving Human Research Potential & the Socio-Economic Knowledge Base, Key Action Socio-Economic Research** [36] there are several relevant projects ongoing, eg: "Science Teacher Training in an Information Society" and "Implementation of Virtual Environments in Training and Education".

The **Eurydice** survey 'ICT@Europe.edu : Information and Communication Technology in European Education Systems' [27] has a specific section on teacher training and highlights several important initiatives being undertaken to improve teachers' awareness of e-learning and their competency in the use of ICT. It highlights the European Schoolnet (EUN) [15] as an example of a network which can support these activities at a European level.

The draft **Employment** Guidelines for 2002 [6] recommend that "*Member States should develop e-learning for all citizens. In particular, Member States should ensure that all education and training institutions have access to the internet and multimedia resources by the end of 2001 and that all the **teachers and trainers needed are skilled in the use of these technologies by the end of 2002** in order to provide all pupils with a broad digital literacy.*"

3.3. Services and content: favourable conditions and priority areas for innovation and development

3.3.1. A conducive environment

e-learning standards are recognised as being useful, even essential, to encourage and enable the reuse and interoperability of learning materials. The CEN/ISSS Learning Technology Workshop [37] has well over 100 members and encourages appropriate standards for learning technologies for Europe through:

§ Participation in, and collaboration with, global initiatives
§ Creating specifications, agreements, guidelines and recommendations
§ Providing a forum for discussion and exchange of ideas
§ Promoting the Workshop's activities

Several active projects are making very significant progress through a mixture of experts and contributions. The focus is on how Europe can add to and enhance global initiatives to meet European requirements. Examples of topics include: Learning Object Metadata (LOM) specification; quality assurance standards, guidelines and codes of practice; Educational Modelling Languages (EML); taxonomies/vocabularies for a European Learning Society; education copyright licence conditions; etc. In many cases, the outcome to be immediately adopted will be a CEN Workshop Agreement (CWA) – a process which is faster than the more traditional one involving the development of ISO standards.

The European Schoolnet (EUN) [15] is carrying out an important project (OASIS) and a series of conferences (EMINENT) and workshops aimed at promoting the use of standards by ministries.

18 projects have been launched in the IST programme on "**Open Platform and Tools**" [28] providing new learning tools and infrastructure for producing and using reusable learning materials and software as a means to create more flexible and cost-effective learning systems and services. This action also provides a strong European contribution to international standardisation in learning technologies through the CEN/ISSS workshop on learning technologies [37] and the IEEE standards group.

The **PROMETEUS** support action [17] is co-ordinating a number of Special Interest Groups (SIGs) which are examining, amongst other things, the use of standards in e-learning.

CEDEFOP is supporting initiatives to raise the awareness of the need for standards. It is promoting expertise for national training bodies in a transnational initiative steered by Vdab (Belgium).

Quality and certification are becoming increasingly important and the Commission plans to address these issues in greater detail in 2002, as part of the follow-up work to the report 'The concrete future objectives of education and training systems' [4]. CEDEFOP is steering a transnational initiative on the formulation of quality indicators and standards in e-learning. (joint CEDEFOP/BIBB (DE) initiative for "**Quality management in e-learning**").

Ethical issues associated with the use of e-learning are also receiving attention. An action line of the Information Society : **Internet Action Plan** supports for self-regulation giving advice to bodies drawing-up a code of conduct [38]. An event is being planned under the Spanish Presidency in 2002 to address ethical issues, together with UNESCO.

Regarding the **security of educational and cultural sites**, a communication has been issued from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions in June 2001 [39] about **Network and Information Security: proposal for a European policy approach**. Discussion is ongoing regarding a possible European Directive.

A project on **Educational Copyright Licence Conditions**, in the context of the CEN/ISSS Learning Technologies Workshop [37], is examining the practical aspects of, for example, IPR issues for a single teacher developing his or her own content. A website for educational copyright issues is to be established and it will include the final report of the project.

3.3.2.   Priority areas for innovation and development

Three subject areas were identified in the *e*Learning Action Plan for special attention: **modern languages; science, technology and society;** and **art, culture and citizenship**. The recent Call for Proposals under the *e*Learning Initiative (see section 2.3) encourages demonstration projects in these important subjects.

Several projects within the IST programme address these subjects directly: eg the 'Learning Citizen' project EDCOMNET – an e-learning project for citizenship; MYTHE - Multimedia Young Children Thesaurus for Educational Purposes and FRETEXT - French in Context: an Advanced Hypermedia CALL System Featuring NLP tool for a smart treatment of Authentic documents and Free Production Exercises.

A number of projects under the **Leonardo da Vinci programme** address the topic of language learning. Examples include the projects: IT - support for the self study of languages; DICTION – Trans-national project E-language learning; TEGG - Development Training in English, German and Greek in the Bulgarian Vocational curricula system; and LIPS - Language instruction for Public Servants [40].

The **European Schoolnet** (EUN) [15] encourages the production of multimedia learning content for schools, in a variety of languages. The European Treasury Browser is building a '**European Schoolnet Information Space**' [41] to help provide quality learning materials for educators and learners, highlighting key issues related to finding, publishing and sharing multilingual learning materials. An alpha version of the ETB Thesaurus is now available in five languages containing over one thousand descriptors in English, French, German, Italian and Spanish. Piloting and feedback have begun and work is progressing in the areas of interoperability, quality and multilingual thesauri.

Some projects covering multilingual and multicultural production of digital content for e-learning were financed following the first call for proposals under the *e*Content Programme.

In the framework of the activities of the Key Action "Improving the Socio-Economic Knowledge Base" of the specific programme "Human Potential" of FP5 [36], there are a number of relevant projects and two clusters which aim to synthesise the results: SYPREDEM – Synergy between practitioners' needs, research orientations, and decision making on the use of ICT in primary and secondary education; MERLIN – Monitoring and evaluation of research in learning innovations.

The "Benchmarking Report 2001" [11] indicated a **gender gap in Information Society** professions. The draft Employment guidelines for 2002 [6] recommend better conditions for the access of women to IT training and the establishment of indicators measuring progress of equal opportunities for each guideline. To enhance the participation of women, some Member States included specific measures in their National Action Plans for Employment. The '*e*Inclusion report' [12] recommends *e*Inclusion policies should mainstream gender.

The Leonardo da Vinci project WITS – **Women and new technologies**, is helping to develop strategies for continuous professional development and re-training for women in Europe.

The **quality of educational content** is becoming more of an issue, as is the need for **innovative educational packages**. Projects launched under the "**Open Platform and Tools**" Action Line of the IST Programme will help to maintain quality by providing a much needed European contribution to international standardisation in learning technologies through the **CEN/ISSS workshop on learning technologies** and the IEEE standards group. They also address innovation by focusing on new learning tools and infrastructure for producing and using reusable learning materials and software as a means to create more flexible and cost-effective learning systems and services. Tools and processes for locating and sharing learning objects are also being developed, including solutions for operational issues such as **intellectual property rights**, **accreditation** and **payments**.

The European Investment Bank (EIB) (see section 3.1.3) will also be able to intervene to **improve the availability of finance** for innovation and development of educational services and content. Given that most projects will be small (below EUR 25m), such an intervention will probably be by means of credit lines ("Global Loans") administered by commercial banks for SMEs or local authorities active in the e-learning sector. Finally, in the context of EIB Group activities, the European Investment Fund could favour the

development of risk capital innovative business start-ups by fostering the creation of national or pan-European e-learning venture capital funds.

3.4. Strengthening co-operation and dialogue

3.4.1. *The e-learning site: a virtual co-operation platform*

Many excellent e-learning sites already exist; too numerous to detail here. However, a few are worth a special mention:

- The **PROACTe** project [28] is a service to communicate work funded by the European Union under the Education and Training Area of the Information Society (IST) Programme. Communication is the key to PROACTe which encourages dialogue between projects and others in the field of educational technologies. The service allows to find out what EU projects in educational technologies are doing, discover resources and news on education and training using IT in Europe, and discuss the opportunities and challenges in this fast-developing area. (http://www.proacte.com)
- CEDEFOP maintains an e-learning website within the **European Training Village** [16] as a major resource on developments in policy, practice and research. The site has 17 000 registered users. (http://www.trainingvillage.gr/etv/)
- The **CEN/ISSS Learning Technology Workshop** [37] maintains a website presenting the results of the various projects on e-learning standards. (http://www.cenorm.be/isss/workshop/LT)
- The **PROMETEUS** support action maintains a website to help co-ordinate the activities of its Special Interest Groups (SIGs) and disseminate their results. SIGs address matters of common interest concerning the use of educational and training services, based on information and communication technologies, and concerning multimedia access to education and training in Europe, involving 500 signatory organisations and 1 800 People. (www.prometeus.org)
- The **Commission** has further developed its official *e*Learning Initiative website [0], to provide comprehensive information on Community activities in e-learning, including a regularly updated 'What's new' page. (http://europa.eu.int/comm/education/elearning/doc_en.html)

The Commission is preparing a tender to develop and maintain an e-learning site that will act as a single point of reference for e-learning activities and resources in Europe. The intention is not to duplicate what is already being done but rather to build-upon and link-together the disparate sources to provide a **knowledge directory of e-learning in Europe**.

3.4.2. *Reinforcing the European education and training networks*

It is important to encourage the exchange of experience within Europe on the use of ICT for learning and to develop a common understanding of what is good or *Best Practice*. In this context, the Commission is supporting a number of projects or initiatives which focus on specific e-learning issues – refer to the previous section which details the websites of **PROMETEUS**, **PROACTEe**, the **CEN/ISSS Learning Technology Workshop** and CEDEFOP's **European Training Village.**

Specific conferences on e-learning have taken place under the French and Swedish presidency, in Paris and Västerås. A conference was also organised under the Belgian presidency on 15-16 November 2001 in Brussels entitled "**Didactical materials in school education**" [42].

CEDEFOP is organising an **e-learning Summer Academy**, to take place as of 2002. In addition, its **TTnet** project [19] is actively supporting the dissemination of innovative practices and the exchange of knowledge for teachers and trainers.

The **European Schoolnet** (EUN) [15] is facilitating co-operation between teachers and schools through its e-learning portal, encouraging innovation in learning and the exchange of learning resources.

In the context of the IST programme, there are regular **'Concertation' meetings** between projects concerned with e-learning – the last one being held on 3 September 2001 in Luxembourg [43]. Similar events occur for the projects funded by the Minerva action.

Issues related to the *e*Learning Action Plan have an important role within the **IST2001 Conference** [32]. They will be highlighted, in particular, in the sessions "Towards an Inclusive Information Society" and "Mobile Killer Applications" that explicitly include e-learning as one of the important issues to be addressed.

The **ARIADNE** foundation [44] is holding an "**E-Learning in Practice**" Conference featuring 15 plenary sessions, with contributions from several countries, each dealing with real experiences in academic, corporate and professional contexts. The Foundation was created to exploit and further develop the results of ARIADNE projects, funded through the Community research programmes, and its members have been actively involved in the development and use of international open standards.

There are many activities taking place in Europe and an important role of the proposed e-learning web site will be to help users to keep track of these activities and access their results.

APPENDICES

A. Bibliography of e-learning related documents and web links

[0]   The Commission's official webpage for the *e*Learning Initiative, including 'What's New' in e-learning, http://europa.eu.int/comm/education/elearning/doc_en.html

[1]   COM(2000) 318 final, 24.5.2000, '*e*Learning – Designing tomorrow's education' *

[2]   COM(2001) 172 final, 28.3.2001, 'The *e*Learning Action Plan – Designing tomorrow's education' *

[3]   Council Resolution of 13 July 2001 on e-learning (2001/C 204/02)*

[4]   5680/01 EDUC 18, Report from the Education Council to the European Council "The concrete future objectives of education and training systems", 14 February 2001

[5]   The European Employment Strategy is based on four pillars: employability, entrepreneurship, adaptability and equal opportunities
       http://europa.eu.int/comm/employment_social/empl&esf/ees_en.htm

[6]   COM(2001) 669 final, 'Amended proposal for a COUNCIL DECISION on Guidelines for Member States' employment policies for the year 2002'
       http://europa.eu.int/comm/employment_social/empl&esf/news/emplpack2001_en.htm#Guidelines

[7]   OJ C292, 'Council Resolution of 8.10.2001 on "e-Inclusion- Exploiting the opportunities of the Information Society for Social Inclusion"'
       http://europa.eu.int/comm/employment_social/soc-dial/info_soc/esdis/documents.htm

[8]   COM(2001) 711, 29.11.2001, "The impact of the e-Economy on European enterprises: economic analysis and policy implications"

[9]   COM(2001) 678 final, 21.11.2001, 'Making a European Area of Lifelong Learning a Reality' http://europa.eu.int/comm/education/life/index.html

[10]   SEC(2001) 1583, eEurope 2002 Benchmarking, European youth into the digital age, Commission Staff Working Paper

[11]   SEC (2001) 222, 7.2.2001, 'Benchmarking Report following-up the "Strategies for jobs in the Information Society", with the support of the High Level Group "Employment and Social Dimension of the Information Society" (ESDIS)'
       Will be updated prior to the Barcelona Summit with a view to deepening the qualitative aspects of employment in the Information Society
       http://europa.eu.int/comm/employment_social/soc-dial/info_soc/esdis/documents.htm

[12]   SEC (2001) 1428, 18.9.2001, Commission Staff Working Paper, 'e-Inclusion - The Information Society's potential for social inclusion in Europe'
       [with the support of the High Level Group "Employment and Social Dimension of the Information Society" (ESDIS)]
       http://europa.eu.int/comm/employment_social/soc-dial/info_soc/esdis/documents.htm

[13]   The Information Society Technologies (IST) Programme, part of the 5th Framework Programme for Community research http://www.cordis.lu/ist

[14]   European Investment Bank : Innovation 2000 Initiative
       http://www.eib.org/pub/news/i2i/overview.htm

[15]   The European Schoolnet (EUN), http://www.eun.org/eun.org2/eun/en/index_eun.html

[16]   CEDEFOP's European Training Village, http://www.trainingvillage.gr/etv/

[17]   PROMETEUS www.prometeus.org

[18]   The ICT Skills Monitoring Group, launched in co-operation with Member States in the context of the GoDigital initiative http://europa.eu.int/comm/enterprise/ict/policy/ict-skills.htm

[19]   CEDEFOP's TTnet, http://www2.trainingvillage.gr/etv/ttnet/index.asp

[20]   European *e*Learning Summit, La Hulpe, 10-11 May 2001,
       http://www.ibmweblectureservices.com/eu/elearningsummit

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* available from [0]

[21] Consultation on the key research issues for technology supported learning in the 6th Framework Programme http://www.proacte.com/challenge

[22] COM (2001) 136 Final, GoDigital http://europra.eu.int/ISPO/ecommerce/godigital/Welcome.html

[23] Call for Proposals - Preparatory and innovative actions - eLearning Action plan http://europa.eu.int/comm/education/elearning/call.html#prop

[24] Call for Tenders, reference DG EAC/08/01, for carrying out four studies in the context of the *e*Learning Initiative. Deadline for submission was 22 October 2001.

[25] *e*Europe 2002 Action Plan, An Information Society for All, 14.6.2001 http://europa.eu.int/information_society/eeurope/action_plan/index_en.htm

[26] Key data on education in Europe - 1999/2000 edition, Eurydice, http://www.eurydice.org/

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[29] COM (2001) 565 final,10.10.2001, 'Communication From The Commission To The Council, The European Parliament, The Economic And Social Committee And The Committee Of The Regions - Draft Joint Report on Social Inclusion', Objective 2: To prevent the risks of exclusion , section 3.2.1 Promoting eInclusion
http://europa.eu.int/comm/employment_social/soc-prot/soc-incl/index_en.htm
press release IP/01/1395 :
http://europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc= IP/01/1395|0|RAPID&lg=EN

[30] The Minerva Action, http://europa.eu.int/comm/education/socrates/minerva/ind1a.html part of the Socrates Programme http://europa.eu.int/comm/education/socrates.html

[31] The Leonardo da Vinci programme, second phase, http://europa.eu.int/comm/education/leonardo/leonardo2_en.html

[32] IST Conference, Düsseldorf, 3-5 December 2001, http://2001.istevent.cec.eu.int/

[33] TEN-Telecom programme, which has the education and training area as one of the priority areas for the 2000 Workprogramme, http://www.ten-telecom.org/

[34] The EUMEDIS initiative in the Mediterranean area, *which includes education and training as priority sector*, http://www.eumedis.org.dz/

[35] A European Portal on Learning Opportunities – Open Call for Tender EAC/62/01 published on 18 September 2001 in the Official Journal.

[36] Improving Human Research Potential & the Socio-Economic Knowledge Base, Key Action Socio-Economic Research http://improving-ser.sti.jrc.it/default/

[37] CEN/ISSS Learning Technology Workshop, http://www.cenorm.be/isss/workshop/LT

[38] The Safer Internet Action Plan, Information Society DG, http://www.europa.eu.int/information_society/programmes/iap/index_en.htm

[39] Communication from the Commission about Network and Information Security, http://europa.eu.int/information_society/eeurope/news_library/new_documents/index_en.htm

[40] Leonardo da Vinci programme, compendium of projects, http://leonardo.cec.eu.int/pdb/

[41] The European Treasury Browser, http://etb.eun.org

[42] 'Didactical materials in school education', 15-16 November 2001, Brussels. Organised by the French community in the Belgian presidency. Contact bernard.carlier@cfwb.be

[43] IST Programme 'Concertation' Meeting for Education and Training, 3-5 September 2001, Luxembourg. http://www.proacte.com/meetings/concertation_Sept2001/index.asp

[44] The ARIADNE foundation, http://www.ariadne-eu.org

[45] The Career Space project http://www.career-space.com

B.   Eurostat questionnaire

The Information Society questionnaire covers the following variables under the chapter 'ICT usage for education':

5.1 General indicators
a) Number of schools
b) Number of teachers
c) Number of higher education institutions (universities)
d) Number of university students

5.2 Use of PCs in schools
a) Number of PCs for teaching purposes in primary and secondary schools per 100 pupils
a1) Number of PCs for teaching purposes in primary schools per 100 pupils
a2) Number of PCs for teaching purposes in secondary schools per 100 pupils

5.3 Use of Internet in schools
a) Percentage of schools with an Intranet
b) Percentage of schools with an Internet connection
c) Percentage of schools with a broadband Internet connection
d) Percentage of primary schools with an Internet connection
e) Percentage of secondary schools with an Internet connection
f) Number of teachers with pedagogical IT skills

5.4 Use of PCs and the Internet in higher education institutions
a) Number of PCs for use of students in higher education institutions (including universities)/100 students
b) Number of PCs for use of students in higher education institutions (including universities) with Internet connection/100 students
c) Number of higher education institutions (including universities) with broadband Internet connection

6. Use of IT for training and employment
6.1 Training courses
a) Number of persons having followed 2nd level IT related courses (total)
a1) Of which women
b) Number of persons having followed 3rd level IT related courses (total)
b1) Of which women
c) Number of 2nd level IT course graduates (total)
c1) Of which women
d) Number of 3rd level IT course graduates (total)
d1) Of which women
e) Number of 2nd level training places
f) Number of 3rd level training places

6.2 Job vacancies
a) Total number of job vacancies for IT expertise (on 1st of July)

6.3 Teleworking
a) Number of enterprises with teleworkers

b) Number of person employed engaged in telework
c) Number of person employed engaged in telework with framework agreement

6.4 Expenditure
a) Total private expenditure for IT training
b) Total public expenditure for IT training

The response rates shown in the following table (% of the 14 countries sending back the questionnaire that have provided corresponding data, 7% = 1 country).

1. Distribution and use of IT	all years	98	99	00
Chapter 5 Use of IT for education				
5.1a N° of schools	66,7	64	64	71
5.1b N° of teachers	61,9	64	57	64
5.1c N° of higher education institutions (Univ.)	59,5	57	57	64
5.1d N° of Univ. students	61,9	57	64	64
5.2a N° PCs for teaching in primary/secondary schools	16,7	7	14	29
5.2a1 N° PCs for teaching in primary(p.100 pupils)	21,4	14	14	36
5.2a2 N° PCs for teaching in secon.(p. 100 pupils)	33,3	29	29	43
5.3a % schools with Intranet	11,9	0	7	29
5.3b % schools with Internet	23,8	14	29	29
5.3c % schools with broadband	4,8	0	7	7
5.3d % primary schools with Internet	28,6	21	29	36
5.3e % secondary schools with Internet	38,1	29	43	43
5.3f N° of teachers with IT skills	23,8	21	21	29
5.4a N° PCs for students in higher education	4,8	0	0	14
5.4b N° PCs for students with Internet connection	4,8	0	0	14
5.4c N° higher educ. institutions with broadband	4,8	0	0	14
Chapter 6 Use of IT for training and employment				
6.1a N° persons with 2nd level IT training	9,5	7	7	14
6.1a1 - of which women	9,5	7	7	14
6.1b N° persons with 3d level IT training	7,1	7	7	7
6.1b1 - of which women	7,1	7	7	7
6.1c N° of 2nd level IT course graduates	4,8	7	7	0
6.1c1 -of which women	4,8	7	7	0
6.1d N° of 3d level IT courses	4,8	7	7	0
6.1d1 -of which women	4,8	7	7	0
6.1e N° of 2nd level training places	0,0	0	0	0
6.1f N° of 3d level training places	0,0	0	0	0
6.2a N° job vacancies for IT expertise	0,0	0	0	0
6.3a N° enterprises with teleworkers	2,4	0	0	7
6.3b N° persons employed in telework	14,3	7	14	21
6.3c N° persons in telework with agreement	2,4	0	0	7
6.4a Total private expenditure for IT training	0,0	0	0	0
6.4b Total public expenditure for IT training	0,0	0	0	0

C. Eurydice indicators on ICT

Basic indicators on the incorporation of ICT into European education systems: 2000/2001 Annual report (to be published in November 2001)

		Source
National policy and official documents on the incorporation of ICT into education		
Figure 1	Education levels covered by official documents on the use of ICT. Primary, secondary and higher education (ISCED 1-3, 5 and 6). (in force during 2000/2001)	Eurydice
Figure 2	National or official bodies with a remit for ICT in education, 2000/2001	Eurydice
Figure 3	Implementation schedule for typical ICT projects. Primary and secondary education, (ISCED 1, 2, 3). 1995-2010	Eurydice
Figure 4	Objectives in ICT. Primary education (ISCED 1). Projects under way in 2000/2001	Eurydice
Figure 5	Objectives in ICT. Secondary education (ISCED 2 and 3). Projects under way in 2000/2001	Eurydice
Figure 6	Number of pupils per computer, and number of pupils per computer with an Internet connection, in primary education (ISCED 1), 2001	Eurobarometer
Figure 7	Number of pupils per computer, and number of pupils per computer with an Internet connection, in secondary education (ISCED 2 and 3), 2001	Eurobarometer
Figure 8	Responsibility for the purchase and maintenance of hardware. Primary and secondary education (ISCED 1, 2, 3). Projects under way in 2000/2001	Eurydice
Figure 9	Distribution of the specific budget between the purchase of equipment and expenditure on human resources. Primary education (ISCED 1). Projects under way in 2000/2001	Eurydice
Figure 10	Distribution of the specific budget between the purchase of equipment and expenditure on human resources. Lower secondary education (ISCED 2). Projects under way in 2000/2001	Eurydice
Figure 11	Distribution of the specific budget between the purchase of equipment and expenditure on human resources. General upper secondary education (ISCED 3). Projects under way in 2000/2001	Eurydice
ICT in primary education		
Figure 12	Inclusion of ICT in the curriculum. Primary education (ISCED 1), 2000/2001	Eurydice
Figure 13	Percentage of teachers who use computers and/or the Internet in the classroom, in primary education (ISCED 1), 2001	Eurobarometer
Figure 14	Average periods during which primary schoolteachers (ISCED 1) use computers (with or without Internet connections) in the classroom, in hours per week, 2001	Eurobarometer
Figure 15	Approaches to ICT defined in the curriculum. Primary education (ISCED 1), 2000/2001	Eurydice
Figure 16	Objectives defined in the curriculum for the teaching or the use of ICT. Primary education (ISCED 1), 2000/2001	Eurydice
ICT in secondary education		
Figure 17	Inclusion of ICT in the secondary education curriculum (ISCED 2 and 3), 2000/2001	Eurydice
Figure 18	Percentage of teachers who use computers and/or the Internet in the classroom, in secondary education (ISCED 2 and 3), 2001	Eurobarometer
Figure 19	Reasons given for not using the Internet with pupils in secondary education (ISCED 2 and 3), 2001	Eurobarometer
Figure 20	Approaches to ICT defined in the curriculum. Lower secondary education (ISCED 2), 2000/2001	Eurydice
Figure 21	Number of hours devoted to teaching ICT as a subject in its own right. The average is based on a 'notional' year of lower secondary education (ISCED 2), 2000/2001	Eurydice
Figure 22	Objectives defined in the curriculum for the teaching or the use of ICT. Lower secondary education (ISCED 2), 2000/2001	Eurydice
Figure 23	Approaches to ICT defined in the curriculum. General upper secondary education (ISCED 3), 2000/2001	Eurydice
Figure 24	Objectives defined in the curriculum for the teaching or the use of ICT. General	Eurydice

	upper secondary education (ISCED 3), 2000/2001	
Teacher training		
Figure 25	Specialist ICT teachers. Primary and secondary education, 2000/2001	Eurydice
Figure 26	Inclusion of ICT in the initial training of all teachers (except specialist ICT teachers). Primary education, 2000/2001	Eurydice
Figure 27	Inclusion of ICT in the initial training of all teachers (except specialist ICT teachers). Lower secondary education (ISCED 2), 2000/2001	Eurydice
Figure 28	Inclusion of ICT in the initial training of all teachers (except specialist ICT teachers).General upper secondary education (ISCED 3), 2000/2001	Eurydice
Figure 29	Percentage share of compulsory teaching related to ICT, and the number of hours devoted to such teaching, in the initial training of all teachers (except specialist ICT teachers). Lower secondary level (ISCED 2), 2000/2001	Eurydice
Figure 30	Desirable ICT skills according to official recommendations for the initial training of all teachers (except specialist ICT teachers). Lower secondary education (ISCED 2), 2000/2001	Eurydice
Figure 31	Percentages of primary schoolteachers (ISCED 1) and secondary schoolteachers (ISCED 2 and 3) who have received official training in the use of computers and/or the Internet in their teaching, 2001	Eurobarometer
Figure 32	Percentages of primary schoolteachers (ISCED 1) and secondary schoolteachers (ISCED 2 and 3) in the EU who have received official training in the use of computers and/or the Internet in their teaching, 2001	Eurobarometer