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The Development of eServices in an Enlarged EU: A Synthesis Report on eLearning

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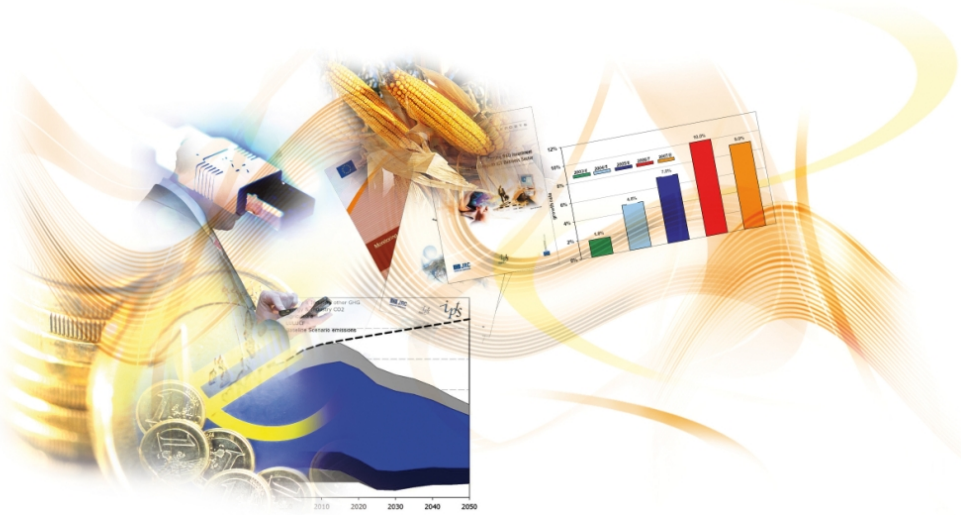

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ICEG EC team

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IPTS team

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Next steps in developing Information Society Services in the New Member States: The case of eLearning

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PREFACE

Policy context

At the European Council held in Lisbon in March 2000, EU15 Heads of Government set a goal for Europe to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. The renewed Lisbon goals of 2005 emphasize working for growth and jobs, and include plans to facilitate innovation through the take up of ICT and higher investment in human capital.[1]

Information and Communication Technologies (ICT), and related policies, play a key role in achieving the goals of the Lisbon strategy. In 2005, the new strategic framework for Information Society policy - i2010[2] - identified three policy priorities: the completion of a single European information space; strengthening innovation and investment in ICT research; and achieving an inclusive European Information Society.

Education and training systems play an important role in reaching these goals. As ICT is a driver of inclusion, better public services and quality of life, all citizens need to be equipped with the skills to benefit from and participate in the Information Society (IS). Enabling lifelong learning[3] for citizens with the facilities that ICT can offer is an important way of fostering their competitiveness and employability, social inclusion, active citizenship and personal development. Policy actions such as the Education and Training 2010 Work Programme[4] and Lifelong Learning Programme[5] have set objectives for education and support the development of learning in the knowledge society. One of the special focus areas of the Lifelong Learning Programme is developing innovative ICT-based content, services, pedagogies and practice in order to promote better education and training throughout a citizen's life.

Research context

IPTS[6] has been researching IS developments in acceding countries[7] since 2002.[8] The outcomes of this prospective research, which aimed to identify the factors influencing Information Society developments in these countries and the impacts these developments have on society and the economy, point to the need for better understanding the specific contexts in each member state for the take-up of e-applications, in particular eGovernment, eHealth, and eLearning. These key application areas have an impact not only on the relevant economic and public service areas but also on the development of the knowledge society as a whole.

Taking the above into account, IPTS launched a research project to support eGovernment, eHealth and eLearning developments at European and Member States level. The research, which was carried out by a consortium led by International Center for Economic Growth – European Center (ICEG EC) in 2005, focused on the three application areas in the ten New Member States[9] that joined the European Union in 2004, in order to build up a picture of their current status and developments in the field, the most important opportunities and challenges they face, the lessons other member states may learn from them, and the related policy options. National experts from each country gathered the relevant qualitative and quantitative data for analysis, in order to develop a meaningful assessment of each

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1 http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm

2 "i2010 – A European Information Society for growth and employment" COM(2005) 229

3 Lifelong learning means all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective.

4 http://ec.europa.eu/education/policies/2010/et_2010_en.html

5 http://ec.europa.eu/education/programmes/llp/index_en.html

6 Institute for Prospective Technological Studies, one of the seven research institutes that make up the Joint Research Centre of the European Commission

7 Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, and Turkey

8 For a list of complete projects and related reports see http://fiste.jrc.es/enlargement.htm

9 Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia

country's current state, and trajectory, and to find out the main factors. This allowed them to derive the relevant conclusions in terms of policy and research.

The IPTS team designed the framework structure for the research, the research questions and methodology. This team and the consortium coordinator jointly guided the national experts in their work through workshops, extended reviews and editing of the various interim reports. Data sources such as international and national survey data, literature, policy documents, and expert interviews were used to capture the most recent situation of the country.

Report objectives

In addition to national monographs describing eGoverment, eHealth and eLearning developments in each country, the project has delivered a synthesis report, based on the country reports, with the aim to offer an integrated view of the developments of each application domain in the New Member States. Finally, a prospective report looking across and beyond the development of three chosen domains was developed to summarize policy challenges and options for the development of the Information Society towards the goals of Lisbon and i2010.

This synthesis report on eLearning was produced by consortium members led by ICEG European Center and the IPTS researchers. First, the report discusses the status of eLearning developments in general in the European context and describes the educational and technological context in EU10. Then, it summarizes the eLearning developments in the EU10. The report gathers the major technical, economic, political, ethical and socio-cultural factors of eLearning developments to a joint discussion, and based on them, discusses policy options and suggests R&D topics for EU10 and the whole Europe. The report reflects the views of the authors and does not necessarily reflect the opinion of the European Commission. Its content has been peer reviewed by national experts, ICEG EC coordinators, and IPTS.

In this study, eLearning is defined as encompassing both learning through the use of ICT and learning the necessary competences to make use of ICT in the knowledge society. Hence, the study considers the use of ICT in formal education[10] (schools and higher education), the use of ICT in training and learning at the workplace (professional education), the use of ICT in non-formal[11] education (including re-skilling and training for jobseekers) and the use of ICT in everyday life (digital literacy/digital competences and informal learning[12]).

All reports can be found on the IPTS website at: http://ipts.jrc.ec.europa.eu/publications/. Information about other IPTS studies and reports on ICT and Learning can be found at: http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html

[10] **Formal Education** is typically provided by an education or training institution. Formal learning is structured (in terms of learning objectives, learning time or learning support) and leads to certification. Formal learning is intentional from the learner's perspective.

[11] **Non-Formal Education** is provided by any organised, structured and sustained educational activities outside formal education. Non-formal education may take place both within and outside educational institutions and cater to persons of all ages. Non-formal learning is intentional from the learner's perspective, but typically does not lead to certification.

[12] **Informal Learning** is learning that results from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional, but in most cases it is non-intentional (or "incidental"/random).

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EXECUTIVE SUMMARY

The project "Next Steps in Developing Information Society Services in the New Member States: The Case of eLearning" aimed to collect the relevant qualitative and quantitative data, analyse it and develop a meaningful assessment of the state and trajectory of eLearning developments in the EU10 countries,[13] to discover the main factors, drivers and barriers to eLearning, and to derive relevant conclusions in terms of policy and research. Ten country studies, which took into account the existing national and international literature and data and the results of 15 national interviews, were carried out by national experts. These studies were prepared according to a unified structural and methodological framework. This Synthesis Report is based on the ten country studies, and aims to offer an integrated and prospective view of eLearning developments in the EU10.

The context for eLearning in the EU10

The EU15 spends more than twice as much on education as the EU10, if this expenditure is measured in Euros. However, if public expenditure on education is taken as a percentage of GDP, the EU10 devote a slightly higher percentage than the EU15 (5.4% versus 5.2%, Eurostat (2004)). The amount spent on education has been increasing in proportion to GDP. Attention has been focused on certain key areas, such as increasing tertiary enrolment. Private, as compared to total, spending on education is small, and similar to the averages of the EU27 spending.

A positive feature of the EU10's education systems overall is the high rate of schooling,[14] especially at primary and secondary education levels. In 2007, three of the EU10 countries (Slovenia, the Czech Republic, and Poland) were the best EU performers against the Education and Training (E&T) 2010 benchmark[15] for the share of early school leavers. The upper secondary completion rates for the Czech Republic, Poland and Slovenia were the best in the European Union, and Lithuania and Cyprus achieved the benchmark target of 85%. Estonia has performed well (13.6%) against the benchmark on reading literacy and Poland and Slovenia are also getting close to the target of 15.5%. (data source: European Commission, 2008)

While formal education at all levels is well developed in the EU10, there are significant gaps in lifelong learning and adult training. The share of adults participating in education and training in the EU10 remains well below the EU15 values, with the exception of Slovenia (14.8% in 2007). The share of Mathematics, Science and Technology (MST) graduates varies from country to country, for example Lithuania achieved 19.5% whereas Cyprus only achieved 4.3%. Many EU10 countries achieved good scores for their share of female graduates. (data source: European Commission, 2008)

Patterns of ICT use and basic skills in the EU10 population are similar to those in the EU15. The young and highly educated have better skills whereas older and unemployed people use computers less and have lower skills levels. While young people in the EU10 and the EU15 have similar skills levels, there is a much larger gap between those who are less ICT literate. This reflects the various social and financial disparities in the EU10. Income dispersion is somewhat greater in the EU10, a fact reflected in the average Gini coefficients in 2006 exceeding the EU15 averages. Regional income disparities are on average 25-30% higher in the EU10 than in the EU15, and the EU10 have similar or somewhat higher unemployment figures, especially for long-term unemployment.

In terms of infrastructure, many EU10 countries still lag behind the EU15 in the diffusion of ICT, as shown by the main access, penetration, content and usage indicators. However, in recent years, the gaps between these two country groups have narrowed as the EU10 have put significant effort into developing their information economy. As a result, affordability and access no longer constitute the

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[13] This Synthesis Report is based on country studies covering the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia

[14] One aspect of the good heritage of the education sectors of the EU10 from the past regime in the early 1990s was in relatively high education indicators, internationally comparable strengths in several areas (including natural sciences, maths), very high levels of primary and secondary enrolment and total youth education attainment level.

[15] The EU average rate by 2010 of no more than 10% early school leavers, at least 85% of 22 years old in the EU to complete upper secondary education, the percentage of low-achieving 15 year-olds in reading literacy in the EU to decrease by at least 20% compared to 2000, the EU average level of participation in lifelong learning to reach 12.5% of the adult working age population, the total number of graduates in MST in the EU to increase by at least 15 %.

main problem for information society developments, though there are user groups, areas and regions, which are still hindered by the lack of appropriate access. Gaps in broadband access for households are also a problem.

Selected eLearning indicators and services

At primary and secondary schools, most projects focus on improving ICT infrastructure and utilising ICT equipment capacity to the greatest possible extent. ICT training is also provided to the teaching staff. The Empirica (2006) survey showed that EU10 schools have reached good levels of internet connectivity but, with respect to school equipment, they clearly lag behind in PC/student ratios (6 per 100 students in the EU10 versus 11 per 100 students in the EU15). Levels of computer use in teaching seemed to be similar in both country groups, but the share of those who do not use computers at all in class is lower among the EU10. In the EU10, the share of schools which organise separate computer courses is 91% whereas in the EU15 it is 46%. There seem to be no significant differences between the EU10 and the EU15 in teachers' ICT skills, and teachers in the EU10 actually consider lack of skills or interest to be less of a barrier to computer use in class than teachers in the EU15.

In the EU10, eLearning approaches are most developed at universities, which also have the best ICT infrastructure. Several projects for universities and distance education have been launched, and many universities have also started to use learning management systems, digital libraries and other eLearning solutions as a means of enriching traditional forms of education. Eurostat indicators for individuals aged 16-74 who use the internet for formal education were 16% in Slovenia, 16% in Lithuania, 12% in Cyprus and 10% in Hungary: all higher than the EU15 average of 9% in 2006.

The share of companies that use eLearning applications for training is much higher in the EU10 than in the EU15, though progress has not been spectacular in either group. The indicator measuring how much individuals use internet for education and training activities (including formal and non-formal training) shows that Lithuania and Slovenia had better or equal shares to the EU15 average of 22% in 2006. In the youngest age group, all the EU10 countries perform very well. However, in the oldest age group and among the unemployed, internet use for training and education is lower than in the EU15, which is partly explained by the lower ICT usage and skills in these groups.

Achievements and shortcomings

The EU10 have progressed in learning to use ICT and also using ICT for learning, and are beginning to have the basic infrastructure in place for both these aspects of eLearning.

In the area of learning how to use ICT, there are a number of ICT training courses of varying content and levels, designed for different target groups. In some countries (Estonia, the Czech Republic, and Latvia, for example), eLearning solutions are provided to disabled job seekers and in many cases, several other projects providing ICT literacy courses and eLearning applications for the unemployed have been successfully implemented. Generally, the younger generation is provided with basic computer and Internet knowledge through compulsory ICT training courses, and this may contribute to the fact that statistics show that young people are well equipped with ICT skills even in comparison with the EU15. However, a major shortcoming is that there are still large digital divides which hinder significant groups of potential users from benefitting from learning with ICT, as they do not have basic access or skills.

ICT and multimedia tools are integrated into education and are used in a wide variety of subjects, either directly in classes or through online courses. Many teachers appear to be motivated and interested in applying ICT for education in primary and secondary schools. However, the number of teachers actually applying ICT approaches is small, and lack of equipment is considered to be a serious obstacle. Hence, the opportunity to learn with ICT is not equally available to all learners in different schools and subjects. The most advanced eLearning solutions can be found at universities, where specific online courses are offered and there is a possibility of distance education, though its level depends on the university and the subject. However, it seems that sometimes eLearning is seen as simply the provision of multimedia learning materials, and not an opportunity to develop ICT-supported interaction and new learning processes between learners and teachers.

Increasing numbers of companies are developing online courses according to their own needs in specific topics or languages, hence supporting the lifelong learning of their employees. Many enterprises also provide training on ICT knowledge and skills at the workplace. Up until now, eLearning has been adopted primarily by larger enterprises, but recently smaller companies have also started to use the opportunities provided by standardised online courses and learning applications. It seems that the access to eLearning in the workplace is not evenly distributed. Even though a high number of enterprises use eLearning in training, not all employees have access to these opportunities, or to the internet in general, at the workplace.

Drivers and barriers for eLearning in the EU-10

eLearning depends heavily on the overall performance of the national economies as the more successful an economy is, the more funding is available for ICT-related investments and the more accessible ICT and eServices are to the general population. The major drivers are thus the ongoing catch up and fast economic growth, and the rapid expansion of the tertiary sector. R&D, however, seems to be a barrier due to low R&D capacity and poor R&D structures in the EU10 countries. The changing structure of the economy has also been important as the share of agriculture and industry has decreased, compensated for by the growth of the tertiary sector both in employment and output. Because the service sector is labour intensive, and requires highly-qualified employees who have a growing need for ICT knowledge and skills, the demand for eLearning services has also been increasing.

However, structural changes and fast economic growth are accompanied by deepening regional divides, and income, age and employment disparities. These partly contribute to and partly explain the widening digital divide, which has certainly been one of the hindrances to eLearning development in the EU10. These disparities are broadened by uneven regional development, since the EU10 is characterised by high concentrations in the larger cities - exceptionally high in most of the capitals. Most eLearning provision is therefore concentrated in the cities and there are few eLearning programmes targeting rural, poorer or remote-area populations. High unemployment influences the income levels of inhabitants, their purchasing power, and their motivation to increase their ICT skills.

The lack of specific policies has adversely affected eLearning as this domain has been treated as a part of broader information society and education policies. National development strategies have sometimes included eLearning as they have had sections on human resources development, and several lifelong learning strategies have dealt with distance education. The national policies have been based on EU initiatives with the most important reference documents being the eEurope+, eEurope 2005 and i2010, eLearning initiative and the eLearning programme (2004-2006). EU structural funds and programmes have been, and still are, considered to be important drivers for ICT developments in education. However, the absence of a comprehensive approach to developing ICT in education seems to have been a barrier, as eLearning has generally been absent or has received little attention as part of other policies. Specific government initiatives for ICT literacy for different target groups have driven interest and participation in ICT use.

Lack of ICT skills requirements for students, teachers and principals has been seen as a regulatory barrier, as these could improve the skills and interest in ICT-enabled learning approaches in educational institutions. Mandatory basic informatics courses at schools have been considered as a means of encouraging ICT use, for the young learners themselves and also for their families. The development of European standards for evaluating quality in eLearning approaches is expected to support and encourage the emergence of eLearning developments.

A facilitator for eLearning usage is the level of formal education among the adult population and the share of population with tertiary education, which are both high (and in the latter case, fast increasing) in the EU10. People attending higher education use eLearning services more and become better prepared for them after their formal education. However, lifelong learning participation rates are very low, and hence a large group of potential e-learners do not have the tradition of learning after formal education. The ongoing reforms of the education systems are expected to stimulate developments of ICT-enabled learning approaches as well.

Participation in eLearning approaches by adults is hindered by their low general digital skills and by their anxiety about using ICT. Furthermore, there are teachers without these skills at all levels, who are therefore unable to implement ICT-enabled learning approaches. However, the reports and studies also show general interest in ICT among populations and teachers, hence these barriers could be overcome by providing learning and support opportunities in a suitable way. One educational factor hindering eLearning participation and development is the lack of knowledge of the English language.

The presence of a significant digital gap is the single most important socio-economic barrier for eLearning developments in the EU10. The level of digital divide has been higher in the EU10 than in the EU15 and it has not reduced during recent years. Since the digital divide coincides with other social divides, it is increasingly difficult to overcome as a barrier to eLearning. Besides digital divide, country size can be a barrier. Small countries with respectively small native population groups offer a limited market for local language content, decreasing the profitability of eLearning services developed specifically for these countries.

Policy options and R&D challenges

Several national studies have pointed out that one of the biggest problems for eLearning is the lack of awareness and knowledge of it. Its promotion in the media, in education policy and among main stakeholders and users is therefore crucial.

Most experts during the study shared the opinion that there should be one institution with a comprehensive responsibility for eLearning, support of the Internet and broadband diffusion. It is suggested that cooperation and dialogue should be strengthened at all levels - local, regional, national and European - for measures, initiatives, sharing of expertise and best practice between all institutional players. A general question remains: should eLearning issues be covered by a specific eLearning strategy, by a general eServices strategy, by learning strategies for different educational levels or by an overall learning strategy? In this respect, national experts differ, but agree that some level of coordination and focused effort for developing eLearning is needed, as dispersed policies are seen as a major barrier to the developments so far.

Public policies should continue to improve ICT infrastructure and promote digital literacy initiatives in order to close the gap between richer and poorer regions and different social groups. Both these general initiatives are still needed and especially programmes targeted at specific groups (such as the unemployed, senior citizens or handicapped people) to combat divides which constitute a barrier to information society inclusion. Furthermore, the appropriate government bodies should improve computer equipment availability at schools, by, for example, centralising purchases. In its financial decision-making, the state should take into account expected expenditure on future maintenance and renewal of ICT equipment at schools, and invest in both ICT and human resources for user support.

In several countries, reports claim that the attitudes of teachers to developing new approaches with ICT, and their lack of opportunities to do so, constitute a major problem. The institutions should be able to provide flexible curricula and financing systems, which would allow and encourage teachers to develop ICT-enabled learning approaches. Attention should be paid to embedding eLearning aspects into teacher curricula and to promoting in-service training on ICT skills and eLearning didactics, possibly as part of a promotion system. Teacher networks, guidance materials, and best practice exchanges should also be developed to support teachers in implementing eLearning approaches and being innovative in developing new ones.

More visibility for existing eLearning solutions is suggested. For example, public institutions should provide and administer public research grants supporting innovative projects on eLearning for different educational levels. The results and resources developed could be made visible in a central portal which would give access to interested stakeholders and learners, and promote existing courses and eLearning approaches in general. This could also support networking between different educational partners.

Research challenges for eLearning in the EU10 are often not specific to these countries, but arise from the need, shared with the EU15, to find and exchange good practices, quality learning approaches and models for partnerships. Specific EU10 R&D challenges arise mainly from the fact that these

countries have inherited old models for their educational systems. Additionally, the business environment in the EU10 is different from that of the EU15, and the EU10 countries are mostly small nations with their own languages. This report suggests that EU10-specific research issues are:

- The basic problem for a large number of potential learners in EU10 is access. Research efforts should therefore concentrate on finding easily usable and achievable solutions, which, for example, take advantage of the opportunities offered by mobile technologies, and use the local language. Open source solutions may provide a cost-efficient solution for more easily obtainable tools that could be tailored to the target audience.
- Collaboration between different educational institutions, possibly with a central repository, could be supported by research and the implementation of interoperable approaches for material, course and personal data management.
- Developing approaches to evaluate the impact and quality of eLearning projects and approaches would help in making investment and financing decisions. Quality certification systems for courses could increase the attractiveness of lifelong learning and eLearning solutions among the adult population.
- Lifelong learning participation is very low in the EU10 despite high basic educational attainment. Research is required to determine how ICT-enabled learning could be best used to reach new groups of lifelong learners in the EU10.

1 INTRODUCTION

The project "Next Steps in Developing Information Society Services in the New Member States: The Case of eLearning" aims to collect the relevant qualitative and quantitative data, to analyse it and to develop a meaningful assessment of the state and trajectory of eLearning developments in these countries,[16] to discover the main factors, drivers and barriers to eLearning, and to derive the relevant conclusions in terms of policy and research. The project, launched in 2005, carried out studies on the 10 Member States that joined the European Union in 2004.

These ten country studies, prepared by national experts, took into account the existing national and international literature and data and the results of 15 national interviews. The studies were prepared according to a unified structural and methodological framework. This Synthesis Report is based on the country studies and additional statistical information and aims to offer an integrated and prospective view of eLearning developments in the EU10.

In this project, eLearning is defined as learning through the use of ICT. It encompasses the use of ICT in traditional education (schools and higher education), the use of ICT in training and learning at the workplace (professional education), the use of ICT in lifelong learning (including re-skilling and training for jobseekers) and the use of ICT in everyday life (to give people the necessary critical skills and competences to make use of ICT in a knowledge society). This study aims to take into account these different dimensions of eLearning. Furthermore, it is pointed out that although eLearning relates to lifelong Learning,[17] formal learning,[18] non-formal learning[19] and informal learning,[20] it does not equal any of these (EC, 2006).

The Synthesis Report is not only a summary of the national reports, but also goes beyond their findings.[21] First, it gives a comparative assessment of policies, institutions, financing, problems and progress with eLearning in the individual countries, which, when summarised, allows us to compare them with the existing institutions, and policies in the EU15. Second, it shows best practices in eLearning and allows us to draw generalised conclusions for policy makers. These may apply to a broader set of countries. Third, it provides an assessment of the implementation of European policies and priorities in eLearning by the EU10 and also describes the lessons for the European Union from the experiences of these countries. Finally, the Synthesis Report shows that some of the lessons and issues of eLearning in the EU10 may have implications for research in the eLearning domain, which go beyond the policy discussion. Priority issues such as the technological aspects of eLearning, institutional changes in the education sector, and the effect on employment of eLearning use are discussed.

The remainder of the Synthesis Report is structured as follows. Chapter 2 describes the context and state of the art in eLearning in general and in the European policy context. Chapter 3 looks at the status of eLearning developments in the EU10 by assessing the statistical facts, and major policies and strategies. Chapter 4 gives a qualitative assessment of eLearning developments and cross-country

[16] This Synthesis Report is based on country studies covering the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia

[17] Life Long Learning (LLL) is defined as "all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective".

[18] Formal Learning is defined as "learning typically provided by an education or training institution, structured (in terms of learning objectives, learning time or learning support) and leading to certification. Formal learning is intentional from the learner's perspective".

[19] Non Formal Learning is defined as "learning provided by any organised, structured and sustained educational activities which may take place both within and outside educational institutions and which is provided to persons of all ages. Non-formal learning is intentional from the learner's perspective, but typically does not lead to certification".

[20] Informal Learning is defined as "Learning resulting from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional, but in most cases it is non-intentional (or "incidental"/random)".

[21] However, it uses as a background the examples, the lessons learnt, policies assessed, institutions developed in the individual EU10. These country examples are included in boxes and serve the purpose of illustrating the general conclusions of the Synthesis Report.

analysis drawing information and assessment from the national studies. Chapter 5 deals with the impacts and consequences of eLearning developments in the EU10, pointing to the main technical and non-technical challenges specific to eLearning. Finally, based both on the Synthesis Report and on the national studies, Chapters 6 and 7 discuss the general lessons learnt and the conclusions relevant for European wide developments and policies.

2 eLEARNING DEVELOPMENTS IN EUROPE

2.1 Models in eLearning

This report considers eLearning as a wide set of learning activities, all somehow connected to information and communication technologies. The two main groups of these activities are:

- learning how to use ICTs (or digital competence),
- learning with the use of ICTs.

It is important, first of all, to provide some definitions of these two areas of eLearning. According to the Recommendation for Key Competences by the European Parliament and Council in 2006,[22] digital competence is defined as the confident and critical use of Information Society Technology for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet. Digital competence is a key competence in the Information Society and the advanced skills for confident and critical usage in collaborative networks do not follow automatically from the basic skills for using the ICT equipment.[23]

Learning with the use of ICTs is composed of any learning, regardless of where it takes place (school, training, kindergarten, at home, etc), that is aided with these technologies. According to the European Commission, all these forms of learning should "improve the quality of learning by facilitating access to facilities and services as well as remote exchanges and collaboration".[24.]

This chapter aims to demonstrate, using evidence from practice, policy and research, that eLearning is at a critical stage of its evolution. As with all "e-hype"-related terms, eLearning is often associated with a period of uncritical techno-enthusiasm that, in this case, has been over for several years.

It has been suggested that the "e" of eLearning should disappear, either to get back to the past or get "back to the future", i.e. a situation in which technologies are an unnoticed contextual factor, since "the powerful and ever-accelerating functionality of Internet-enabled support solutions disappear into the normal way of working. And even learning itself will become more transparent as the boundaries between work, education, practice and human development are blurring".[25] This also implies also that there might be some developments that have been enabled by ICT that are no longer classified as "ICT-related", since they have become part of an "ambient intelligence" environment.[26.]

With regards to policies, the main driving trend is the almost complete disappearance of eLearning both as a term suspected of having lost its impact, and − more seriously − as a significant component of educational policy.[27] In the European Union, for instance, the "open coordination method" was used to push ministries of education to develop specific eLearning strategies, especially in the years 2000-2002. Now, the emphasis on eLearning is definitely less. eLearning development is seldom an objective in itself, though it is often associated with broader policy objectives such as access to learning and the development of Information Society.[28] However, recently the mostly administrative

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22 European Council (2006). Recommendation of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning. Official Journal of the European Union, L394.

23 Ala-Mutka, K., Punie, Y. & Redecker, C. (2008). Digital Competence for Lifelong Learning. Institute for Prospective Technological Studies, European Commission, Joint Research Centre. Technical Note: JRC 48708, http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1820

24 www.elearningeuropa.info/

25 Brook M. (2003), Organizing Enterprise-Wide ELearning and Human Capital Management , Chief learning officer, May-June http://www.clomedia.com/content/templates/clo_feature.asp?articleid=170&zoneid=32

26 Science and Technology Roadmapping: Ambient Intelligence in Everyday Life (AmI@Life) JRC/IPTS - ESTO Study Compiled and Edited by: Michael Friedewald (Fraunhofer Institute Systems and Innovation Research ISI) Olivier Da Costa (Institute for Prospective Technology Studies IPTS), June 2003

27 ODL Liaison Committee (2004), *Distance Learning and eLearning in European Policy and Practice: The Vision and the Reality*, Policy Paper approved by the Member Networks the 17/11/2004

28 See i2010 - A European Information Society for growth and employment. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, COM(2005) 229 final, Brussels, 1.6.2005: http://europa.eu.int/information_society/eeurope/i2010/index_en.htm

usage of ICT for learning has been criticised. It has been pointed out that ICT has the potential to transform learning and teaching processes, and that it is a key tool for promoting innovation and creativity.[29] It has been suggested that there has been a shift in focus: policies are oriented more to eLearning contextual factors than to eLearning as such. These policies comprise the "necessary complementary measures such as teacher training, competence building, and other measures that can ensure real qualitative development".[30]

The main driver of the disappearance/blurring of eLearning is definitely the diversification of eLearning paradigms. And this diversification is a sign of that eLearning is alive and well, despite the semantic ambiguities mentioned above. Certainly, eLearning is becoming more and more context-related, for instance, in different learning systems and sub-systems (vocational training, initial education, the business sector).

However, a purely sectoral approach would not allow us to grasp the poliedricity of eLearning in a complex society.[31] Many other differentiating aspects are emerging. Not only has there been a rich debate, but several cases of practice and a growing literature have enhanced (and, at the same time, threatened) the concept of eLearning by associating it to more established modes of learning. This has given rise to the "blended" learning approach, i.e. a combination of online and in-person, classroom learning activities, and also varying application fields of eLearning (e.g. sectors, purposes, target groups), which have contributed to a growing articulation of eLearning. Moreover, these developments have taken place in a context where technology enables an increasing number of scenarios of use. Country-specific eLearning developments can certainly be identified,[32] and gender, age, and different value systems of eLearning stakeholders are emerging fields of research.[33]

In order to systematise in an original way and escape over-simplistic views of eLearning differentiation, the Helios consortium[34] has developed the "map of eLearning territories" (see Chart 1 below).[35] Some of the eLearning territories are already in the consolidation phase, while others are currently emerging. Some are clustered according to their purpose, others according to the education/ training sector in which they mainly occur, and others can be considered "transversal". All of them imply different visions and perceptions of eLearning, sometimes with rather permeable boundaries, but also with clear "identity" elements that provide analytical ground for differentiation.

Some of the territories reflect the traditional articulation of learning systems into sectors and their physiognomy is influenced, but not "turned upside down" by eLearning. In these contexts, such as "ICT for learning purposes within schools" or vocational training, despite the introduction of eLearning (indeed with a varying degree of implementation), the vast majority of learning initiatives occurs in a context that is organised and structured in a substantially formal and "traditional" way.

On the other hand, in territories such as "non professional eLearning communities" or in those "communities generating eLearning as a side effect", eLearning is not usually organised or structured (in terms of objectives, time or learning support), nor necessarily fully intentional from the learner's perspective. Moreover, especially in the territories in which informal eLearning prevails, online services appear to be more and more centred on their users, or even co-built with users, also thanks to the emergence of open source software and content. Open educational resources are providing new resources and networking opportunities for learners, teachers and institutions.[36]

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29 European Commission (2008b). Commission Staff Working Document. The use of ICT to support innovation and lifelong learning for all - A report on progress.

30 eWatch consortium

31 N:Luhmann,1995 Social systems. Stanford University Press, Stanford, CA

32 L-Change consortium, the L-Change yearly report 2003-2004, Menon network EEIG 2004

33 See the Helios research on eLearning and personal development

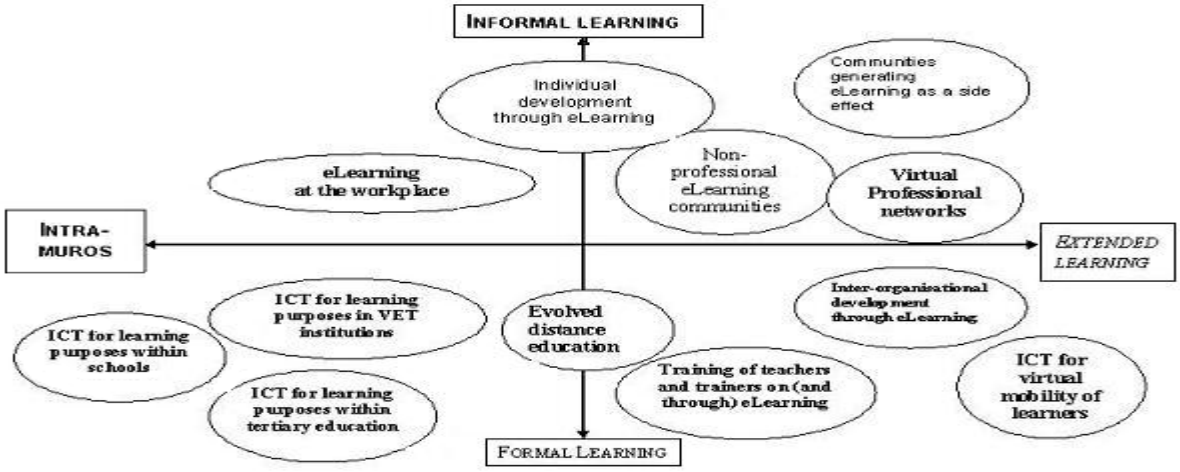
34 HELIOS consortium, (2005) Evolving eLearning The Helios yearly report 2005-2006 http://www.education-observatories.net/helios/reports/

35 One of the first definitions of eLearning as a "large and unexplored territory has been formulated by Gilly Salmon in her Keynote presentation "Future learning encounters" at EUROCALL 2002 Jyvaskyla Finland, 14-17 August 2002 http://www.solki.jyu.fi/eurocall2002/eurocallencounters.pdf

36 The forerunner in this field has been the MIT open courseware initiative http://ocw.MIT.edu See also Creative commons which provides a flexible range of protections and freedoms for authors, artists, and educators,

Another viewpoint, which can be useful for mapping eLearning territories, is the distinction between "intra-muros", which means the use of eLearning tools in a closed context and for a specific, already established group, and "extended learning context", which represents the use of eLearning for the diversification of learning contexts, settings and organisations involved.

Chart 1. Formal, non-formal and informal eLearning territories



Source: Helios Consortium (2005)

There is a growing diversity of eLearning in subjective perceptions, according to different value systems and visions of the world, and in objective terms, due to different purposes, models, organisations, and contents of eLearning territories. This is one of the main reasons why there is not one leading approach or theoretical model in eLearning, but many.

However, some convergence issues can be identified:

- There is a significant trend towards "bottom up-produced eLearning 2.0".[37] Social computing approaches are facilitating new ways for learning, where the learners can have an active role in creating and personalising their learning.[38] Increasingly, collaborative approaches and innovative tools are being experimented with in educational institutions.[39]
- As mentioned above, some developments enabled by ICT are no longer classified as "ICT-related". There is evidence that we are moving towards the disappearance of "e" focus in eLearning, in favour of an approach centred on e-enablement of learning.
- eLearning is going beyond the dichotomy technology – i.e. pedagogy that has accompanied the eLearning discourse[40] for a long time - as it is ever more embedded in work and organisational change processes.[41]

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www.creativecommons.org, as well as the opencourse.org which hosts virtual communities developing, evaluating and using open, non-proprietary learning objects in their discipline. http://opencourse.org/ . Other examples are Connexion, a free, open-licensed educational materials in fields such as music, electrical engineering and psychology http://cnx.org/ and MERLOT, http://www.merlot.org A free and open resource designed primarily for faculty and students of higher education. Wikipedia, the free online encyclopaedia, is also a very popular example of open information resource http://en.wikipedia.org

37 "The model of eLearning as being a type of content, produced by publishers, organised and structured into courses, and consumed by students, is turned on its head. Insofar as there is content, it is used rather than read— and is, in any case, more likely to be produced by students than courseware authors. And insofar as there is structure, it is more likely to resemble a language or a conversation rather than a book or a manual".Downes S, (2005) ELearning 2.0, elearn magazine, 10/17/05, http://elearnmag.org/index.cfm

38 Ala-Mutka, K., Punie, Y. & Redecker, C. (2008). ICT for learning, Innovation and Creativity. Institute for Prospective Technological Studies, JRC, European Commission.

39 See IPTS research on Web2.0 Innovations on Education and Training, e.g. Redecker (2008): http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html

40 See, for instance, "Pedagogy before Technology: Re-thinking the Relationship between ICT and Teaching", Journal of Education and Information Technologies Springer Netherlands Volume 6, Number 4 / December, 2001

41 See the outcomes of the Helios research on eLearning and organisational change

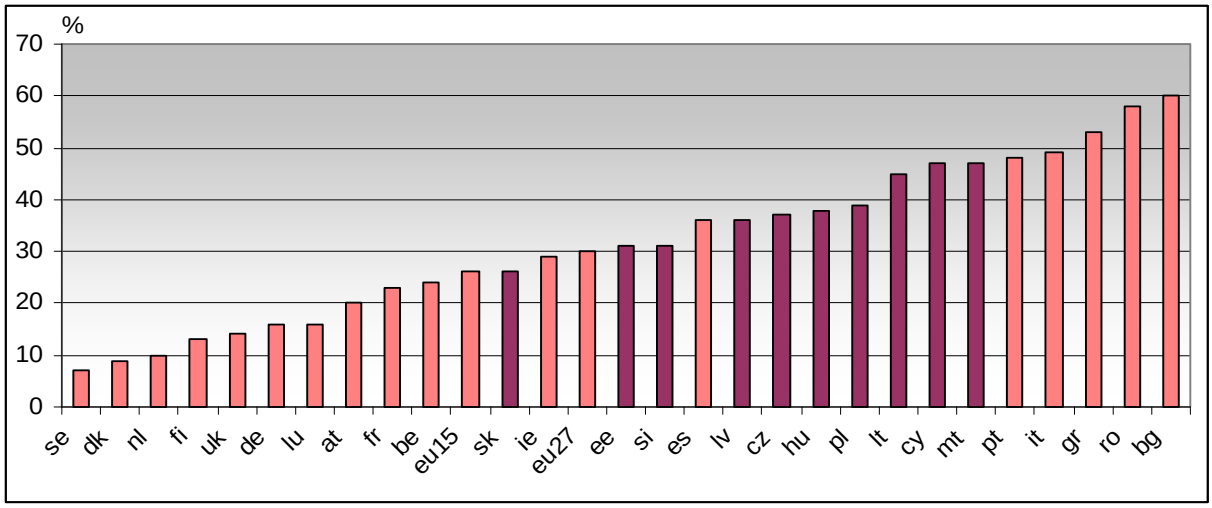
- Educational gaming, enabled by ICT, is also revealing its potential for adult learning.[42]
- eLearning is starting to reach the "less reachable". One of the conclusions of the POLE consortium in 2004[43] was that eLearning has opened new learning opportunities, but has not extended the number of adult learners, or the range of contents available for adult learners enough. The opportunities have been enjoyed, to a large extent, by those adults who were already used to learning and eLearning contents have been concentrated in a few subjects in which supply of education and training was already rich. However, nowadays the picture is, to a certain extent, different. New opportunities for learning are emerging with social and collaborative approaches, which support new ways for informal learning and reaching people outside educational institutions.[44]

2.2 eLearning in Europe

This section aims to illustrate major trends and drivers of eLearning, considering both the aspects of learning *how* to use ICT and learning *with* the use of ICT.

With regards to learning how to use ICT, Eurostat surveys show that digital literacy is a problem for a large part of the population. Chart 2 shows the percentage of the population who did not use computers in 2007 in each EU country and in the EU15 and EU27. EU10 countries are marked in a darker shade.

Chart 2. Percentage of adults (16-74 year-olds) who have never used a computer, 2007



Source: Eurostat, Community survey on ICT usage in households and by individuals

According to this survey, almost one in three (30%) of EU citizens have never used a computer. However, there are profound differences in the European Union. Whereas less than 15% of Nordic citizens aged 16 to 74 has never used a computer, this percentage is much higher in the new member states, especially Romania and Bulgaria. However, some of the states from EU15 also have high shares of people not using computers, especially Greece, Italy and Portugal.

According to Eurostat surveys, internet usage by European citizens follows the same pattern as computer usage, although it is a little bit lower. Usage is not equally distributed among citizens, as older people or those with a lower-level education are far less likely to use computers and the Internet. In the EU27 in 2007, 59% of people with no or low formal education had never used the Internet, meaning that specific online educational programmes or jobsites aimed at those with a lower-level education may reach only a quarter of the potential target users.

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[42] Kurt Squire Game-based learning 2005 The Masie Center http://www.masie.com/xlearn/Game-Based_Learning.pdf

[43] Aceto S., Dondi C, Kugemann W. (2004) *Technologies for the Knowledge Society & Lifelong Learning - Key Findings and Suggestions for Action*, MENON Network http://www.education-observatories.net/pole/key_report_web.pdf

[44] See IPTS research on Innovations in New Learning Communities: http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html

From the above, we can first conclude that learning "with the use of ICT", and in particular learning involving Internet is possible only for a minority, although a growing minority, of European citizens. However, when one adds the other part of the story, 'learning ICT', then an increasing majority of citizens are involved in eLearning. As ICT literacy and access increases, so learning with the use of ICT is expected to expand too.

Along these lines, the 'e-Readiness ranking' table formulated by the Economist Intelligence Unit[45] provides an overview of the "state of play" of a country's information and communications technology (ICT) infrastructure and the ability of its citizens, businesses and governments to benefit from ICT. It also demonstrates that differences in Europe are still significant.

Table 1 : Economist Intelligence Unit e-Readiness rankings, 2008

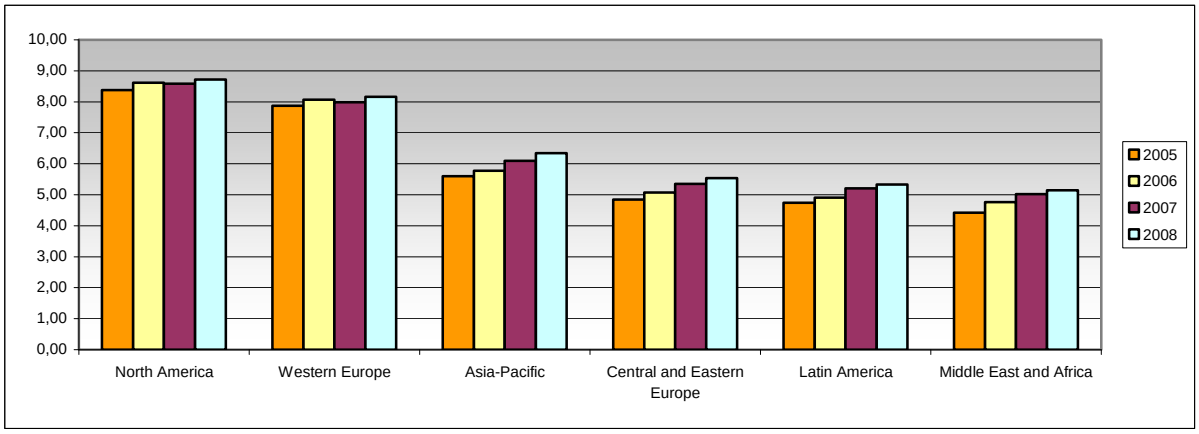
2008 rank (of 70)	2007 rank (of 69)	Country	2008 e-readiness score (of 10)	2007 e-Readiness score (of 10)	Change in score
3	**2**	Sweden	8.85	**8.85**	**-**
5	**1**	Denmark	8.83	**8.88**	**-0.05**
7	**8**	Netherlands	8.74	**8.5**	**+0.24**
8	**7**	UK	8.68	**8.59**	**+0.09**
9	**5**	Switzerland	8.67	**8.61**	**+0.06**
10	**11**	Austria	8.63	**8.39**	**+0.24**
11	**12**	Norway	8.6	**8.35**	**+0.25**
13	**10**	Finland	8.42	**8.43**	**-0.01**
14	**19**	Germany	8.39	**8**	**+0.39**
20	**20**	Belgium	8.04	**7.9**	**+0.14**
21	**21**	Ireland	8.03	**7.86**	**+0.17**
22	**22**	France	7.92	**7.77**	**+0.15**
23	**24**	Malta	7.78	**7.56**	**+0.22**
25	**25**	Italy	7.1	**7.45**	**-0.35**
26	**26**	Spain	7.46	**7.29**	**+0.17**
27	**27**	Portugal	7.38	**7.14**	**+0.24**
28	**28**	Estonia	7.1	**6.84**	**+0.17**
29	**29**	Slovenia	6.93	**6.66**	**+0.17**
30	**32**	Greece	6.72	**6.31**	**+0.41**
31	**31**	Czech Republic	6.68	**6.32**	**+0.36**
33	**34**	Hungary	6.3	**6.16**	**+0.14**
36	**39**	Slovakia	6.06	**5.84**	**+0.22**
37	**37**	Latvia	6.03	**5.88**	**+0.15**
38	**41**	Lithuania	6.03	**5.78**	**+0.25**
41	**40**	Poland	5.83	**5.8**	**+0.03**
45	**45**	Romania	5.46	**5.32**	**+0.14**
48	**48**	Bulgaria	5.19	**5.01**	**+0.18**

Source: The Economist Intelligence Unit, 2008

[45] Economist Intelligence Unit (2008) The 2008 e-Readiness rankings - A white paper from the Economist Intelligence Unit, The Economist, 2008.

Chart 3 presents a comparison between e-Readiness and its development in various regions of the world, including Western and Eastern Europe. It illustrates the fact that the narrowing digital divide between developing and developed countries has continued, but to a lesser degree than in previous years.

Chart 3. Economist Intelligence Unit e-Readiness rankings, 2005-2008: World region scores[46]



Source: Economist Intelligence Unit, 2008

Western Europe scores well in the measurements, as the removal of regulatory obstacles, the emergence of VOIP and open source software have contributed to enhancing European e-Readiness.[47] However, in 2008 it fell back in comparison to USA (1st) and Hong Kong (2nd). Australia also improved its position with regards to Europe, reaching 4th position. The Economist (2008) suggests that the relative improvement of these countries is due to their investments in connectivity, including broadband accounts, Wifi hotspots, and the security of Internet connections.

As far as learning with the use of ICT is concerned, it is difficult to provide reliable and updated data on its state of development, especially on a global scale, as data are scarce and seldom comparable. One of the latest attempts to carry out a worldwide comparison with a specific reference to eLearning dates back to 2003, when the Economist Intelligence Unit formulated an eLearning readiness index.[48] Table 2 presents a synthesis of the results.

46 Each region's score is based on the e-Readiness scores for each of the region's countries covered in EIU's rankings.

47 Economist Intelligence Unit (2007) The 2007 e-Readiness rankings - A white paper from the Economist Intelligence Unit, The Economist, 2007.

48 Economist intelligence unit The 2003 eLearning readiness rankings http://www-304.ibm.com/jct03001c/services/learning/solutions/pdfs/eiu_eLearning_readiness_rankings.pdf

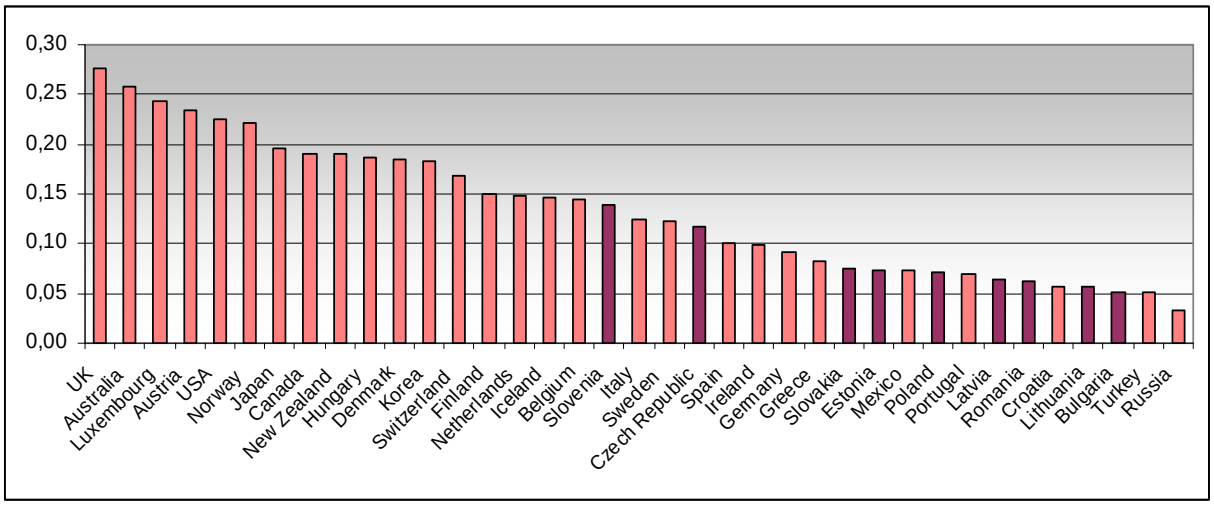
Table 2 : eLearning Readiness ranking in 2003

Country	Score (of 10)	Rank (of 60)
Sweden	8.42	1
Canada	8.40	2
US	8.37	3
Finland	8.25	4
South Korea	8.24	5
Singapore	8.00	6
Denmark	7.98	7
UK	7.93	8
Norway	7.91	9
Switzerland	7.72	10
Spain	6.98	22
Greece	6.52	24
Portugal	6.33	27
Czech Republic	6.11	29
Hungary	6.09	30
Poland	5.73	33
The Slovakia	5.51	35

Source: Economist Intelligence Unit (2003)

This comparative attempt had huge limitations, as "internationally comparable data are still very limited in these areas".[49] In fact, the available comparisons at a world-wide level mainly refer to indicators such as the growth of the eLearning market[50] or the number of computers per student[51] in different countries of the world, presented in Chart 4.

Chart 4. The number of computers for instruction per student from PISA 2006



Source: OECD (2008)

As far as the eLearning market is concerned, one could argue that it has developed, and is still developing, at a much slower rate than was foreseen some years ago. Whereas "last year's state of the eLearning market sounded a note of cautious optimism − training budgets were up, spending on eLearning was increasing, and the sector seemed poised for respectable, if not skyrocketing, growth, this year, spending on eLearning continues to hold its own, though it has come nowhere near to reaching the epic proportions analysts predicted it would both before and after the dot-com bubble

[49] See the chapter on the eLearning index in the L-Change yearly report 2003/2004, Menon network EIG, 2004

[50] See, for instance, Global Industry Analysts 2006 ELearning a global strategy business report http://www.strategyr.com/pressMCP-4107.asp

[51] OECD, 2006, Are Students Ready for a Technology-Rich World?, Paris, OECD

burst."[52] According to IDC (2001 forecasts), the worldwide eLearning market in 2001 was $US 5.2 billion, and was expected to be $23.7 billion in 2006, an increase of 35.6% per year.[53] These predictions were revised down by many observers for following years. IDC also predicted, in 2003, a modest compound annual growth (CAGR) on a global basis of about 5% between 2002 and 2007 for the IT education and training market.[54]

Another example is provided by the forecasts for the Japanese eLearning market, which in 2004 estimated that this market would grow at a ratio of 10% per year.[55.] With regards to Europe, IDC estimates, for instance, that the corporate eLearning market is still expected to grow at a double-digit rate, (15-17%).[56.] However, the United States remains the largest market, both in terms of numbers of users and eLearning vendors.[57]

But these data or estimates, as well as the data presented above on digital literacy, do not tell us anything about actual learning processes involving the use of ICT. The sheer presence of a computer in a classroom, for instance, is not an effective indicator of actual eLearning take up.

One of the most interesting trends − from the user's point of view, not the vendor's − is that eLearning applications and services are starting to look more and more alike, particularly in the off-the-shelf (OTS) content and platform areas of the business.[58] This means that vendors can only compete on price, and prices for LMSs and content are dropping precipitously[59] (the emergence of open source software has also affected to the lower prices).

On the demand side, there is evidence, especially in the corporate sector, that the ROI (return on investment) paradigm is no longer the first consideration for buyers. Not only savings, but also relevance, flexibility of provision, value-added services and support to organisational change are becoming important factors.[60] For instance, tutoring costs, often underestimated up until 5 years ago, are now taken into consideration more often.

As far as educational institutions are concerned, despite significant investments in computers and connectivity, the results in practice development are still not yet clearly visible or widespread on a large scale. Whereas ICT has potential for transformative change in education, this has not been realised (Punie & Cabrera, 2006). ICT, as used in education, would appear to have had very little impact on traditional teaching methods and the way schools normally operate. However, research has shown that it is especially the new teaching approaches implemented with ICT and not ICT in itself, which make the difference in learning results (Law et al, 2006).

Finally, when it comes to individuals and families, falling costs and increased flexibility of second generation eLearning provisions, and also the young generation spontaneously adopting the new media,[61] are the main driving forces for the eLearning take up.

Enhancing factors for eLearning development include:[62]

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52 Boehle S. (2005), *The State of the ELearning Market*, Training *magazine,* http://trainingmag.com/training/reports_analysis/feature_display.jsp?vnu_content_id=1001177885&imw=Y&imw=Y&imw=Y

53 Downes, IDC notes http://www.downes.ca/files/IDC.doc

54 IDC Sees Key Opportunities For Renewed Growth In Corporate Training Markets Published on Thursday, April 03, 2003 - 12:25 AM PST Source: IDC http://www.distance-educator.com/dnews/?name=News&file=article&sid=8775

55 Yoshimi FUKUHARA - NTT Resonant Inc Learning Trends in Japan presentation at the ASEAN eLearning conference the 16 December 2004

56 IDC analyst; report Western European Corporate eLearning Market 2003-2008. See also http://www.scil.ch/congress-2005/programme-10-11/docs/keynote-aksoycan-slides.pdf

57 Reference as above

58 http://www.weiterbildungsblog.de/archives/001070.html

59 See "The 2005 Buying eLearning Research Report" published by the eLearning Guild in June

60 Lance Dublin: The nine myths of eLearning implementation: ensuring the real return on your eLearning investment Journal: Industrial and Commercial Training ISSN: 0019-7858 Year: 2004 Volume: 36 Issue: 7 Page: 291 - 294 Publisher: Emerald Group Publishing Limited

61 See the description of the dichotomy "Information knowledge" in the report issued by the LEONIE consortium Understanding Change, Adapting to Change, Shaping the Future MENON Network EEIG, 2005

62 Page K. (2006), A preliminary study on the current state of eLearning in lifelong learning, CEDEFOP Panorama Series, 123, Luxembourg, Office for Official Publications of the European Communities.

- Broadband connections have greatly increased in the last year; and this, combined with a general reduction in costs, means that the installation of broadband is much more appealing to the general user.
- The low level of digital literacy is being addressed especially in developed countries.
- Greater cooperation between academia and SMEs is being encouraged. Several initiatives are being set up to promote networking between SMEs. In general, eLearning partnerships are growing in quantity and scope.[63]
- There are several good examples of learning systems, both already in use and being researched, the best of which are able to integrate different learning strategies, including ICT-supported learning.
- There is a growing volume of free development software available to eLearning developers, which will assist in keeping costs to a manageable level.

Major areas of progress in the provision of eLearning resources worldwide are:

- Business, especially large multinationals. "Many large organisations have adopted eLearning and integrated it – even loosely – into their training functions. The most recent trends show that eLearning is integrated into the working process as such and has therefore become a component of workflow-related procedures."[64] The same does not apply to SMEs, although significant developments are taking place in this area.
- Tertiary education, as it is supported by significant (and often growing) public and sometimes private (though still to a limited extent) investments. More and more universities are embracing eLearning, even in relation to the growing internationalisation of higher education[65] and are expanding their range of courses available across the Internet by offering their programmes in a number of languages.
- Informal learning, due to the multiplication of learning arenas, space and modalities of learning provisions. Disruptive take up of social computing has also brought forward new opportunities provided by blogs, wikis, and social bookmarking for learning outside traditional settings (Ala-Mutka, 2008). These tools can also be used in formal learning settings for providing the student with growing ownership and encouraging his/her active engagement in learning (Redecker, 2009).
- Schools are becoming more and more aware of the pedagogical implication of introducing PCs and Internet in the classroom.
- Traditional distance education providers are now rather naturally evolving towards eLearning.

2.2.1 Impediments facing eLearning developments

"The fortunes of online learning have fluctuated over the past ten years. Touted in the 1990s as the learning vehicle of the future, it was seen as the key to overcoming the limitations of traditional classroom-based learning. Proponents argued that "virtual classrooms" would ultimately replace the school classroom and university lecture hall but in the years following the millennium, enthusiasm for online learning waned. The problem was that the reality rarely lived up to the promise − many early online learning programmes were badly designed and delivered, suffered from technical faults and often not did not meet the needs of students."[66]

This quotation, taken from a report on eLearning issued by the Financial Times, illustrates very clearly what could be defined "the original sin of eLearning". eLearning was born in a period in which techno-enthusiasm and investors' confidence in the almightiness of technologies was high. This led to a proliferation of early online learning programmes which were too business-oriented and not attentive enough to the context of the learning experience and the learner's needs. This "original sin" has

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63 L-change consortium, (2003) Change in European Education and Training Systems related to Information Society Technologies (IST), IST 2000-26226 project report

64 See the forthcoming benchmarking eLearning policies report

65 In relation to the so called "Bologna process" in Europe

66 Morgen W., (2005) *A new era for digital learning*, Financial times, 6/10/2005 http://news.ft.com/cms/s/0bb99646-3651-11da-bedc-00000e2511c8,dwp_uuid=b1b2f39a-364b-11da-bedc-00000e2511c8.html

caused high dropout rates among early adopters and loss of confidence of potential eLearners. Moreover, those who were resisting eLearning from inside the education and training system had the time to build their case against it.[67]

Some significant factors that hinder eLearning development in Europe are the following:

- Technology infrastructure (such as broadband diffusion, ICT equipment in schools) may still be a problem, in the European New Member States and also elsewhere.
- Lack of investment in eLearning by private and public actors. For instance, with regards to policies fostered by the European Union, particularly the new European programme for lifelong learning after 2007,[68] the disappearance of a specific action dedicated to eLearning in favour of a transversal theme related to ICT (Key Activity 3) and another for learning innovation (Key Activity 1), may be problematic. With regards to the private sector, the challenges of open source and user-generated content have increased the risk in investing in this area.

In many cases, the hidden costs of eLearning (after the purchase of technology) have been underestimated or "have not been adequately treated in an educational context"[69] due to simplistic − or wrong − implementation strategies which do not take into consideration sufficiently the fact that an innovation such as eLearning requires the creation of a positive context to ease its diffusion.

Other significant trends world-wide are the following:

- IPR confusion and specificities in the education and training field. "Intellectual property rights have until recently been relatively obscure parts of the eLearning world but they are now rapidly becoming crucial to its development".[70]
- There is still resistance or inertia[71] among formal education providers with regards to the use of ICT for learning purposes. This resistance to innovation expresses itself in several forms: it can be the introduction of small elements of ICT-based learning to offer the same teaching as before, or even opposition to eLearning on the basis of negative experiences with first generation low quality eLearning
- The concern about quality in eLearning is rather generalised, and yet many examples demonstrate the fragmented picture of approaches. Quality, although considered a fundamental concept by all stakeholders, seems to be in "the eye of the beholder"[72] i.e. it does not have the same meaning for all eLearning stakeholders. Some scholars make a distinction between two core function areas: services (like administrative activities of E&T providers) and education.[73] Dondi et al (2006) proposed a distinction between learning sources, (i.e. all sources of learning such as materials, infrastructure, teaching and support staff), the processes supporting learning (guidance, design, delivery and evaluation of learning) and the learning context (i.e. the environment in which learning takes place).

Three main caveats and lessons can be drawn from a review of these impediments:

- Avoid innovation turbulences in eLearning, as not all new things work or are necessarily better. Some EU countries renew their eLearning strategy on a frequent but irregular basis and this may not be the best practice, as innovation adoption always requires the dedication of time and resources and some level of coherence in the medium term.

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67 ODL Liaison Committee, reference as above

68 European Council, (2006), *Decision of the European Parliament and of the Council establishing an integrated action programme in the field of lifelong learning,* http://europa.eu.int/comm/education/programmes/newprog/index_en.html

69 "The Costs of Networked Learning" , Bacsich, P. and Ash, C. Springer Computer-supported Cooperative Work Series, 2001

70 Intellectual Property Rights (IPR) in Networked ELearning A Beginners Guide for Content Developers, John Casey 28 Apr 2006 http://www.jisclegal.ac.uk/pdfs/johncasey.pdf

71 See the L-Change consortium report (2003) reference as above

72 Dondi C., Moretti M., Nascimbeni F., *Quality of eLearning: negotiating a strategy, implementing a policy* in *European Quality Handbook* (2006) CEDEFOP

73 Srikanthan, Gitachari; Dalrymple, John F. (2003) *Developing a Holistic Model for Quality in Higher Education*, Vol. 8, No. 3, pp. 215–224

- More attention should be paid to adoption logics, dynamics, and timing, as not all E&T stakeholders and potential eLearners are convinced that technology for learning purposes adds value.
- Policy may be conceived with good intentions, but its implementation can generate counter-productive effects.

2.3 European policies and priorities for eLearning developments

Learning how to use ICT and learning with the help of ICT are both crucial for Europe and European policy making. Key strategies such as the Lisbon Agenda, eEurope 2005 and i2010, consider the area to be of huge importance, and more and more domain-specific strategies, such as various European educational strategies (eLearning, Life Long Learning) include detailed analysis of the subject.

A much quoted sentence states "The Union must become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion (European Council, Lisbon, March 2000)". The knowledge-based economy is built on learning and the use of information technologies. The Lisbon Agenda builds on two aspects of ICT skills and eLearning. Firstly, in micro-economic terms, the development of Information Society and eServices play a crucial role in achieving the Lisbon goals. Secondly, increasing investment in human capital, through better education and skills, calls for the promotion of lifelong learning and eLearning.

Back in 2002, eEurope had already focused on eLearning, in harmony with the understanding of ICT in learning in that era. This focus was mainly on the presence of information technology in education, a key target of the policy being the connection of all schools to the internet by 2002. In eEurope 2005, the focus shifted to four eServices: eBusiness, eGovernment, eHealth and eLearning as the key enablers of Information Society development. In its understanding of eLearning, eEurope 2005 still categorised eLearning as an online public service, and this was partly responsible for the institutional approach to the domain being maintained.

In the field of eLearning, the following actions were proposed:[74]

- Connecting educational and research institutions, museums, libraries, archives, etc with broadband,
- Launching an eLearning Programme to fulfil the objectives of the eLearning Action Plan 2004-2006,
- Virtual campuses for all students, by involving the eTEN programme,
- Setting up university and research computer-supported co-operative system based on high performance computing infrastructures and GRID technologies,
- Re-skilling for the knowledge society –key skills for the information society for adults as well, involving, if necessary, financial support from the Structural Funds.

i2010 also deals with eLearning (to be more precise: with digital literacy) in its third objective, "An Information Society that is inclusive, provides high quality public services and promotes quality of life".[75] ICT skills and digital literacy are seen as key elements for eInclusion.

Regarding the more specific policies and programmes, first the education, training and mobility programmes of the European Union − Socrates, Leonardo da Vinci and Youth - were urged to incorporate and to emphasize the use of ICT, digital literacy and eLearning between 2000 and 2006. The eLearning initiative adopted on 24 May 2000, a supplement to the eEurope initiative, was the first

[74] European Commission (2002), eEurope 2005: An information society for all – An Action Plan to be presented in view of the Sevilla European Council, 21/22 June 2002

[75] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions (2005): "i2010 – A European Information Society for growth and employment", Brussels

clearly targeted measure for the domain. The next phase was the adoption of the eLearning Action Plan in 2001. It had the following targets:[76]

Key measures related to infrastructure and equipment:

- Development of tools to assist decision making (benchmarking, indicators, etc),
- Research – new learning environments,
- Development of infrastructure.

Key measures on training:

- New skills and eLearning - mainly digital literacy,
- Training of teachers and trainers to use new technologies in education.

Key measures on services and content:

- Conducive environment (consumer protection, quality certification system, security, standards, IPR),
- Innovation and development in three subject areas of strategic importance: modern languages; science, technology and society; and art, culture, citizenship.

Key measures to strengthen cooperation:

- The eLearning site,
- Reinforcing the European education and training networks.

The eLearning Programme, adopted on 5 December 2003, was a breakthrough. The Programme, which ran from 2004 to 2006, was of key importance to the development of this eService. The action lines of the Programme were:

- Promoting digital literacy,
- European virtual campuses,
- eTwinning of schools in Europe and promotion of teacher training,
- Transversal actions for the promotion of eLearning in Europe (to promote best practice, products and services).

For the period of 2007-2013, the European Commission has amalgamated the following four previous programmes under the umbrella measure "Lifelong Learning Programme":

- The Comenius programme (for pupils, teachers, schools and related institutions/ organisations - pre-school and school education up to the the end of upper secondary education).
- The Erasmus programme (for students, scholars, professors, universities and related institutions/organisations - higher education, including trans-national student placements in enterprise).
- The Leonardo da Vinci programme (for apprentices, workers, employees and related institutions/organisations - vocational education and training).
- The Grundtvig programme (for adults, teachers and related institutions/organisations active in the field of adult education).

These four pillars are complemented by a transversal programme that focuses on:

- policy cooperation and innovation,
- language learning,
- innovative content, services, pedagogies and practices in the field of information and communication technologies (ICT),
- dissemination, exploitation of results and exchange of good practice.

Finally, the Structural Funds represent a key instrument for eLearning and digital literacy in the EU10. The Council Decision of 6 October 2006 on Community strategic guidelines[77] on cohesion includes

[76] Communication from the Commission to the Council and the Eropean Parliament: The eLearning Action Plan – Designing tomorrow's education, Brussels, 2001

[77] Council Decision of 6 October 2006 on Community strategic guidelines on cohesion [Official Journal L 291 of 21.10.06]

eLearning, among other eServices, as an important contributor to the realisation of the Information Society and declares that digital skills constitute a key tool to attract and retain more people in employment. The goals and priorities of the Structural Funds fit well with promoting ICT skills and eLearning services in the European Union.

3 CONTEXT FOR ELEARNING IN THE EU10

3.1 Education system features of the EU10

3.1.1 Spending on education

An important indicator for the education sector is the level of spending on education. According to the next table, if measured in nominal terms (i.e. Euros spent per student), the EU15 spends more than twice as much on education in total as the EU10. But if relative expenditures (i.e. public expenditure on education expressed as a percentage of GDP) are measured, then – according to Eurostat - the EU10 devotes a slightly higher percentage of their GDP to education than the EU15 (5.4% versus 5.2%) in 2004.

Table 3 : Statistical data on the expenditure on education as a percentage of GDP in 2004[78]

	Annual expenditure on public and private educational institutions per pupil (€)[79]	Public expenditure on education (% of GDP)[80]	Private expenditure on education (% of GDP)[81]
Cyprus	6097	6.71	1.17
Czech Republic	3736	4.42	0.61
Estonia	—	5.09	—
Hungary	—	5.43	0.52
Lithuania	2403	5.20	0.48
Latvia	2412	5.08	0.82
Malta	4094	4.99	0.46
Poland	2747	5.41	0.59
Slovenia	5552	5.96	0.86
Slovakia	2606	4.21	0.76
EU10	3706*	5.25	0.59
EU25	5587	5.09	0.70

Source: Eurostat database

Moreover, the amount spent on education has been increasing. In 2000, it was 5.1% of GDP in the EU10 and then, from 2000 to 2004, some countries significantly increased the level of spending on education, including Cyprus (from 5.4% to 6.7%), the Czech Republic (from 4% to 4.5%), Hungary (from 4.5% to 5.4%) and Poland (from 4.8% to 5.4%). This rise in spending has been linked to focused attention given by these countries to certain key areas, mainly to the increase of tertiary enrolment, and the growth of public and also private sector spending on tertiary education.

Within total spending on the education sector, the level of spending by the private sector is small, which is in line with the averages of the European Union. Private expenditure on education is somewhat higher in the EU15 than it is in the EU10 (0.63% versus 0.59%). The private sector contributes mainly to the financing of tertiary and adult education, while the overwhelming majority of expenditure on formal education is covered by the public sector. Most of the education institutions are publicly owned, while the church and the private sector only play an additional role.

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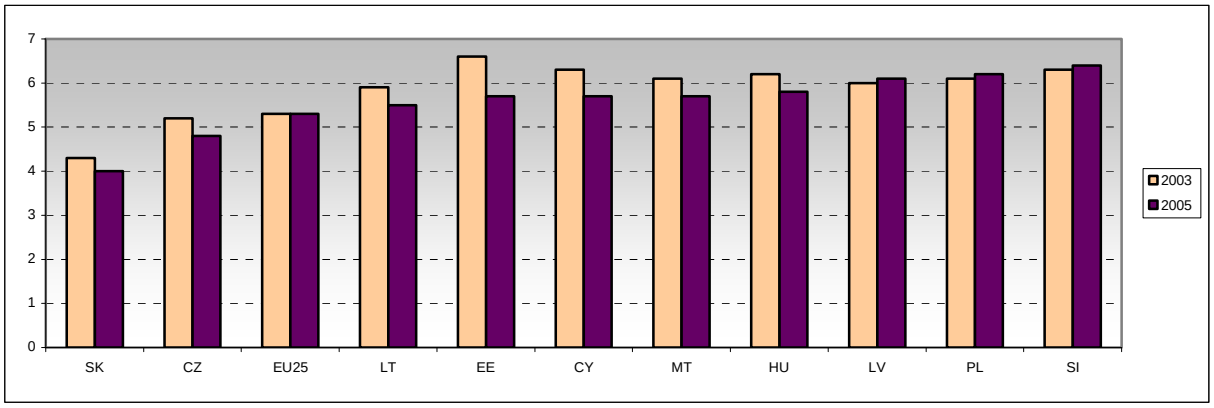
78 By far the greatest share of GDP (6.71%) was laid out for education in Cyprus, which is unusual as Cyprus has the lowest schooling expectancy (14.4 years) among EU10 and below EU15 average (17.7 years), it only has 30% of 18-year-olds still in education, which is the lowest share among the EU10 and far below EU15 average. Slovenia spent the second largest share of GDP (5.96) on education in 2004 and it has the lowest percentage of early school leavers in the EU10 (5.2 %), a high percentage of people involved in life-long learning (15.3 %), and one of the highest youth education attainment levels (90.5 %).

79 Annual expenditure on public and private educational institutions per pupil/student in EUR PPS, for all levels of education combined, based on full-time equivalents in 2004.

80 Total public expenditure on education as percentage of GDP, for all levels of education combined, in year 2004.

81 Expenditure on educational institutions from private sources as percentage of GDP, for all levels of education combined, in year 2004.

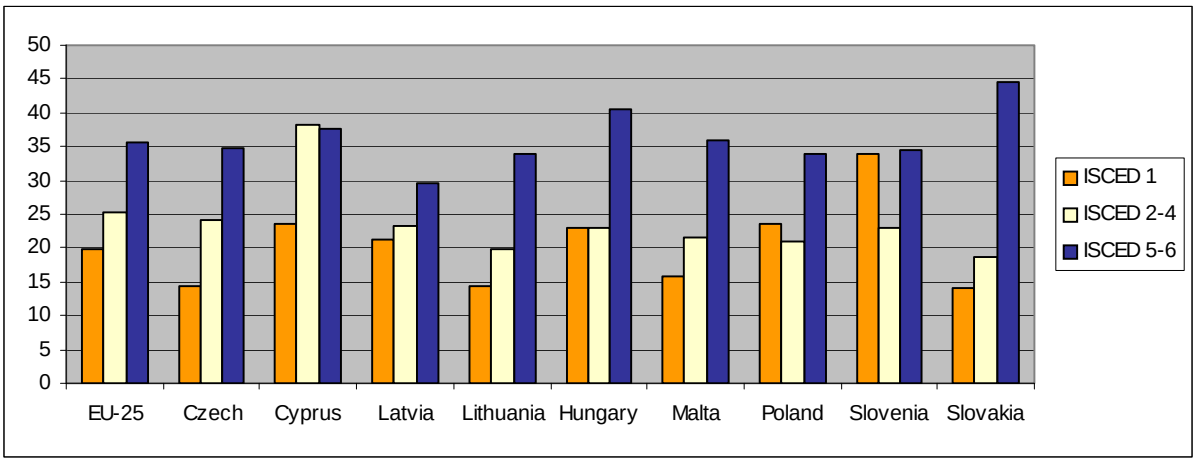
Chart 5. Expenditure on education as a percentage of GDP in 2003 and 2005



Source: Eurostat database

In the EU10, the spending at various levels of education is also rather similar to the EU15 average. Chart 6 shows that the EU10 spend relatively more on primary education per student relative to their per capita GDP and somewhat less on secondary education compared to the EU15. Thanks to the fast rise in expenditure on tertiary education, the total average expenditure per student has reached the figures of the EU15 but with significant country differences.

Chart 6. Total expenditure on educational institutions per pupils compared to GDP in 2004



Source: Eurostat database

3.1.2 European Education and Training Benchmarks

The following five European Benchmarks for 2010[82] in the field of education were adopted by the European Council in 2003 to set the main goals for the improvement of education and training systems until 2010:

- EU average rate of no more than 10% early school leavers should be achieved.
- At least 85% of 22 year olds in the EU should have completed upper secondary education.
- The percentage of low-achieving 15 year-olds in reading literacy in the EU should have decreased by at least 20% compared to the year 2000.
- The EU average level of participation in lifelong learning should be at least 12.5% of the adult working age population (25-64 age group).
- The total number of graduates in mathematics, science and technology (MST) in the EU should increase by at least 15%.

[82] Education and Training Contribution to the Lisbon Strategy: http://ec.europa.eu/education/policies/2010/et_2010_en.html

This section will discuss the features of the education system in the EU10, taking into account the objectives of these benchmarks.

One overall positive feature of the education system of the EU10 is the high rates of schooling, especially in primary and secondary education. The number of compulsory education years is high and the level of early school leavers is among the lowest, due to long and extensive education. The already high completion rate increased further during the 1990s, mainly due to the extension of compulsory attendance years.

As shown in Table 4, three EU10 countries (Slovenia, Poland, and the Czech Republic) are the best performers in the entire European Union as regards the benchmark on decreasing the share of early school leavers. Slovakia has also already achieved the benchmark and Lithuania is only slightly above the target of no more than 10% of early school leavers (10.3%). The share of early school leavers measures on the share of young people, aged 18-24 with only lower secondary education and not participating in further education. The EU goal is to reduce the share of such individuals to 10% of the corresponding population.

Table 4 : European Benchmark - Share of early school leavers(%) in 2007

Benchmark area	**Concrete target 2010**	**Three best performers in EU**			**EU27 average**	**EU10 according to their success in achieving the target**						
Early schools leavers (18-24, %)	No more than 10%	SI 4.3%	PL 5.0%	CZ 5.5 %	14.8%	SK 7.2 %	LT 8.7 %	HU 10.9 %	CY 12.6%	EE 14.3 %	LV 16 %	MT 37.6 %

Source: Commission working document: Progress towards the Lisbon Objectives in Education and Training, Report 2008

The second European benchmark relates to Eurostat's Labour Force survey indicator "Youth attainment level, which denotes percentage of population aged 20-24 having completed at least upper secondary education". As with the first benchmark, three EU10 countries (the Czech Republic, Poland, and Slovenia) are leading in the European Union. Slovenia and Lithuania have also achieved the benchmark target (85%). There are differences among the EU10 with Slovenia, the Czech Republic, Slovakia and Poland having completion rates above 90%, and with Hungary and the Baltic States remaining slightly above 80%.

Table 5 : European Benchmark – Upper-secondary attainment in 2007

Benchmark area	**Concrete target 2010**	**Three best performers in EU**			**EU27 average**	**EU10 ordered according to their success in achieving the target**						
Upper-secondary attainment (20-24, %)	At least 85 %	CZ 91,8%	PL 91.6%	SI 91.5%	78.1 %	SK 91.3 %	LT 89. 0 %	CY 85. 8 %	HU 84. 0 %	EE 80. 9 %	LV 80. 2 %	MT 54. 7 %

Source: Commission working document: Progress towards the Lisbon Objectives in Education and Training, Report 2008

As regards the third European Benchmark "Ratio of low achieving 15 year olds in reading literacy", of the EU10 countries only Estonia achieved the target of 15.5% in 2006 (see Table 6). Poland and Slovenia are also close to the target. However, the other European member states have not been progressing towards the target either, and only 3 of the EU10 countries fall behind the EU average of 24.1%. Furthermore, from 2000 to 2006, Latvia and Poland occupied positions in the European top three in decreasing the number of low achievers in reading. Among the EU10, Hungary also registered a decrease (-9.3%), but not as big as the benchmark demands (20%). This benchmark relies on the PISA (OECD Programme for International Student Assessment) surveys on student skills, particularly the literacy indicator.

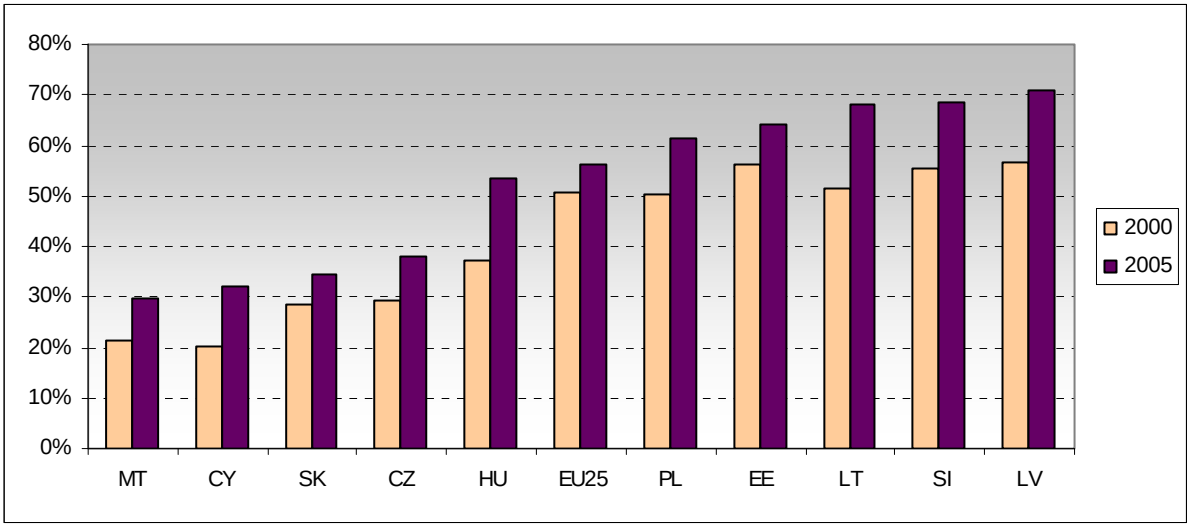
Table 6 : European Benchmark – Ratio of low achieving 15 year-olds in reading literacy

Benchmark area	Target 2010	Three best performers in EU			EU average	EU10 according to their success in achieving the target						
Ratio of low-achieving 15-year-olds in reading literacy	At least 20 % decrease (to reach 15,5 %)	Change in the share of low achievers in % (2000-2006)										
		FI -31.4 %	PL -30.2 %	LV -29.6%	+13.1 %	HU – 9.3 %	CZ +41.7 %	SK n.a.	SI n.a.	LT n.a.	EE n.a.	CY, MT, n.a.
		% of low achievers in 2006										
		FI 4.8 %	IE 12.1 %	EE 13.6 %	24.1 %	PL 16.2 %	SI 16.5 %	HU 20.6%	LV 21. 2 %	CZ 24. 8%	LT 25. 7%	SK 27.8%

Source: Commission working document: Progress towards the Lisbon Objectives in Education and Training, Report 2008.

While primary and secondary attendance and completion rates have traditionally been high in the EU10, the last decade saw a significant increase in the number of students enrolled to tertiary education. At the beginning of the transition in the early 1990s, there were both quality and quantity gaps in tertiary education compared with the advanced European countries. Most of the spending efforts were directed at increasing tertiary enrolment in order to reduce these gaps, increase the supply of human capital and manage certain social problems (like the increase of unemployment among the younger generation). These gaps were eliminated by 2003-2004, when 56% of the 18-24 year-old generation attended tertiary education in the EU10 compared with the average of 58% for the whole European Union. While in 2005, there were differences in the enrolment rates of the EU10 (the Baltic States and Slovenia led, while Malta, Cyprus, the Czech Republic and Slovakia remained below 40%), significant increases were also present everywhere, as shown in Chart 7.

Chart 7. Participation in tertiary education (ISCED 5-6) as % of the 20-24 year-old population



Source: Eurostat (2005)

The number of graduates in mathematics, science and technology (MST) increased during 2000-2006 in the EU27 by 4.4%, compared to the benchmark of 15% for 2010. Among the countries with the strongest growth were Slovakia and Poland from the EU10. At the same time, Slovenia and Malta recorded the slowest increase in the number of graduates. All the other EU10 countries, except Hungary, had growth rates similar or above the EU25 average rate.

Table 7 : European Benchmark – Graduates in mathematics, science and technology

Bench-mark area	Concrete target 2010	Three best performers in EU			EU27 average	EU10 according to their success in achieving the target								
Graduates in MST	Increase of at least 15 %	Average annual increase 2000-2006												
		PL +13.8 %	IT +13.8 %	SK +12.3 %	+4.4 %	CZ 8.9 %	CY +8.1%	MT +8.1 %	EE +7.1 %	LT +6.3 %	HU +3.2 %	LV +2.4 %	SI +0.9 %	
		Graduates per 1000 population aged 20-29 in 2006												
		IE 21.4%	FR 20.7%	LT 19.5%	13.0%	PL 13.3 %	EE 11.2%	SK 10.3%	CZ 10.0 %	SI 9.5 %	LV 8.9 %	HU 5.8 %	MT 5.0 %	CY 4.3 %
		% of females among graduates in 2006												
		EE 42.9%	BG 41.2%	PT 39.7	31.6%	PL 39.2 %	CY 35.9%	SK 34.8%	LV 32.4 %	LT 31.6 %	HU 27.9 %	CZ 26.5 %	MT 25.9 %	SI 25.7 %

Source: Commission working document: Progress towards the Lisbon Objectives in Education and Training, Report 2008

While the gaps between the EU10 and the EU15 were reduced in terms of higher education enrolment and graduation indicators, the quality of education did not follow these changes. The standard of primary and secondary education either stagnated or declined, reflected in the outcome of various international comparisons (Pisa, etc.), while in tertiary education quantitative expansion was accompanied by sizeable quality differences in individual institutions. As a result, education sector weaknesses have also contributed to the emergence of mismatches between supply and demand for skills, and labour market frictions stemming from the low quality of human capital. The contribution of human capital to growth in the EU8 (and probably in the EU10 as well) has been modest so far, as reflected by the OECD (2005) and World Bank (2006).

Despite the well-developed basic educational attainment in the EU10, there are significant gaps in lifelong learning and adult training. In the EU10 countries, the percentage of the adult population participating in education and training remains below the averages of the EU15, with the exception of Slovenia. Several reasons explain this, e.g. the lack of corporate sector interest, the weaknesses of public training and retraining programmes and the low level of interest in lifelong learning in the case of higher education units. The consequences of transition-specific effects on the labour market also matter, including the presence of rigid employment forms, the sizeable pool of long-term unemployed, and the significant number of people who had to exit the labour market.

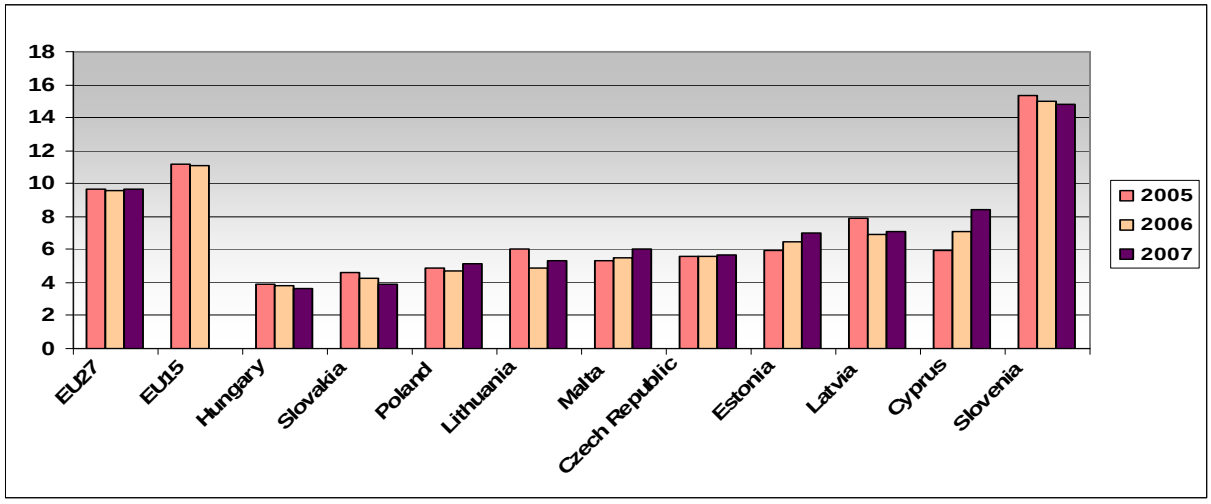
Only Slovenia among the EU10 achieves the European benchmark of a rate of at least 12.5% of adult participation in lifelong learning in 2007, as shown in Table 8. The EU15 average, and also all the rates for the EU27 countries, are below the target. However, in this measurement many of the EU10 countries perform poorly in comparison with EU15 countries, with Hungary being the last among EU10 and the penultimate after Greece in the entire EU. This benchmark represents the indicator from Eurostat's Labour Force Survey "Percentage of adult population aged 25-64 participating in education and training".

Table 8 : European Benchmark - Adult participation in lifelong learning in 2007

Benchmark area	Concrete target 2010	Three best performers in EU			EU27 av.	EU10 sorted according to their success in achieving the target									
Adult participation in lifelong learning (25-64) in 2006	At least 12.5 %	SE 32.0 %	DK 29.2 %	UK 26.6 %	9.7 %	SI 14.8 %	CY 8.4 %	LV 7.1 %	EE 7.0 %	CZ 5.7 %	MT 6.0 %	LT 5.3 %	PL 5.1 %	SK 3.9 %	HU 3.6 %

Source: Commission working document: Progress towards the Lisbon Objectives in Education and Training, Report 2008

Chart 8. Development of LLL participation of adult population aged 25 to 64



Source: Eurostat database

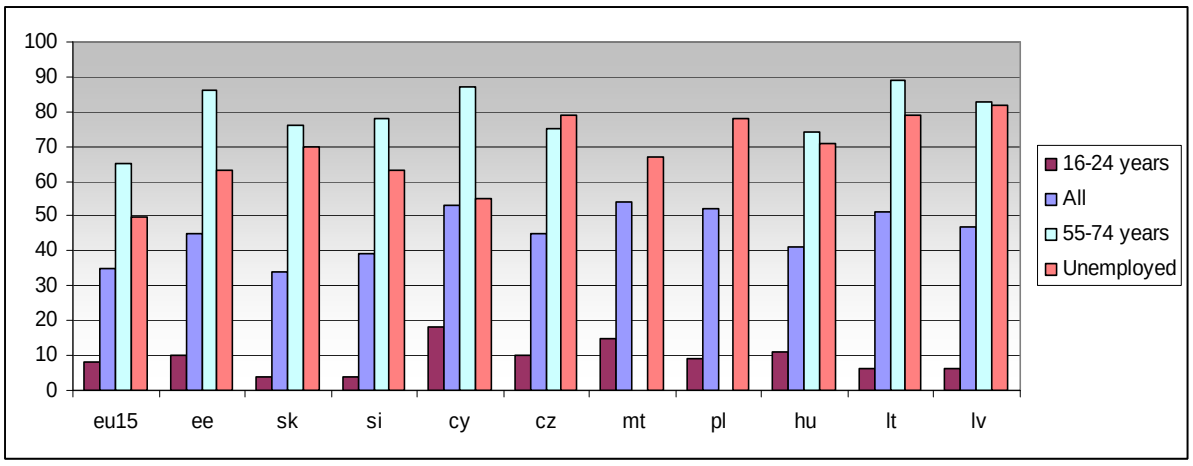
Altogether, the EU10 do not fall behind in relative expenditure on education. In the three benchmark areas, which target school education (early school leavers, upper-secondary education and low achievers in reading), we find strong performances in the New Member States (Poland, the Czech Republic, Slovenia and Slovakia, and also Latvia as regards reducing the share of low achievers in reading). In post-compulsory education, some EU10 countries (Slovakia, Hungary, Poland and the Czech Republic) have low percentages of population with tertiary education. However, Slovakia and Poland are among the leading countries as regards increasing the number of mathematics, science and technology (MST) graduates. Estonia, Latvia and Cyprus are among the top performers as regards increasing the share of women among MST graduates. In lifelong learning, the EU10 are performing poorly, with the exception of Slovenia.

3.1.3 Computer literacy

An important aspect for the development of eLearning is the level of computer literacy of the population, as the level of already achieved computer literacy has implications for the usage of eLearning services and access to them by various social groups.

Overall, the pattern of those who do not possess any basic computer skills in the EU10 countries is quite similar to lower-performing EU15 countries. The share of those who do not have any computer skills varies considerably among the EU10, with Slovakia performing better than the EU15 average, Slovenia and Estonia being close to it, and Lithuania, Cyprus and Hungary lagging considerably behind.

Chart 9. Percentage of population without basic computer skills, 2007

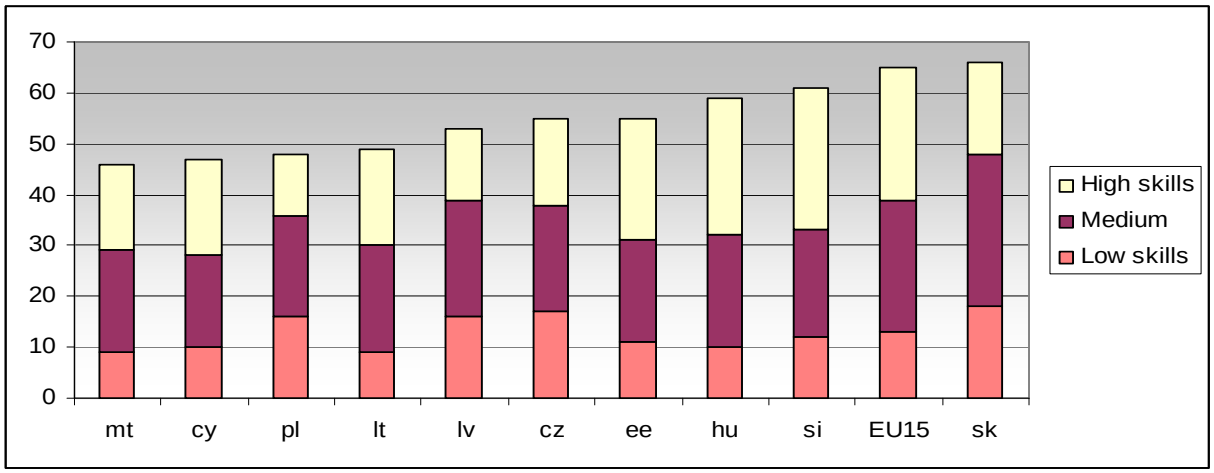


Source: Eurostat database, calculated from those who have not completed 1-2, 3-4, nor 5-6 basic activities

In terms of the lack of basic computer skills of various potential user groups, one can observe similar patterns to the EU15 in the analysed countries. Among the younger generation (aged 16-24), the share of those with no skills is the smallest in Slovakia (4%), Slovenia (4%), Latvia (6%) and Lithuania (6%) –these countries perform better than the EU15 average (8%). The largest shares of 16-24 year olds with no skills can be found in Malta (15%) and Cyprus (18%). This measurement is based on surveys of the completion of basic computer-related activities, and, as expected, the highest shares of people who never complete these tasks are found among the oldest age groups and the unemployed (see Chart 9). The lack of computer skills among older people and the unemployed seems to be more severe in the EU10 than in the EU15. Among young people, however, computer skills figures in the EU10 are similar to those of the EU15.

When the population is assessed according to the share of those having high levels of computer literacy, the picture is reversed in terms of the age and social group divisions: the younger generations have the highest and, as expected, the older and unemployed groups the lowest. However the differences in these figures for all groups seem to be smaller among the EU15 than the differences among the analysed EU10 countries. In terms of the population share with a high level of computer literacy, Estonia and Slovenia outperform the EU15 average. Hungary performs close to the EU15, while it lags considerably behind in the case of the population share with no basic computer skills.

Chart 10. Percentage of EU10 population with different levels of computer skills, 2007



Source: Eurostat database, high skills = 5-6 activities, medium skills = 3-4 activities, low skills = 1-2 activities. Difference between sum and 100% means people without completing any activities mentioned, shown also in Chart 9.

3.1.4 ICT skills of teachers

The Empirica (2006) study showed no significant differences between the EU10 and the EU15 countries in teachers' ICT skills. Table 9 shows similar shares of teachers with little, novice or good knowledge of ICT usage. Approximately 40% of teachers have good ICT skills and less than 10% of them have no, or next to no, user experience with computers. This goes for the new and old Member States. Among the EU10, Latvia, Slovakia and Hungary have the biggest percentage of computer-inexperienced teachers – about 14%. Slovakia is also the last in the number of teachers with good ICT skills. In Estonia, however, 50% of teachers have good ICT skills, giving this country the best ratio in the entire EU. There is also no difference in teachers' computer skills with respect to text processing or usage, email and downloading software. In the use of computers for presentations, EU10 teachers are even more confident than those of the EU15 (41% versus 33%).

Table 9 : Percentage of teachers with ICT skills

	Teachers with no or next to no user experience	Teachers with novice ICT Skills	Teachers with good ICT Skills
EU25	7	11	42
EU15	7	11	42
EU10	8	13	41
Cyprus	8	10	33
Czech Republic	5	9	47
Estonia	8	13	50
Hungary	15	14	33
Lithuania	9	23	48
Latvia	14	34	42
Malta	5	4	31
Poland	6	12	41
Slovenia	5	14	47
Slovakia	13	3	30

Source: Empirica (2006)

The Empirica study also shows that EU15 teachers perceive their schools to be well equipped with ICT and those in EU10 are even more convinced of this (75% and 77% respectively). In the EU10, teachers are less critical about the speed of Internet connection and about teachers' computer skills.

3.2 Information society developments and ICT diffusion in the EU10

3.2.1 Overview

The provision of eServices in general, and also in case of eLearning, requires that users have appropriate physical ICT infrastructure (PCs, Internet connection and broadband), basic ICT skills and digital literacy and that the service providers have well developed e-Skills. This chapter reviews the level of eLearning related to ICT development in the EU10 by focusing on major usage and penetration indicators for the main sectors.

The EU10 as a group and most of the individual countries lag behind the EU15 in the diffusion of ICT. This is reflected in the main access, penetration, content and usage indicators. According to the country studies, the differences have been caused by low demand for ICT, its low affordability, existing income, regional and societal divides, slow emergence of threshold effects[83] and delays in adopting and implementing appropriate ICT policies to stimulate usage. The development of the information society began later than in did in the EU15. Private and public investment funds have

[83] Threshold effect occur when such penetration and usage rates are reached, which generate new services and encourage the emergence of new service providers. Threshold effects play an important role in the spread of mobile communication and broadening of services related to it.

been limited, and the structural transformation of the EU8 diverted the attention of policy makers towards other challenges. Finally, low affordability of services has also been caused by insufficient competition levels due to the emergence of mono- or oligopolistic market structures following the privatisation of incumbent telephone operators, which coincided with weak regulatory capabilities.[84]

However, in recent years, the gaps between the two country groups started to narrow as the EU10 - realising the potential economic and social benefits of ICT – have put significant effort into improving their indicators. As a result, though there are still significant differences among the individual countries, access can no longer be considered to be the main barrier to information society development. While there are gaps in usage and penetration indicators in households, and the public and corporate sectors, they have similar patterns of ICT readiness in the two country groups.

The EU10 are far from being homogenous. The differences between them are sometimes greater than their differences with the EU15, and the standard deviation of indicators is higher within the EU10 than the EU15. There are some countries, which generally perform below the averages of the EU10, while two countries (Estonia and Slovenia) usually exceed the EU15 average.

3.2.2 The household sector

While the level of expenditure on ICT has been, on average, stagnating in the EU15, in the EU10 it has been rapidly increasing .There are two significant differences between the EU10 and the EU15 as regards ICT expenditure. While the EU10 countries do not spend as big a share of GDP as the EU15 on information technology, the situation is reversed if we look at the shares of GDP spent on communication technology. Of the EU10, Latvia and Estonia devote the biggest share of GDP to communication (7.4% and 6.9% in 2005) and also more than double the EU15 average (3.3% in 2005). Lithuania, the third fastest growing economy in EU, also devotes a big share of GDP to communications and has increased it by 1.6 percentage points over the last two years.

Internet access in households is not as widespread in the EU10 as it is in the EU15 (36% versus 54%). Only Slovenia has the same share as the EU15 average. However, the EU10 are expanding internet access much faster: 14 percentage points from 2004 to 2006, while the EU15 only advanced 9 percentage points in this period. Lithuania had the biggest increase in households with Internet access - its share almost tripled in two years. Not far behind are Latvia and Hungary, whose shares more than doubled from 2003 to 2005. However, none of these countries reached the EU15 average. Only Slovakia and the Czech Republic have slower growth rates in shares than the EU15 average. These two countries also have the smallest shares in the EU10 and almost the smallest shares in the EU25 (with the exception of Greece, which is at the bottom).

[84] Competition has started to intensify in many of the EU10 countries only in recent years, which has contributed besides quality improvements also to price declines (broadband access, PC prices, etc.).

Table 10 : Selected information society indicators

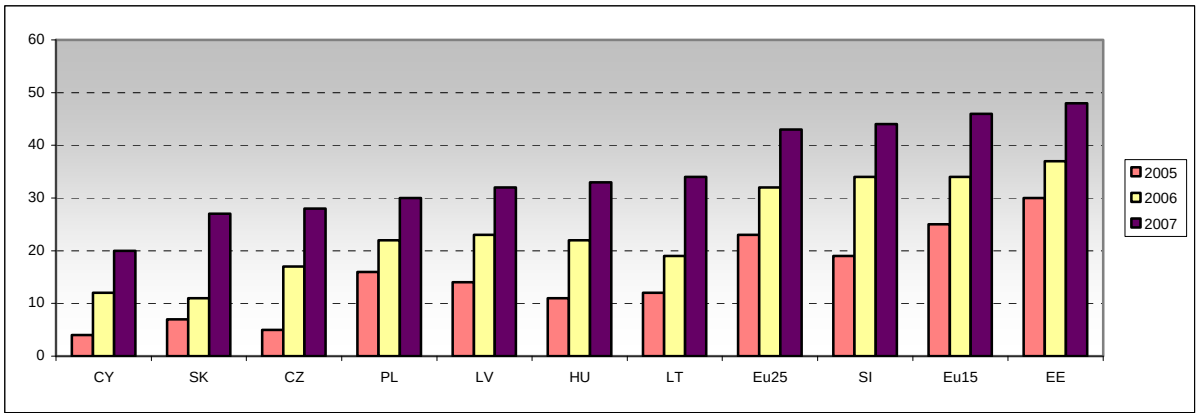
	Information technology expenditure as a percentage of GDP						Share of households with Internet access (%)[85]			Share of individuals regularly using the Internet[86]		
	Information technology expenditure			Communications expenditure								
	2004	2005	2006	2004	2005	2006	2005	2006	2007	2005	2006	2007
Cyprus	—	—	—	—	—	—	32	37	39	26	29	35
Czech Republic	2.8	2.8	3.2	3.9	4.2	4.4	19	29	35	26	36	42
Estonia	2.7	2.9	2.9	6.4	6.7	6.8	39	46	53	54	56	59
Hungary	2.4	2.4	2.5	4.9	5.5	5.0	22	32	38	34	42	49
Latvia	2.1	2.3	2.3	6.8	7.4	7.6	31	42	51	36	46	52
Lithuania	1.5	1.7	1.8	5.8	4.8	5.0	16	35	44	30	38	45
Malta							n.a.	53	54	34	n.a.	43
Poland	1.9	2.4	2.6	4.9	4.8	5.0	30	36	41	29	34	39
Slovenia	2.1	2.1	2.2	3.2	3.5	3.6	48	54	58	40	47	49
Slovakia	2.1	2.3	2.5	4.0	4.2	4.2	23	27	46	43	43	51
EU15	2.7	2.8	2.7	3.0	3.0	2.9	53	54	59	46	49	55

Source: Eurostat database

The average Internet penetration rate to households was 36% in the EU10 in 2006 compared to 54% in the EU15. However, as shown in Table 11, the EU10 countries are catching up with the EU15 average, some showing extremely fast development in two years (e.g. the share of households with internet access increased 2005-2007 in Lithuania with 28 percentage points, in Slovakia with 23, and in Latvia with 20), while the EU15 average has progressed 6 percentage points, from 53% to 59%. In 2007, Slovenia, Malta and Estonia were already getting close to the average level of the EU15 in the household internet access, and only the Czech Republic, Hungary and Cyprus had shares below 40%.

The measurement for regular Internet users shows even smaller gaps between the EU15 and the EU10. In the EU10 countries, relatively more people use the Internet than are connected to it as households because of household access problems, the presence of strong Public Internet Access Points (PIAPs) in several countries, the positive attitude of certain user groups (especially the younger generation and higher income groups) and the use of Internet at work.

Chart 11. Share of households with broadband access (%)



Source: Eurostat database

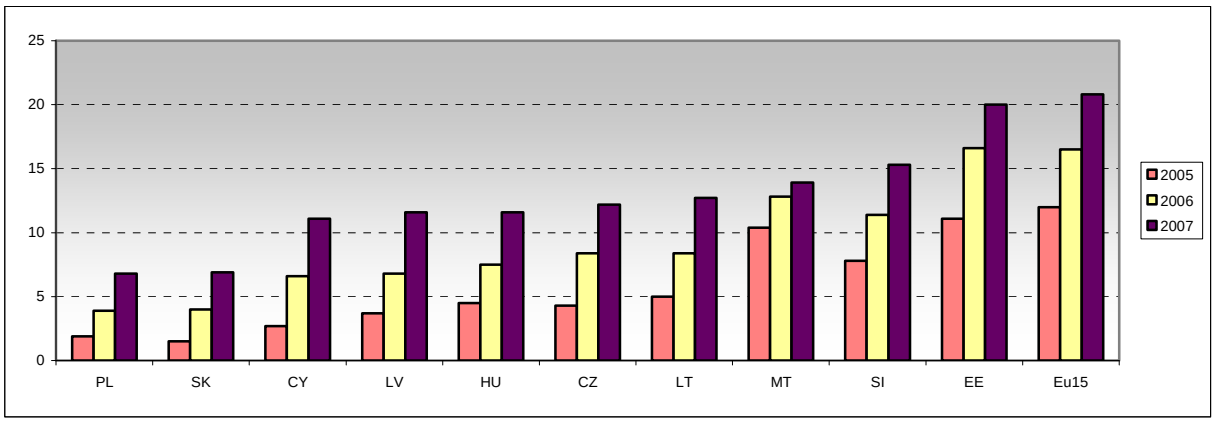
[85] Source: Eurostat, Community survey on ICT usage in households.

[86] Percentage of individuals who accessed the Internet, on average at least once a week, in 2005, 2006, 2007. This indicator covers all individuals aged 16 to 74 who access the Internet, on average, at least once a week, within the last three months before the survey. Source: Eurostat, Community survey on ICT usage by individuals.

A relatively high percentage of households in the EU10 are connected to the Internet via broadband. Due to the later start of ICT deployment in these countries, households connected directly via broadband to the Internet, skipping narrow band connections (see Chart 11). This can be seen in the share of broadband connections as a share of internet connections to households, where the EU10 performs very well in comparison to the EU15 average (78% in 2007). Only Latvia (63%), Slovakia (57%) and Cyprus (52%) have shares below 70%. Estonia (90%) is one of the top performers in the whole EU in this measurement, which may also be related to the fact that it is the only new Member State that exceeds the EU15 average for individuals regularly using Internet.

Overall, however, the EU10 lag behind the EU15 in broadband penetration in the number of broadband lines as a percentage of total population. Broadband penetration has increased considerably in recent years and, in 2007, it varied between 6.8% (Poland) and 20% (Estonia) against the EU15 average of 20.8%. However, the EU10 has not caught up with the EU15 in this measurement as quickly as it has in the other IT indicators presented above.

Chart 12. Broadband penetration rate (broadband lines in % of total population)



Source: Eurostat database

3.2.3 The corporate sector

As regards the Internet access of enterprises, the gap between many EU10 countries and the EU15 average has closed. Slovakia, Slovenia, the Czech Republic and Malta are on a par with, or surpass, the EU15 average, and the differences among the EU10 countries themselves are small, without any obvious laggards. Reflecting the later take up in broadband connections, a much bigger gap is present in broadband connection of enterprises, where only Malta surpasses the EU15 average (82% in 2007). Moreover, the differences among the EU10 are much bigger, with Latvia, Lithuania and Poland having much lower levels. Cyprus and Slovakia have shown very fast progress in broadband connections, increasing their share by almost 30% points from 2005 to 2007. However, although many enterprises are connected to the internet, the share of employees using networked computers is lower in all EU10 countries than in the EU15, which may reflect unevenly distributed or lacking computer resources within the companies among different employees.

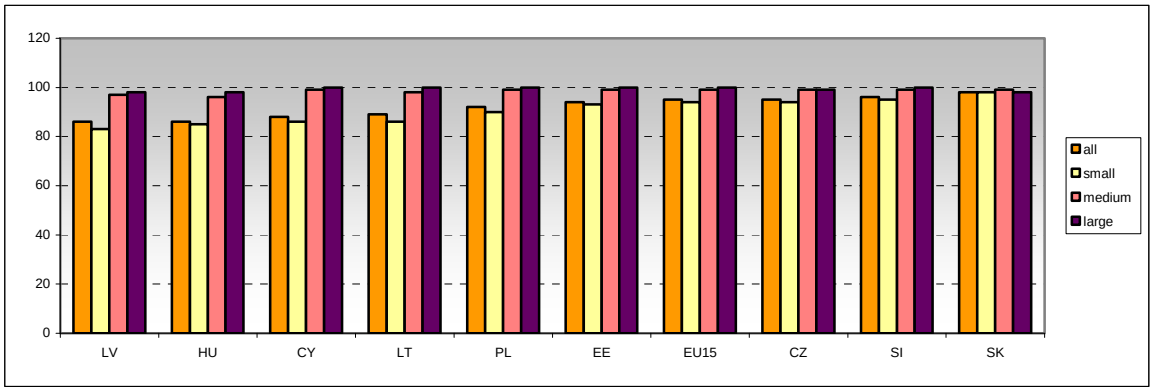
Table 11 : Selected indicators on ICT usage in enterprises

	Share of enterprises with internet access[87]			Percentage of enterprises with broadband access[88]			Employees using Internet connected computers for work[89]			Telework[90]		Enterprises with WLAN[91]		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2005	2006	2007
CY	85	86	88	40	55	69	31	31	31	18	18	15	14	19
CZ	92	95	95	52	69	77	26	29	30	6	23	12	15	22
EE	90	92	94	67	76	78	38	33	35	18	20	16	22	27
HU	78	80	86	48	61	70	17	21	24	20	14	6	11	17
LV	75	80	86	48	59	57	16	19	23	8	9	9	14	16
LT	86	88	89	57	57	53	20	23	23	14	18	6	10	13
MT	90	90	95	78	83	89	n.a.	35	30	23	n.a.	14	20	27
PL	87	89	92	43	46	53	27	28	26	4	6	10	14	20
SI	96	96	96	74	75	79	36	35	38	22	32	12	17	26
SK	92	93	98	48	61	76	26	29	34	35	31	15	18	23
EU15	92	94	95	65	77	82	37	38	41	20	23	16	22	23

Source: Eurostat database

However, as Charts 13 and 14 show, the overall averages hide size-specific differences in companies. Chart 13 shows that there is no difference among EU10 and EU15 in the internet access of large enterprises, but small and medium enterprises in some countries lag behind. This applies more clearly when considering the type of internet access. Chart 14 shows that in the case of broadband connections, both small and medium enterprises in many EU10 countries are lagging clearly behind the EU15 respective averages, although large enterprises are on par with the EU15.

Chart 13. The differences of Internet connection by enterprise size, %, 2007



Source: Eurostat database; No available data for Malta for 2007

87 All enterprises, without financial sector (10 employed persons or more) Source: Eurostat, Community survey on ICT usage in enterprises.

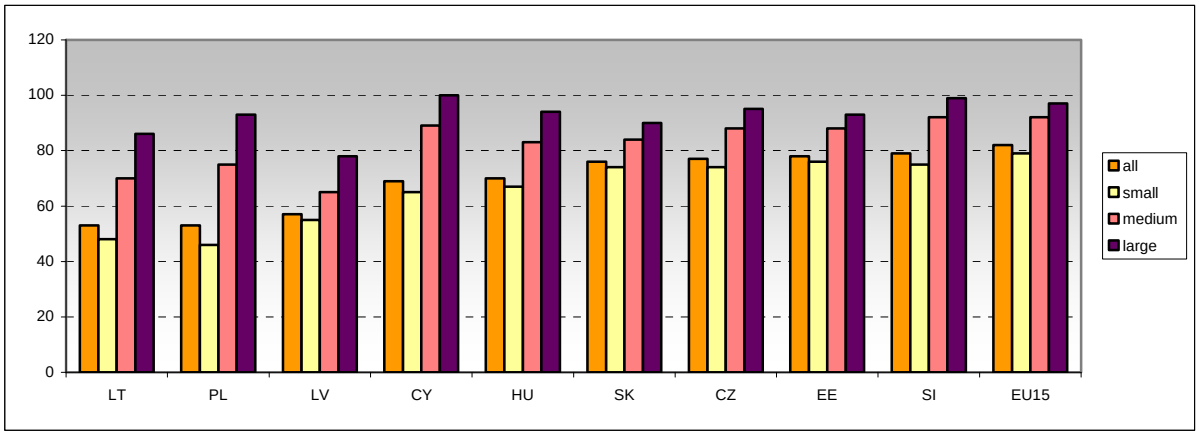
88 Share of all enterprises, without financial sector (10 employed persons or more). Source: Eurostat, Community survey on ICT usage in enterprises.

89 Percentage of persons employed using computers connected to the Internet in their normal work routine at least once a week in all enterprises without financial sector (10 employed persons or more). Source: Eurostat, Community survey on ICT usage in enterprises.

90 Percentage of enterprises with persons employed working part of their time away from enterprise premises and accessing enterprise's IT systems from there. Source: Eurostat, Community Survey on ICT usage in enterprises.

91 Percentage of enterprises with wireless LAN, all enterprises, without financial sector (10 employed persons or more) Source: Eurostat, Community Survey on ICT usage in enterprises.

Chart 14. The level of broadband connections in the enterprise sector in 2007 (%)



Source: Eurostat database; No available data for Malta for 2007

Telework is quite frequent in Slovenia and Slovakia – employees in more than 30% of enterprises teleworked for at least some of their working hours in 2006, which is more than the EU15 average (23%). Telework is considerably less common in Poland and Latvia (6% and 9%, respectively). On the other hand, the Czech Republic registered substantial growth in the share of enterprises with teleworkers (from 4% to 23% in two years).

As for shares of enterprises with WLAN (Wireless Local Area Network), all the EU10 register perceptible growth, and Estonia (27%), Malta (27%) and Slovenia (26%) have reached higher shares than the EU15 average (23%) in 2007. Although the shares registered in Lithuania (13%) have grown continuously, it is the country with the lowest scores in this indicator.

3.2.4 The public sector

There are limited data about the usage of ICT in the public sector, but those available reflect the fact that, in most indicators, the EU10 lag slightly behind the EU15. Overall, this gap is not significant, but there are huge gaps in the Internet and computer access rates among the EU10 countries themselves, as there are among the EU15 countries.

In Internet access, the level of penetration and usage in the EU10 is on a par with the EU15, while there are somewhat fewer broadband connections in the former group. However, the computer access rates are much lower in the EU10 than in the EU15, which may reflect limited computer usage in a number of public institutions.[92] Altogether, the public sector is somewhere between the household and corporate sectors in major ICT usage indicators, as shown in Table 12.

Table 12 : Comparison of major ICT usage indicators in the EU15 and the EU10[93] (%)

	2004		2005	
	EU15	EU-9[94]	EU15	EU-9
Computer access rates	46	34	51	36
Internet access rates	96	94	96	95
Broadband access rates	n.a.	65	83	71

Source: IDABC, eUser country studies

[92] While in this respect the country differences prevail too, there is evidence that in most of the countries the level of computer usage is very low in the majority of local government institutions and there are differences in the penetration rates for civil servants working in different central government institutions, depending on the financial position and management of that particular institution.

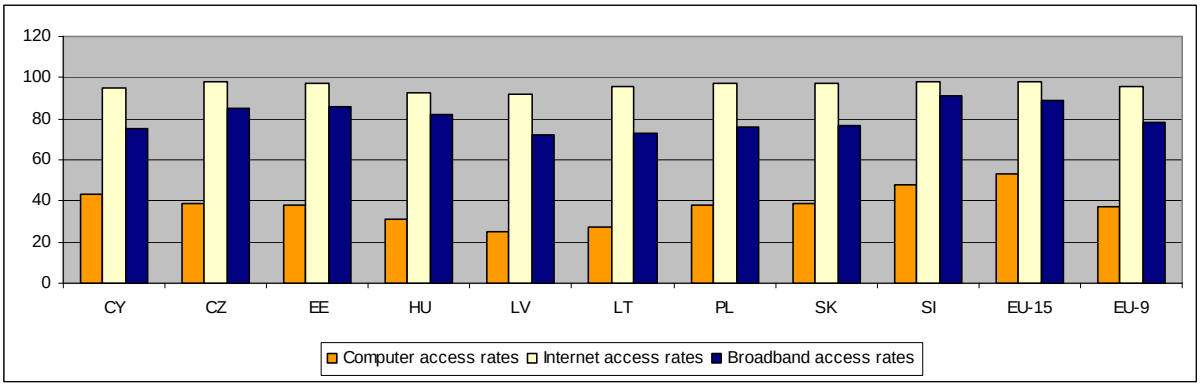
[93] Computer access rates for public sector shows the percentage of employees using any computer; Internet access rates for public sector shows the percentage of employees using Internet; Broadband access rates for public administration shows the percentage of employees connecting to the Internet via fixed broadband

[94] The EU10 without Cyprus

As with most of the ICT indicators, there are significant differences among the countries in their public sector-related indicators. For example, an average computer access rate of 37% (2006) was the outcome of country data which varied from 25% and 27% for Latvia and Lithuania and 43% and 48% for Cyprus and Slovenia.

In the case of broadband access rates for public sector employees, the average of 78% was the outcome of variation between 72% and 73% for Latvia and Lithuania and 86% and 91% for Estonia and Slovenia. The time series data reveal that the differences seem to be persistent, as no country has been able to leapfrog, nor has any fallen back significantly during 2003-2006.

Chart 15. Major usage indicators in the public sectors of the individual countries in 2006 (%)



Source: Eurostat database

The usage indicators for the public sector also confirm the differences in ICT development among the EU10. Slovenia, and to a smaller extent, Estonia also seem to be the leading countries in this area, as they are in other penetration, access and usage indicators for the private sector.

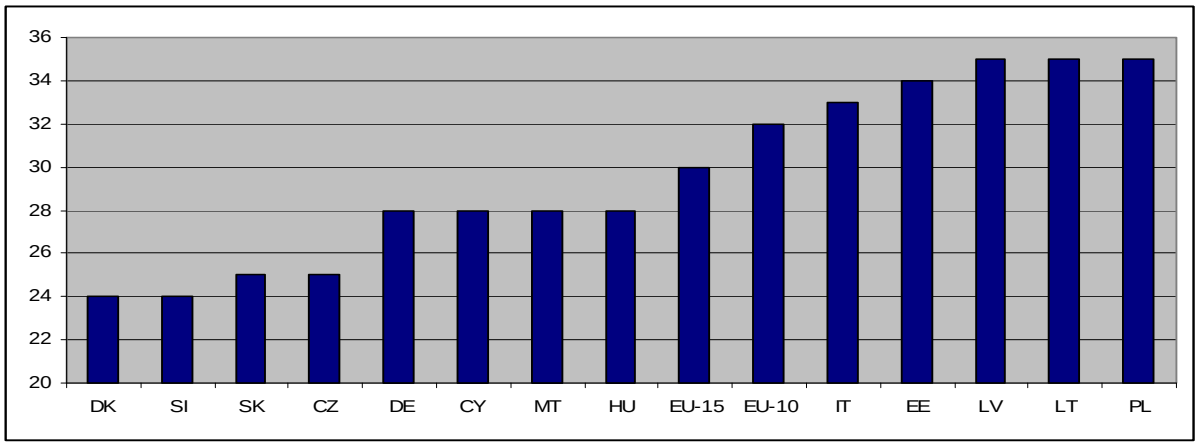
Altogether, while there are still gaps in the main access and penetration rates between the EU15 and the EU10, these have progressively diminished in recent years. Affordability and access no longer constitute the main problem for information society developments and eGovernment usage, though there are users or regions which may still be hindered by unequal access.

3.3 Disparities, and economic and digital divides in the EU10

Besides being influenced by features of the education sector and ICT development, eLearning in the EU10 is also strongly affected by the presence of regional, income and other forms of social divide. In 2006, income dispersion was somewhat greater in the EU10, exceeding the EU15 averages, according to the average Gini coefficient.[95]

[95] The disparities are higher even if some NMS have low Gini coefficients as emerging income differences are mitigated by social transfers and public redistribution.

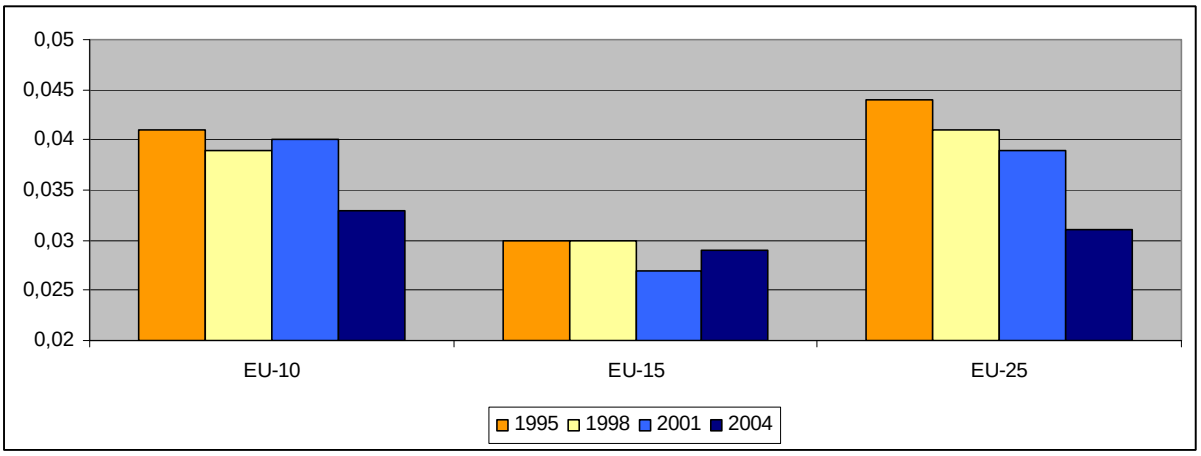
Chart 16. The Gini coefficient in the EU10 and three EU15[96] countries in 2006



Source: European Community Household Panel Survey (2007)

Regional income disparities are on average 25-30% higher in the EU10 than in the EU15. Though some decline in regional differences in the EU10 has been observed in recent years, they have remained above the EU15 levels.

Chart 17. The variation of regional GDP per capita (PPS) 1995-2004

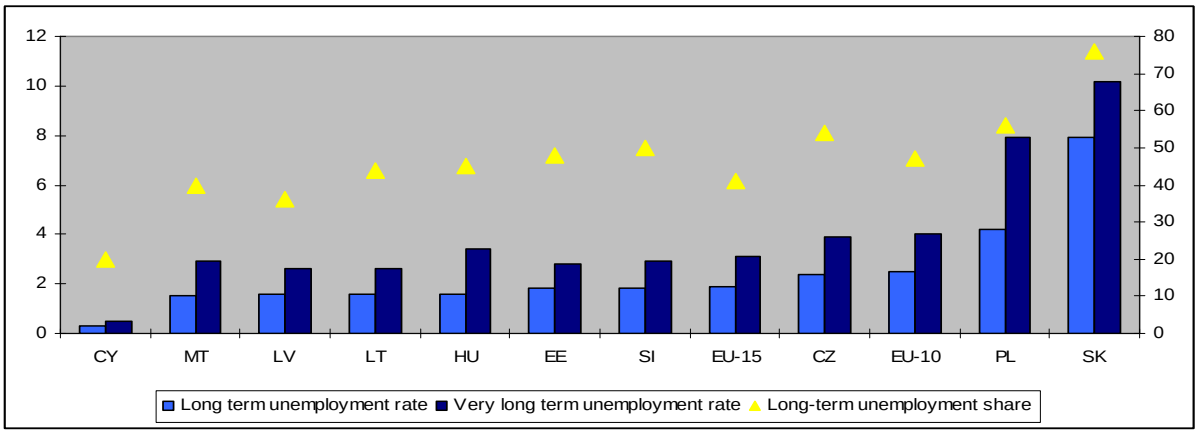


Source: Eurostat (2007), Paas-Schlitte (2006)

The EU10 overall are characterised by similar or somewhat higher unemployment figures, especially in relation to long-term unemployment. The higher long-term unemployment rates and shares reflect the ongoing structural changes, the presence of labour market rigidities and regulations.

[96] The selected EU15 cases represent countries belonging to the three main European social models: Denmark represents the Nordic, Germany the Continental, while Italy and Portugal the Mediterranean models

Chart 18. Long-term unemployment rates in the EU10 and rest of Europe (%) in 2006[97]



Source: Labour Force Survey (2007)

These profound regional, income, and other societal disparities coincide with, and are sometimes responsible for, the emergence and protracted presence of deep digital divide in these societies. Digital divide is partly an outcome of the way the information society spreads as equal access cannot be provided to all users because of their differences in motivation, ability to use ICT and their skills. However, the level of digital divide in the EU10 has been above the EU15 and has generally remained unchanged in recent years, even though penetration and other major information society indicators have improved. Digital divide is a special problem in the EU10 as it coincides with other income, regional, skills and generation divides, which, overall, reduce access to eLearning services.

Part of this digital divide stems from inappropriate policies (for example, little attention has been paid to connecting remote areas to broadband networks), and part of it is due to other, indirect and not ICT-related weaknesses (for example, quality of education and training of labour force). Independently of the causes, its presence and coincidence with a high incidence of poverty, unemployment, and underdeveloped or collapsing regions create difficulties for eService developments.

[97] Long-term unemployment rate is the percentage of long-term unemployed among the economically active population; Very long-term unemployment rate is the percentage of the economically active population being unemployed for more than two years; Long-term unemployment share is the percentage of long-term unemployed among all unemployed

4 THE LEVEL OF ELEARNING DEVELOPMENT IN THE EU10

4.1 Statistical and descriptive data on eLearning

As discussed before, eLearning in this project was defined as encompassing both learning ICT and using ICT for learning and in educational processes. This chapter gathers data on these aspects from national reports, Eurostat statistics and the recent survey on the use of ICT in schools, carried out by Empirica in 2006.[98]

4.1.1 eLearning in primary and secondary schools

The Empirica (2006) survey was conducted among head teachers and classroom teachers in a representative national sample in all the EU27 countries. It provides valuable data giving an overview of the status of ICT use in primary, secondary and vocational schools. The survey shows a surprisingly high percentage for the use of computers in teaching. All of the EU member states have scores above 95%, and the EU15 countries even score above 99%. However, a closer look reveals quite a different picture. Teachers use computers a lot for preparing lessons (89% in the EU15 and 90% in the EU10), however, neither teachers nor students use them very much in the classroom (see Table 13).

The survey shows a difference between the EU10 and the EU15. While the percentage of teachers that use computers for teaching in general is almost identical in the EU10 and the EU15, computers are used less in the classroom in the EU10. In the EU10, as seen in Table 13, 56% of teachers use computers in class, whereas in the EU15, this figure is 65%. Similar rates apply to teachers whose pupils use computers in the classroom – i.e. 54% of EU10 teachers and 69% of EU15 teachers. This suggests that the distribution of computers and other access equipment may be more fragmented and varying in the EU10 as compared with the EU15. At the same time, the differences among the EU10 are much more striking than the gaps between the averages of the EU15 and the EU10. The differences between Latvia and Hungary and the Czech Republic and Slovakia are close to 1:2. The best performer as regards pupils using computers in class among the EU10 is the Czech Republic with 74%, while Latvia comes last with 33%.

[98] http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/final_report_3.pdf - Benchmarking Access and Use of ICT in European Schools 2006.

Table 13 : Use of computers in teaching and ICT equipment in schools

	Use of computers in teaching[99]	Use of computers in class			Internet computers / 100 pupils[103]	Schools with own web page[104]	Schools with own LAN[105]	Schools with Intranet [106]
		To present/ demonstrate[100]	In more than 50 % of lessons [101]	By pupils in class[102]				
EU15	99	65	16	69	11	62	54	43
EU10	97	56	21	54	6	67	60	27
Cyprus	99	68	11	51	9	51	23	17
Czech Republic	100	71	18	74	8	75	81	39
Estonia	99	51	16	52	7	87	72	17
Hungary	97	41	27	36	9	56	56	23
Lithuania	97	56	17	47	5	60	50	25
Latvia	98	34	5	33	5	41	54	33
Malta	100	66	18	65	10	63	60	29
Poland	95	55	24	53	6	68	56	26
Slovenia	100	63	12	60	8	96	88	33
Slovakia	99	66	16	66	6	65	72	25

Source: Empirica (2006). Benchmarking Access and Use of ICT in European Schools 2006.

However, although teachers use PCs in the classroom less often in the EU10, those who do use it use it more intensively. In the EU10, 21% of teachers use computers in more than 50% of their lessons, while this is true only for 16% of teachers in the EU15. On average, the EU10 have a higher share of schools with their own home page (67%) than the EU15, where only 62% of schools have one. The same holds true for the share of schools with their own LAN (60% vs. 54%). (Empirica, 2006)

Table 14 shows that all the obstacles to using PCs are similar or lower in the EU10 compared to the EU15, except the lack of computers. It is worth mentioning that the lack of computers scored the highest in both the EU15 and the EU10 as the main reason why computers are not used in class - 2-3 times higher than any of the other reasons. With respect to school equipment, the EU10 is clearly behind in PC/pupil ratio as compared with the EU15. According to Empirica (2006), in the EU10, the average across all schools is 6.4 internet-connected PCs per 100 students, while in the EU15 it is 10.6 PCs. Malta, Cyprus, Hungary, the Czech Republic and Slovenia surpass or match the EU15 laggards (Portugal, Greece, and Italy), while Lithuania, Latvia, Poland and Slovakia have weaker ratios. However even these countries do not lag far behind and come are very close to Portugal and Greece, where 6 PCs per 100 students is not exceeded. Nevertheless, they lag considerably behind Scandinavian countries, where there are around 25 PCs per 100 students. In the EU10, schools are generally quite short of computers in classrooms: 30% of schools in the EU10 have computers in classrooms whereas 68% of schools in the EU15 have them. However, in both the EU10 and the EU15, the same share of teachers (49%) blames lack of computers for not using them in class.

[99] Percentage of use computers for teaching in schools (in last 12 months)
[100] Percentage of teachers who used a computer in class to present or demonstrate among those who use computers
[101] Percentage of teachers who use a computer in more than 50 % of lessons among those who use computers
[102] Percentage of teachers whose pupils use a computer in class.
[103] Total number of Internet connected computers per 100 pupils.
[104] Percentage of schools having their own home page or web site
[105] Percentage of schools with their own LAN.
[106] Percentage of schools having Intranet

Table 14 : Percentage of teachers stating as a reason for not using computers in class

	Lack of computers	Lack of adequate content/material	Lack of adequate skills of teachers	Lack of interest of teachers	No or unclear benefits
EU25	49	20	23	8.9	16.2
EU15	49	22	27	11	19.6
EU10	49	17	10	3.3	6.8
Cyprus	57	21	14	4.7	0.5
Czech Republic	44	27	16	9.7	25.3
Estonia	53	6	11	2.1	8.7
Hungary	49	10	9	3.4	7.3
Lithuania	78	12	12	2.7	6.6
Latvia	66	27	23	3.7	13.3
Malta	39	25	14	0.0	2.3
Poland	45	16	6	2.2	3.2
Slovenia	61	14	11	6.9	11.9
Slovakia	49	32	22	4.8	9.8

Source: Empirica (2006)

The Empirica survey shows that 22% of teachers in the EU15 blame lack of adequate materials or contents for not using computers in class, as opposed 17% in the EU10 where 17% of teachers state this as the reason. But on the other hand, more teachers in the EU15 (76%) than in the EU10 (62%) actually use online material from existing sources in teaching. Material, available on schools' computer networks and databases, is less used in both groups. This may be due to the lack of material. In the EU15, 65% of teachers use these sources, but only 53% in the EU10

The next reason – besides the lack of the equipment and the lack of on-line learning materials - for not using computers in class is the lack of adequate skills among teachers. While the survey shows that in both the EU10 and the EU15, teachers graded their skills at approximately the same level (see Table 10), only 10% of teachers in the EU10 state their lack of skills as a reason for not using computers compared to 27% of teachers in the EU15. Furthermore, lack of interest of teachers, or their perception that ICT have few benefits, are less often a barrier in the EU10 than in the EU15. This picture, provided by the survey responses, suggests that school teachers in the EU10 might be more receptive to the opportunities of ICT for learning and teaching than in the EU15, and that the barriers come mainly from external factors.

The most obvious difference between schools in the EU10 and the EU15, revealed by Empirica (2006), is in the share of schools which organise separate computer courses, The share of such schools is much bigger in the EU10 than in the EU15 (91% versus 46%). The EU10 also uses computers more often for language courses, but much less often for pupils with special needs, than the EU15. ICT teachers in both the EU15 and the EU10 agree with the statement that Internet and computers are integrated into most teaching subjects (response rate around 79%).

National project reports show that, at primary and secondary schools, most projects are focused on the improvement of ICT infrastructure, i.e. indicators of accessibility of PCs to the students and Internet penetration. This goal is often incorporated in respective national policies. In some cases, specific target values are provided, often in terms of comparisons with the EU averages. In addition, in order to utilise the capacity of ICT equipment to the greatest possible extent, ICT training is provided to the teaching staff. These investments in both physical and human capital are crucial for increasing digital literacy and creating the necessary conditions for eLearning take-up.

In Slovenia, a project to supply schools with ICT had already started in the late 1980s through the initiative called the 'RO' project (computer literacy; "Računalniško Opismenovanje").

> Besides the equipment with PCs and Internet connection, a very broad and elaborated training scheme for teachers was established. This scheme was initially very successful in 1990's and brought Slovenia in good position in international comparisons. However, a certain decline in financing of the educational ICT infrastructure at the end of 1990's occurred.

Provision of computer equipment and Internet connection to Estonian schools, together with in-service teacher training, has been ensured mainly through the Tiger Leap Foundation, established by the Estonian Ministry of Education. In the framework of Tiger Leap and the current Learning Tiger programme, the private sector in Estonia, unlike that of other countries, has been seen as one of the crucial actors supporting the purchase of new modern technologies for schools and also in developing eLearning materials.

Latvia provides an interesting example of cooperation between the Ministry responsible and the university sector. The Latvian University played a crucial role in the Latvian education informatisation system.

> In 1997 it signed an agreement with the Ministry of Education and Science and became the main provider of computers and Internet connections to Latvian schools, development of online learning materials, training ICT skills to teachers, and the provision of online education services to schools. Until 2004, within the project 27 000 teachers were trained and 105 000 pages of on-line study materials were created. The ministry has invested approximately EUR 18.5 million in the project.

In the Czech Republic, the document *National Strategy for ICT in Education* was approved and consequently schools' ICT infrastructure has improved significantly in terms of both PCs and Internet connection and a high share of teachers have been trained on a set of ICT courses. Although the absolute values of these indicators seem to remain below the EU average, there has been a visible, dynamic and positive trend in their development.

Besides the efforts focused on ICT equipment at schools, development of educational software by schools has also been supported by the state, in, for example, the Czech Republic, Estonia and Latvia. In addition, an example of good practice is provided by the Estonian eSchool, which was launched in 2005. This is an Internet-based communication environment between schools and homes, which contains information about studies and allows parents and pupils to see their grades, missed classes or home assignments over the Internet. Again, this project was not fully financed by the state, but the initial costs were largely covered by companies and NGOs.

4.1.2 eLearning in higher education

National reports agree that eLearning services in the EU10 are most developed at universities. Since the 1990s, the interest in eLearning has been growing and the higher education segment has been the most exposed to these activities. Particular institutions use the possibilities of eLearning such as the learning management systems, digital libraries and a number of other eLearning solutions as a means of enriching traditional forms of education, not as their substitute. In addition, distance education has been used more intensively in order to cope with space and human resources limitations.

Regarding distance education, there are significant differences between particular countries. Some countries are more advanced in this respect, devoting more from their funding to the development of these projects, while for others it remains a low priority. For example, in Poland and the Czech Republic, distance education has not played an important role and the offer of distance studies is limited. However, recent developments in these countries show that changes are expected. For example, one of the priorities of the *Strategy for Development of Higher Education* in Poland is the introduction of an eDiploma by 2010, which is seen as a crucial step for distance education.

On the other hand, in the Baltic countries, distance education is more developed. In Estonia, there are a number of policies and projects covering the provision and usage of eLearning services at universities. The *National Support Programme for ICT in Higher Education Tiger University (2002-2004*) followed by the programme *Tiger University Plus (2005-2008)* have supported the development of ICT infrastructure, ICT academic staff, degree courses and ICT-related curricula at higher educational establishments.[107] The *Strategy of Estonian eUniversity* 2004-2007 aimed to increase the percentage of eCourses and also the percentage of modules and curricula and the number of teachers involved in eLearning. It was hoped that by 2007, 50% of higher education courses would include

[107] During 2002-2004 the areas of the Tiger University were supported by EUR 6.25 million. For eLearning activities special section in this strategy is created – eUniversity.

some form of eLearning and 30% of teachers at higher education should include eLearning as part of their study process.

Estonian *Higher Education Strategy for 2006-2015* highlights the need to establish regional eLearning centres to enable people from all over Estonia to study the eUniversity and eVocational school curricula. It also points out the need to support eLearning tutoring.

> Two Estonian largest universities in the country - University of Tartu and Tallinn University of Technology - have created their own strategies for developing eLearning possibilities in the provision of their education and training services. The main goal is to upgrade the quality of education services by improving the access to learning materials and study courses. At the University of Tartu, all curricula in open university system (distance learning) and 30% of stationary level should include some form of eLearning. At the Tallinn University of Technology, the amount of courses that include some form of eLearning element should rise to 90% by 2010.

In Lithuania, the investment programme "Development of Distance Education Network in Lithuania" (LieDM) was started in 1998. This Network was established alongside the programme "Information Technologies for Higher Education and Science (2001-2006)". The Programme consisted of three main interrelated parts: Lithuanian Science and Higher Education Information System, Lithuanian Academic Libraries Network and Lithuanian Distance Education Network. The major goal of the LieDM was to promote the establishment of the information society in Lithuania by developing and coordinating the higher and further education systems with the help of information and communication technologies.

> Studies in the LieDM network are based on modern information technologies, while blending internet-based learning and videoconferencing, expanding the network of distance learning classes and centres, as well as establishing multimedia laboratories and videoconferencing studios. The network is the basic infrastructure for distance education in the country, which is open for everybody; thus, all the institutions - Universities, Colleges, Vocational Schools, and other educational organizations - are able to participate in the delivery of distance learning services. The costs of educational services can be reduced considerably, since these institutions provide many differing educational resources for students all over Lithuania, as well as organizing examinations and planning the implementation of new technologies.

In the late 1990s, several countries participated in PHARE, an EU project for "Multi-country cooperation in Distance Education". During the implementation phase of this project, the three main activities carried out were the establishment of distance education network infrastructure, the creation of distance education courses, and staff training.

> In Lithuania the pilot project ran in 1995-1996 and the follow-up programme in 1997-1999: two distance education centres and seven distance education courses were created. The Czech Republic took part in the programme in 1996-1999 and four distance education centres were created.
>
> In Latvia, Distance Education Study Centre of Riga Technical University was founded within the project "Multi-country Co-operation in Distance Learning": Each year the centre trains about 800 people, who obtain a certificate at the end of their studies. It is also considered a good practice case by the eUser study. During the seven years since its establishment, the centre has participated in more than twenty international eLearning and open distance learning development projects. One of them is very important in the sense of preparing multipliers of eLearning – it is the eCourse Distance Learning and eLearning Methodology and Technology. The aim of this course is to give enough information and skills to the trainees so that they would be able to develop an eCourse on their own.

There are various blended versions of eUniversity services as well, below examples from a Cypriot and Polish case.

> A strategic initiative taken by the University of Cyprus is e-University,108 which operates as an "umbrella", which supports many projects: e-University Portal, e-University Research Lab and e-University Consulting Services Center. The portal provides access to the university services for all actors (students, academic stuff, external or internal collaborators, administration stuff, alumni).

[108] Source: Technology Foresight Summit, Experts Papers, Budapest 2003.

There are three services: a*dministrative services related to the* university's Administration Division (student registration, course registration, student financials, etc.), l*ibrary (*all the traditional services and activities of a university library) and e*Learning with* all services available to the academic and student body in order to support and enrich the course teaching through more advanced and state-of-the-art multimedia forms.

The Academy of Humanities and Economics in Lodz (AHE) and Maria Sklodowska Curie University in Lublin (UMCS) joined their eLearning forces and started Polish Virtual University (PVU) as a common unit and project. The main aim of the project was to build necessary resources, which could enable both institutions to provide online studies and courses. At the moment more than 100 eCourses are available and used as a support for traditional teaching or offered as separated courses on the Internet.

A different type of eService, related to higher education, is offered by enrolment portals, which operate in many countries, for example the Estonian SAIS. Below the Hungarian case is provided.

The portal http://www.felvi.hu, which was "portal of the year" in 2005, is an electronic higher education admission service as all prospective students must upload their application through this portal. The most important target group therefore is secondary school students, but besides them, the portal also provides information to other actors, teachers, parents, and administrative staff. The portal contains the description of the entrance examination process (standardised tests for each subject) and also sample tests in various subjects are published. After the exam, the users can look at their scores and add up their points. After the universities/colleges publish their minimum score, applicants know whether they are above or below, therefore admitted or not.

4.1.3 eLearning among individuals

Individuals can use ICT for learning in many ways, which makes it difficult to measure, especially when it takes place outside formal education institutions. In 2006, the Eurostat survey indicator for individuals 16-74 using internet for formalised educational activities (school, university etc.) showed that these shares in Slovenia (16%), Lithuania (16%), Cyprus (12%) and Hungary (10%) were actually higher than the EU15 average of 9%. The indicator measuring internet use for education and training activities also shows that Lithuania and Slovenia have better or equal shares to the EU15 average of 22% (see Table 15).

Table 15 demonstrates another aspect of internet usage for education: among the youngest age group, the EU10 have shares similar to the EU15 average and in Slovenia, Lithuania and the Czech Republic this share even surpasses it. However, in the oldest age group and among the unemployed, usage of the internet for training and education is lower than in the EU15. As seen earlier, ICT usage and skills in these groups are also lower, which partially explains it.

Table 15 : Percentage of individuals using Internet for training and education, 2006

	All individuals	16-24 years old	25-54 years old	55-74 years old	Unemployed
EU27	19	34	17	5	14
EU15	22	38	20	6	17
Czech Republic	18	50	16	4	9
Estonia	8	21	7	n.a.	n.a.
Cyprus	13	31	13	3	14
Latvia	13	37	10	1	4
Lithuania	27	68	24	n.a.	6
Hungary	13	34	13	2	7
Poland	4	16	2	n.a.	n.a.
Slovenia	22	70	20	1	17
Slovakia	8	17	7	1	3

Source: Eurostat database (% of individuals who have used internet in last 3 months for training and education)

Poland, Estonia and Slovakia form the lowest performing group, which is somewhat surprising, as both Estonia and Slovakia were among the countries with high shares of individuals using computers and internet. Not using the internet for education and training, despite high general use, may reflect gaps in the provision of education and training opportunities via internet, or differences in adoption attitudes of the individuals. Some of the national reports mentioned that quality assurance for online courses was seen as critical before people (both employees and employers) would start to appreciate them. If no blended learning opportunities with both ICT-based and more 'traditional' components are available, the threshold to start participating in a fully online course in this kind of attitudinal environment may be very high.

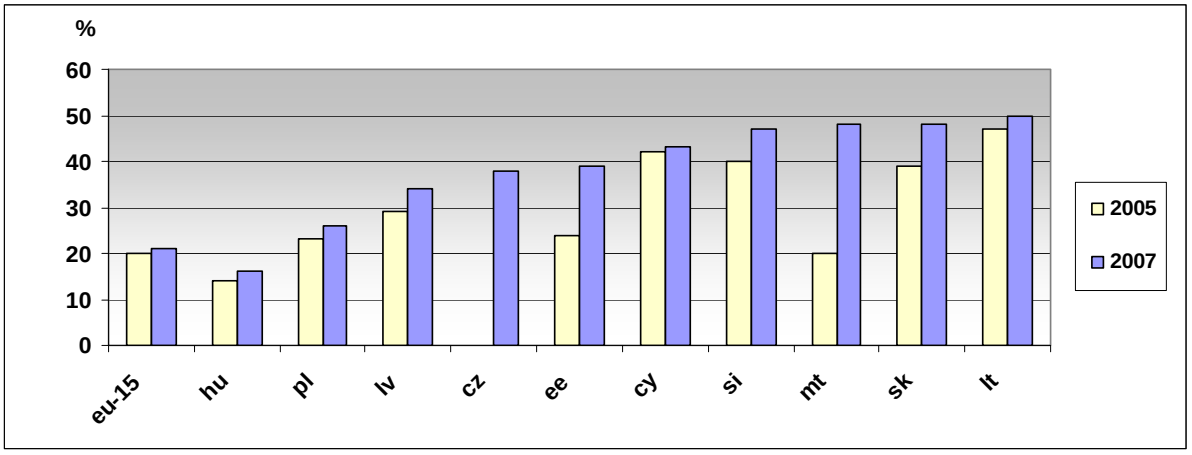
In some EU10 countries, there are eLearning initiatives or projects which focus on people with special needs. In Latvia, for example, there is a project called 'Integration of Disabled Adults in the Labour Market through Distance Learning', while in the Czech Republic, part of the National Programme for Computer Literacy is designed for handicapped people.

In Estonia, the Ministry of Economy and Communication and the Ministry of Social Affairs are responsible for ensuring access to the Internet for disabled people, in line with the principles of the Web Accessibility Initiative. The Tiger Leap Foundation supports access by pupils with special needs to general education by making information and communication technologies available for that purpose. The project is called "ICT in the Education of Pupils with Special Needs'. In Poland, the Stefan Batory Foundation has focused on providing Internet access and training for NGOs and disabled people.

4.1.4 eLearning in enterprises

The progress in using of eLearning applications in enterprises has not been very spectacular in either the EU15 or the EU10 over the last three years, as the average shares did not change significantly. Nevertheless, this kind of training is considerably more common in the EU10 than it is in the EU15, as shown in Chart 19. National reports mention internationally certified online courses as a common type of eLearning taken up by companies. Lithuania has the biggest share of eLearning in enterprises in the whole EU (50% in 2007), but Slovakia, Malta and Slovenia are close behind. It is worth noting that all the EU10, apart from Hungary, outperform the EU15 average. Additionally, there are some countries which perform exceptionally well in this respect, as almost every second company has applied this option for training and educating its employees.

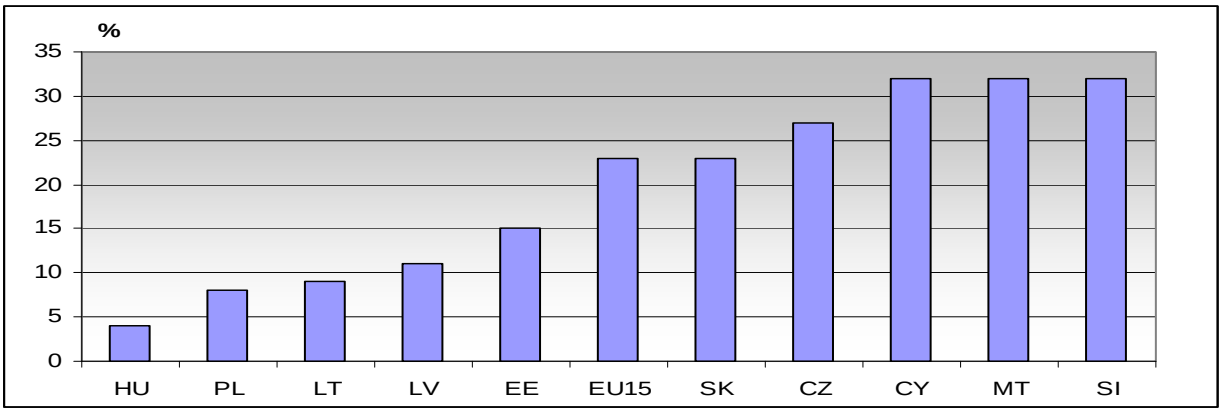
Chart 19. Percentage of enterprises using eLearning for training and education of employees



Source: Eurostat database

Although no indicators show which types of topics are covered by the eLearning offered, the national reports often mention ECDL and other IT-related courses. As shown in Chart 20, many enterprises provide their employees with training to develop or upgrade their ICT skills. This new Eurostat indicator has been included only since 2007, hence no historical data of the development of this training exist.

Chart 20. Percentage of enterprises providing training to develop ICT skills of personnel, 2007



Source: Eurostat database

In all countries, re-qualification for the unemployed is of crucial importance. However, the extent to which ICT courses and eLearning approaches are used to enhance the re-qualification process varies.

> In the Czech Republic, some re-qualification courses are subsidized by the Ministry of Labour and Social Affairs, listed at the integrated portal http://portal.mpsv.cz. The ministry puts emphasis on education of handicapped citizens (both physically and socially), the education of the elderly and education of people in endangered regions, meaning those regions with a high level of unemployment and a complicated transport situation. In 2005, approximately 32% of job applicants who had undertaken a re-qualification course took part in a course focusing on ICT usage.

4.2 Policy frameworks and stakeholders for eLearning

4.2.1 eLearning policies - overview

In the EU10, there have been no specific eLearning policies adopted so far as overall eLearning policies have been included among broad development, information society and education policies. Therefore the provision of eLearning services by the public sector has remained quite fragmented.

The first exception was Slovenia, where the first draft of the Strategy of eLearning 2006-2010 was prepared, integrating all aspects of eLearning activities. The strategy was initially based on EU recommendations, starting with i2010 initiative and the national strategies of selected EU countries and regions.[109] Recently, Malta also committed itself to having in place a national eLearning strategy, and this was adopted at the beginning of 2008. While numerous strategies in the EU10 have been adopted on information society development, eLearning is still quite new, in both formal education and lifelong learning, and its development is usually included in general information society policies. Table 16 lists the main national **information society policies,** which have made up the umbrella strategy for developing eLearning in the EU10 countries. Besides the general strategies, some countries (Estonia, Slovakia) have developed more specific policies focusing on the Lisbon priorities and the contribution information society developments make to these tasks.

In addition, some of the countries have already adopted their own national **broadband strategies** in order to enhance development of broadband penetration, which forms one of the basic preconditions for more extensive eLearning services usage. These are the Czech Republic (Broadband Strategy of the Czech Republic), Estonia (Estonian Broadband Strategy 2005-2007) and Hungary (National Broadband Strategy).

[109] The strategy has chapters on analysis and strategic targets (technology, learning contents and processes, legislation, infrastructure), proposes to establish the national centres for eLearning, the EU harmonization directions, as well as the framework for specific actions in target segments and in corresponding sectors. Other national strategies were intensively studied in the process of writing, particularly the one from UK, but also from Norway, Austria and Ireland.

Table 16 : National information policies in the EU10

Country	National information policy	Date of adoption
Czech Rep.	State Information and Communication Policy – eCzech 2006	2004
Cyprus	Cyprus National Information Society Strategy for 2004-2006	2003
Estonia	Principles of the Estonian Information Policy for 2004-2006 Estonian Information Society Strategy 2013	2004 2007
Hungary	Hungarian Information Society Strategy	2003
Latvia	eLatvia 2005-2008	2005
Lithuania	Lithuanian Strategy for the Development of the Information Society	2005
Malta	National ICT Strategy 2004-2006 National eLearning Strategy 2008-2010	2003 2008
Poland	ePoland - Strategy of the Development of the Information Society in Poland for the years 2004-2006	2003
Slovenia	Strategy of Republic of Slovenia in the Information Society Strategy of eLearning 2006-2010	2003 2006
Slovakia	National Information Society Strategy Action Plan for Information Society of the National Lisbon Strategy	2004 2005

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

However, because up until now higher emphasis has been put on eGovernment services, insufficient attention has been devoted to eLearning in the majority of cases. On the other hand, all the countries are aware of the role of ICT developments can play in their ability to keep pace with knowledge economy challenges, and therefore they may devote more attention to eLearning in the near future.

The majority of national experts consider general documents such as national development strategies (see Table 17) to be relevant for eLearning development. In these strategies, eLearning issues are usually included in the section on human resources development. Similarly, some parts of lifelong learning strategies also deal with eLearning development.

> The examples of such strategies are Estonian "National Priorities of Adult Education for 2004-2006" of "Lifelong Learning Strategy for 2005-2008", Latvian "Lifelong Learning Strategy Development and Implementation" or Polish "Development Strategy for Lifelong Learning until 2010".

Table 17 : National development strategies in the EU10

Country	National information policy
Czech Republic	Strategy of Economic Growth of the Czech Republic 2005-2013
Cyprus	Strategic Development Plan 2004-2006
Estonia	Estonian National Strategy on Sustainable Development
Hungary	Hungarian National Development Plan 2004-2006
Latvia	National Lisbon Programme of Latvia for 2005-2008 Latvian National Development Plan 2007-2013
Lithuania	Long-term Economic Development Strategy of Lithuania until 2015
Malta	Draft Sustainable Development Strategy for Malta Malta National Development Plan 2003-2006
Poland	National Development Plan 2004-2006 National Development Plan 2007-2013
Slovenia	Slovenian Development Strategy
Slovakia	Strategy of Competitiveness until 2010 (National Lisbon Strategy)

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

The majority of these national policies are based on various EU initiatives. The most important reference documents are eEurope+, eEurope 2005 and i2010, the eLearning initiative and the

eLearning programme (2004-2006)[110] which, to varying extents, influenced the formation of the existing policy documents, the priorities set by these documents, and the specific programmes supported and implemented. While the main aims defined in the national policies often follow European strategies or are linked to EU15 main intentions, the policies and strategies have usually reflected specific local conditions and necessities.

The level of detail in which particular policies or strategies are elaborated varies greatly from country to country and from policy to policy. While some of them provide only the direction of projected developments, others include detailed description of planned actions and specify target values for particular indicators and time schedules for their achievement. However, most of the national policies are perceived as too general by the interviewed national experts, who would recommend more binding criteria. At the same time, education policy programmes have generally lacked a specific eLearning orientation as they have focused on reshaping the national curricula, and changing the education systems' institutional and financial frameworks. Less time and attention has therefore been devoted to eLearning-specific issues.

4.2.2 eLearning aspects of information society policies

The vast majority of general information society policies include increasing the population's digital literacy as an objective. In addition, to support the ICT usage in general and therefore to enhance the usage of eLearning services, some of the countries aim to provide Internet connection to the general public via public Internet access points. Furthermore, preventing the exclusion of groups most at risk is an important task for governments, which could be partly achieved through the promotion of eInclusion.

Digital literacy at various levels can help to facilitate inclusion and participation in the information society. It may also have positive social and labour market effects. The availability of ICT skills and a high level of digital literacy offer new opportunities for mobile and innovative forms of work, which may increase the mobility of the generally very immobile EU10 labour force. ICT skills digital literacy is also a precondition for the availability of instruments and methodologies for inclusion in the labour market of people with poorer employment prospects and special needs. Thus, while other factors, including non-digital skills, the presence of appropriate labour market institutions and regulations also matter, digital skills can make an important contribution to employment rates and labour market trends.

The Czech National Programme for Computer Literacy can serve as an example of specific digital literacy projects.

> The programme was launched in 2003 for the broadest population without any experience with ICT and since then more than 200 000 people were trained. Within the public private partnership framework a large network of training centres was built (above all in schools) holding courses for absolute computer beginners. The programme is based on two-hour courses with the price of approximately EUR 3. In addition, more than 1,500 people were trained in the programme's part for people with special needs.

In some districts in Latvia, free ICT training for the unemployed has been launched. Each participant gets a certificate for completing the course, and can apply for more advanced digital literacy courses, also provided for free. In addition, the Latvian Information Technology and Telecommunications Association created 30 Internet access points in these districts, where everyone, who has completed the course, can use the Internet for free.

Similarly in Lithuania, the Window to the Future Alliance, formed by large telecommunication companies and banks, supports information society development.

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[110] Based on the Decision No 2318/2003/EC of the European Parliament and of the Council of 5 December 2003 The eLearning Programme was aimed at improving the quality and accessibility of European education and training systems through the effective use of information and communication technologies. The main tool was a multiannual programme running from 2004 to 2006 based on the integration of ICTs in education and training systems in Europe.

The Estonian initiative is another example of public Internet access point policies. The Estonian government decided to establish the Internet connection in all public libraries during 2002-2004. By now, almost all public libraries will have an Internet connection.

4.2.3 Responsible institutions and financing schemes for eLearning policies

In most of the EU10 countries, the Ministries of Education (under various denominations) are the leading institutions in eLearning policy formation and are important for eLearning in the public sphere since they are, besides others, responsible for ICT education at schools. They are responsible for the development of school education policies, inspection procedures, the allocation of funds, the implementation of laws and administrative decisions. Moreover, in some countries, specialized ministries responsible for the issues related to the information society were established.

> For example in the Czech Republic eLearning issues were covered by the Ministry of Informatics, in Slovenia by the Ministry of Information Society and in Hungary by the Ministry of Informatics and Communication, all of them established at the beginning of the decade.[111] However, the Slovenian ministry was dissolved in 2005 and the Hungarian in 2006.

Other ministries are also partly responsible for eLearning: for example, the Ministries of Culture, which are responsible for Internet connections in libraries and establishment of Public Internet Access Points, and the Ministries of Labour and Social Affairs, which are responsible for re-qualification courses and training for the unemployed.

Public schools, including higher education institutions are the main providers of eLearning materials, education and related services. Private institutions offering their own eLearning materials are the other main suppliers. While there is only ad hoc information available about the extent to which enterprises use eLearning for staff training, it has recently been increasingly used by larger and multinational corporations, especially in the banking and telecommunication sectors. Companies in these sectors usually use eLearning materials with either a general focus, such as language, ICT and work security courses, or tailor-made courses to train employees in new products and company services. In addition, it can be argued that smaller companies are reluctant to use eLearning in their training process, mainly due to the high costs involved. It is worth noting that not only the private sector but also government ministries and independent government entities organise training programmes to improve the performance standards and skills of their employees. These programmes cater for the needs of various levels of civil servants.

Unfortunately, specific data related to the financing of eLearning services and ICT equipment is not available for the EU10 as a group or as individual countries. In general, the private sector is perceived as a key source of funding for the development of ICTs. It is responsible for financing ICT infrastructure and eLearning services in lifelong learning and at workplace. Nevertheless, the government is responsible for financing ICT equipment at schools of all levels. State financing represents a significant part of total resources going to information technologies. Therefore, the role of the state in financing eLearning initiatives is decisive. There are also some cases of private enterprises and their associations participating in public-private partnerships for financing. In some countries, foundations play an important role.

> For example in Estonia the Tiger Leap Foundation and the Estonian Information Technology Foundation play an important role. Also foundations of G. Soros were active in the Czech Republic (Open Society Foundation), Estonia (Open Estonia Foundation) or Lithuania (Open Society Fund Lithuania).

EU funds have provided some resources for ICT and eLearning developments. To finance public projects (and public components of PPP), the EU10 can make use of the opportunities arising from their membership of various EU programmes such as the Sixth Framework Programme for Science and Research – IST (Information Society Technologies), eTEN, IDA (Interchange of Data between Administrations) or eContent. From 2007, eTEN and eContent will be integrated in the Competitiveness and Innovation Framework Programme (CIP). For eLearning development, its sub-

[111] The Czech ministry was established in 2003, the Slovenian one in 2001 and the Hungarian one in 2002.

programme - “ICT Policy Support Programme” - will be important. The CIP will run from 2007 to 2013. Furthermore, a number of projects focused on education of citizens in information society issues, are financed by the European Social Fund. A number of primary and secondary schools participate in the eTwinning programme, which is the main action of the European Union's eLearning programme to promote the use of ICT at schools in Europe.

Besides that, in the framework of the *eLearning Programme* (2004-2006), several countries have participated in European virtual campus programmes, which have received a significant part of the total *eLearning Programme* budget. Finally, eLearning for promoting digital literacy was also supported by European Funds, though the scope of programmes and support was much more limited. The EU10 have been increasingly active in the European eLearning programmes and their participation is expected to continue in the *Lifelong Learning Programme (2007-2013)* into which the objectives of the *eLearning Programme* have been integrated.

Regarding financing for households, the possibility of tax deductions on the purchase of ICT equipment has been used in Hungary and was considered in the Czech Republic and Latvia. Currently, specific eLearning policies and projects focus mainly on distance education at universities, the development of ICT infrastructure in formal education institutions accompanied by teacher training and the improvement of the population’s digital literacy.

4.2.4 Legal framework for eLearning

Generally, the EU10 countries do not have specific legal frameworks for eLearning. The legal base in this area is mainly restricted to policy strategies and does not form any complete or specific legal framework, which would affect further developments. However, there are a number of acts, dealing with education, electronic communication, electronic signature, intellectual property rights and personal data protection, which are also relevant for eLearning. .

Regarding the inclusion of ICT learning in school curriculum, the situation varies from country to country. While in Estonia, informatics and computer studies are not compulsory courses at either primary or secondary education levels, the Maltese government plans to include ICT into the national curriculum. In Cyprus, ICT classes are mandatory at public upper secondary schools and in Latvia they are mandatory at both elementary and secondary schools. The main issue is how to combine eLearning with the national curriculum and also how to incorporate these activities into the remuneration system for teachers, who spend time on the preparation and use of eLearning applications.

There is no strong tendency at workplaces to cover obligatory training with eLearning services. Recently, however, companies have started to also use electronic means to train their employees in mandatory topics such as work safety, first aid, training of drivers, etc. In Lithuania and the Czech Republic for example, driving license applicants do the theoretical part of the exam in an electronic form.

In the majority of countries, there is also a reported lack of legislation on mechanisms for quality assurance, accreditation, certification and other related aspects of adult education. As a consequence, it is difficult to compare and assess the quality of eLearning training providers, and this may hinder the demand for this kind of training.

4.3 Achievements and shortcomings of eLearning in the EU10

Based on the presentation of the developments and the environment surrounding e-Learning, this chapter briefly discusses the main achievements and shortcomings of eLearning in the EU10. It summarizes those achievements and shortcomings which seem to be common in these countries.

4.3.1 The main achievements

Infrastructure for learning ICT or using ICT for learning exists in higher education and large companies. Household connectivity and ICT equipment levels are also catching up with the EU15 levels quickly, although divides exist within and between EU10 countries.

In the area of learning how to use ICT, there is a wide variety of ICT training courses with different content and different levels, and designed for different target groups. There has been significant expansion in the range of these courses, which offers users better choice:[112]

- In some countries (Estonia, the Czech Republic, and Latvia, for example) eLearning solutions are provided to disabled job seekers. In many cases, several other projects providing ICT literacy courses and eLearning applications for the unemployed have been successfully implemented.
- Generally, the younger generation is provided with basic computer and Internet knowledge through ICT training courses. Statistics show that young people in the EU10 are well equipped with ICT skills when compared with the EU15.

ICT and other multimedia tools are integrated into education and are used in a broad variety of subjects, either directly in classes or through online courses. Primary and secondary schools are applying ICT for education, with well motivated and interested teachers. More advanced eLearning solutions can be found at universities, where specific online courses are offered and there is a possibility of distance education, though its level depends on the university and the subject.

- In many countries, online courses have been developed for foreign language education and also for specific IT-related topics. These two areas seem to be of general interest for the wider public and the supply of courses and materials has significantly increased in recent years.
- Higher education institutions have developed online courses and distance education in fields with high demand and which are accredited by the relevant competent authorities.
- Many higher education institutions have obtained learning management systems (LMSs) for supporting and providing education. Both natural and human science-related courses can be found. However, these are often available only for students and for a fee.

eLearning is accessible in different forms for different groups of citizens. Overall students and the public can search for education resources in databases and digital libraries. In most countries (Estonia, Hungary, Lithuania, and Slovenia, among others) the general public may search for information sources on the Internet, for example in an Internet encyclopaedia or database of eLearning materials. eLearning materials for individuals of different content (management, accounting, ICT, languages, etc.) are provided on CDs or are accessible online via the Internet.

- Subsidised courses have been developed for specific target groups, such as the handicapped and re-qualification courses designed for unemployed are also used widely.

An increasing number of companies develop online courses according to their own needs, e.g. for specific information or languages, and hence support their employees' lifelong learning. The share of enterprises using eLearning for training of their employees is higher than in the EU15. Many enterprises also provide training on ICT knowledge and skills at the workplace for the employees. Until now, the usage of eLearning education and training has been adopted primarily by larger enterprises, but smaller companies have also started to use the opportunity offered by more standardised approaches and products.

4.3.2 The main shortcomings

A major shortcoming in the EU10 for eLearning is the population's uneven computer literacy. The young and highly educated are the most computer literate, but the gap between them and other groups is wider than it is in the EU15. There are inequalities of access to ICT and to ICT training courses caused by regional and demographic factors. Distinct differences can be found between population groups living in towns and in smaller municipalities, richer and poorer regions, specific social groups,

[112] For example, in Latvia eLearning has also entered the basic education. Much of the content taught in schools is available digitally on LIIS server. Since the establishment of LIIS in 1997 it has trained more than 70% of teachers for ICT, digitalised study materials, developed educational and school management systems, introduced new infrastructure in schools.

and also between different age groups. The population ageing process contributes to slower closing of this gap.

- There is a strong correlation between age and decrease in usage of computers and the Internet: less than 10% of people older than 55 use the Internet on a regular basis and only 5% of those older than 65 have ever used it.
- Internet usage is very low among the unemployed and economically inactive – only 5-6% of them use it more than once a week.
- People with low, and sometimes even average, income cannot afford a computer and an Internet connection at home, therefore their usage of eLearning is somewhat limited.

Various forms of eLearning are used by primary and secondary schools rather rarely. Although schools are connected to internet and have computers, the availability of computers per pupil is much lower than in the EU15. Another shortcoming in the area of content is that, in basic and secondary education, content development has been biased towards informatics and mathematics and many of the other subjects have not been covered as thoroughly.

- While teachers have received ICT training, their skills and knowledge are insufficient to use ICT as a teaching tool. In many countries (the Czech Republic, Hungary, and Slovenia), the reports show that the teachers are reluctant to use ICT in education because they are afraid that their pupils will be more skilled than they are.

In the case of tertiary education, there are still relatively strong differences in the approach and usage of eLearning solutions by different universities. Some use high quality eLearning solutions extensively, yet others only use eLearning at the most basic level.

- Sometimes eLearning is regarded as simply the provision of multimedia learning materials for digitalizing learning materials for distribution, but not the development of ICT-supported interaction and learning processes between learners and teachers.

There is a lack of online courses for the general public in areas which have long-term economic and societal value. One example of this can be seen in the lack of natural science and technology courses, which are currently less popular in most of the EU10 countries, but for which the economy and the societies have a long-term need.

Another weakness is that the demand for these services is biased as it generally comes from bigger companies, while the demand from the private sector (SMEs) and governments remains limited. On the supply side in education, one general limitation in teachers and other trainers, besides their level of ICT readiness, is their lack of foreign language skills.

- eLearning tools and solutions are not used as much by smaller enterprises as they are by larger ones, due to the high initial investment needed.
- The opportunities for eLearning in the workplace are not evenly distributed. Even though a high number of enterprises use eLearning in training, it seems that not all employees have access to these opportunities.[113] This is also supported by Eurostat statistics, which show that although practically all enterprises have internet access, many employees do not use an internet-connected computer for their work (see Table 11).

[113] For example in Latvia – although Eurostat data from 2006 suggests that 33% of companies use eLearning in workplace trainings - only 12.0% of employees (22% in the EU15) have used the Internet for educational or training in last 3 months.

5 DRIVERS AND CHALLENGES FOR THE DEVELOPMENT OF ELEARNING

5.1 Drivers and barriers of eLearning

The drivers and barriers that affect the evolution of eLearning can be categorised as economic, policy, legal, education, and infrastructure-related. The data in the tables are based on the findings from the national reports and show the most relevant factors in the individual countries.

5.1.1 Economic drivers and barriers

The development of eLearning depends heavily on the overall performance of the national economy. The more successful the economy, the more funding is available for investment in ICT infrastructure and the more accessible ICT and eServices are to the general population. Economic factors include, but are not limited to, the structural changes in the economy; the availability and diversity of financing tools; the roles of the corporate sector, the information and communication technologies industry, and of macro-economic stability and growth; the impact of the state on public finances, and the emerging opportunities and threats of globalisation. Among these factors, several were pinpointed as expected drivers by the country reports (see Table 18). The major drivers are the continuing catch up and fast economic growth, the rapid expansion of the tertiary sector and growth of the ICT sector.

Table 18 : Economic drivers and barriers for eLearning[114]

Economic factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Economic growth		**D**[115]	**D**		**D**		**D**		**D**	**D**
Growth of the ICT sector		**D**	**D**		**D**		**D**			**D**
Cost of ICT and Internet		**D**	**B**				**B**	**B**		
Growth of tertiary sector	**D**	**D**	**D**						**D**	**D**
R&D capacity & financial incentives	**D**		**B**							**B**
Income level and disparities	**B**				**B**					**D**
Size of local market for eLearning software and content development		**B**	**B**	**B**					**B**	**B**

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

The EU10 countries are characterised by fast and broad-based growth of GDP, which has, over the last few years, exceeded the average growth of the EU15 by significant margins. Rapid economic growth and both its direct impact (broadening of the tax base covering public expenditure on ICT, the growth of turnover of the corporate sector to invest more in ICT) and indirect impact (rising living standards, the growth of household purchasing power) had positive effects on information society developments and eLearning.

The provision of eLearning services is supported by the development of communication markets, where the increasing competition between service providers and the investments in recent years have contributed to the emergence of more developed telephone networks. While the gaps between the old and new members of the European Union are broad, the last few years have witnessed sizeable expansion in broadband access, computer penetration, which has increased the demand for eServices (including eLearning).

The overall stable macroeconomic conditions and the fast economic growth increased the purchasing power of individuals and enterprises. This had a positive effect on demand for ICT, but in comparison with European countries, the prices of ICT products (especially computers) and services (especially Internet connections) in the EU10 are higher in relation to purchasing power. High prices are partly due to poor regulation, presence of monopolistic market structures in various market segments, and low levels of competition among suppliers and technologies. The cost of ICT and Internet is a major

[114] The table has been compiled from descriptions of factors in Chapter III in the country reports.
[115] D is driver, B is barrier in this and in the next tables.

barrier in several EU10 countries (Hungary, Poland and Slovakia) though it was identified as a driver in Estonia. In many countries, the high price of physical access represents a significant barrier, especially if this coincides with various social divides. Broadband connection is particularly costly in the EU10. In most EU10 countries, there are no tax allowances on ICT equipment, Hungary being the exception.

The growth of the tertiary sector is an important factor as it increases employment, creates new markets for eLearning services and results in increasing demand for skilled labour requiring ongoing training programmes. Because the service sector is labour intensive, it demands highly qualified employees and there is a growing need for employees with ICT knowledge and skills. As a result, the demand for eLearning services has been increasing. Though the share of services in the EU10 does not differ considerably from the EU15 averages, there is still scope for structural change and there is a constant demand by the service sectors for skilled and well trained labour. The expansion of the ICT sector is a driver because of the high and above-average R&D content of that sector and the spill-over effects stemming from it.

R&D seems to be more a barrier than a driver in most of the countries, mainly due to low R&D capacity and inadequate R&D structure in these countries. The level of R&D is low in the EU10 and the relative role of business R&D is smaller than in the rest of Europe. Therefore research and development capacity and spending currently represent a strong barrier for eLearning take up in the EU10.

Structural changes and uneven economic growth are however accompanied by deepening regional divides, and income, age and employment disparities. In general, low incomes also represents a demand-side barrier which coincides with the above-mentioned high price of ICT and Internet. These factors partly explain the widening digital divide, which has certainly been one of the hindering factors of eLearning development in the EU10. While economic policies may help to rebalance growth, fast economic growth – at least according to the trade-off theory – is generally accompanied by widening regional income and growth disparities. Therefore it may be argued that the expected future income convergence of the EU10 as individual countries is likely to maintain the strong differences among the individual regions.

> An example of the regional divide is Estonia, which has been among the leading countries in the usage of ICT and development of eServices. Even in Estonia, the share of computers and the Internet at home is considerably smaller than in the public and corporate sectors. In rural areas the access to Internet should be developed and the biggest problem about everyday usage of the Internet is still not solved. Considering that average incomes in rural areas are below national ones, the current situation is even worse. The sufficient ICT supply and the quality of Internet connection have been the problems also in rural schools hampering the access and usage of eServices.

5.1.2 Policy drivers and barriers

Governments can influence eLearning developments through regulation, financial support of eLearning programmes, tax allowances on ICT, initiatives which aim to increase digital literacy, and educational curricula.

Of the more frequent policy drivers, two seem to be the most important: the future availability of EU Structural Funds and programmes, and Public-Private Partnerships in eLearning programmes. It is expected that access to EU Structural Funds and programmes will help eLearning development in Estonia, Latvia and Slovenia. The Financial Perspective for 2007-2013 foresees, on average, three or four times more EU funding to the EU10 and the full seven year period will allow policy makers and planners to plan better coordinated and harmonised Operational Programmes for the education sector in general and eLearning in particular. As local development funds are generally scarce in most of the EU10, the inflow of EU structural funds could indeed become a major driver for eLearning.

Several country studies proposed that specific tax allowances should be incorporated into legislation to support ICT use in the education of individuals.[116] Some of these have been partially implemented already but their implementation has been under serious pressure and loss of fiscal revenues.

Table 19 : Policy drivers and barriers for eLearning[117]

Policy factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Availability of EU structural funds and programmes		**D**	**B**		**D**				**D**	
Public-private partnership in eLearning programmes		**D**		**D**	**D**					
Lack of national strategy for eLearning, policy and administrative coordination in design and evaluation of policies	**B**	**B**	**B**		**B**			**B**	**B**	**B**
Motivation of the government	**D**	**D**			**B**			**B**		**B**
A lack of comprehensive approach in developing ICT in education		**B**		**B**					**B**	
Government's initiatives to support and promote ICT-related education	**D**	**D**		**D**			**D**			

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

The lack of national eLearning strategies is the most commonly-mentioned and important policy impediment to eLearning evolution in the EU10. It has been reported that it is a serious barrier in Cyprus, Estonia, Hungary, Latvia, Slovakia and Slovenia. In most of the countries, governments did not have a clear vision of the major aspects of eLearning, the role of public policies in their support, or the links between eLearning and other policy instruments. The only exceptions are Slovenia and Malta with their recently-prepared national eLearning strategies, and it remains to be seen whether they will lead to any substantial change.

Government motivation is listed as one of the most common factors that influence eLearning, and there seem to be visible differences in the attitudes of the governments towards eLearning. For example, the governments of the Czech Republic and Estonia seem to be aware of the importance of eLearning development, while other governments (for example Cyprus, Latvia and Slovakia) have expressed smaller interest in it. However, due to a number of factors, governments are expected to become more motivated to support their citizens' level of digital literacy in the future. The most obvious factor is the relatively low level of digital literacy in general. Additionally, governments are trying to prevent the widening of digital divide.

Another important barrier is the absence of a comprehensive approach in developing ICT in education. This approach should be an integral part of education policies, but in the past it was missing or was given low priority on the policy agenda. As a result, it still represents an important future barrier. For example, emphasis on courses for digital literacy to the general public in the Czech Republic and Poland have increased people's opportunities to participate in further learning opportunities (and work) with ICT.

In some countries, there are state policies which aim to support the digital literacy of individuals. The resulting courses provide an opportunity for people to overcome their initial fear of ICT and the fact that they are not equipped with ICT. Additionally, they can be a way of convincing people of the usefulness and helpfulness of ICT and of motivating them to undertake further learning.

5.1.3 Legal drivers and barriers

Legal factors decisive for eLearning developments include, among others, the effects of the implementation of EU standards in national policies and regulation, the telecommunications and

[116] These included allowances on investments into ICT and activities related to the usage of ICT for education or tax allowances for educational staff (teachers, pedagogues, lectors, librarians) for ICT purchase and investment in self-learning

[117] The table has been compiled from descriptions of factors in Chapter III in country reports

information society-related regulations and the direct regulation of eLearning. It is expected that the implementation of EU harmonisation standards will be an important driver for eLearning developments. While education is the competence of member states, the increased alignment of national policies and practices with EU rules and the adoption of joint legal and policy standards is expected to be a driver for eLearning developments. On the other hand, the country reports were more pessimistic concerning the potential contribution of eLearning regulation to its development, based on the previous developments and experiences in the country.

Table 20 : Legal drivers and barriers for eLearning[118]

Legal factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Implementation of EU harmonization standards			**D**						**D**	**D**
Regulation of eLearning							**B**		**B**	
Lack of ICT qualification standards for students, teachers and principals	**B**	**B**								
Mandatory basic informatics programme in primary and secondary schools					**D**					**D**

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

The lack of a solid and comprehensive legal framework for ICT is an important barrier for eLearning as well, as it results, in turn, in a lack of a legal base or standards for eLearning. The slow introduction and approval of the needed legislation has held up timely implementation of eLearning services. The national reports suggest that there is a lack of legislative preparation for Internet use in many of the EU10. The absence of any law for eLearning means there is no legal base for financing eLearning initiatives. This has resulted in one-off projects rather than eLearning services. The use of eLearning services is supported and influenced by specific provisions of some education or general acts. For example, the corporate sphere has started to use internal electronic courses for compulsory training of employees required by the Labour Codes because of the associated cost reduction.

Another legal impediment for eLearning is the insufficient level of development of ICT qualification standards for students, teachers and principals. The de facto standard for ICT user training in general, vocational and in-service training has been ECDL (European Computer Driving Licence). These holes in the legal base also affect modernisation of teacher training and remuneration systems related to eLearning. In Latvia and Cyprus, mandatory basic ICT education was considered to have contributed to the good levels of ICT skills among the young. This example could be followed by other countries, in order to avoid social and regional divides within this generation.

5.1.4 Education and literacy drivers and barriers

Low general digital literacy levels and anxiety about using ICT are the most frequently identified barriers to eLearning. Low general digital literacy levels are perceived as a major barrier in half the EU10 (i.e. in Cyprus, the Czech Republic, Estonia, Malta and Slovakia). The reports on the Czech Republic, Hungary and Lithuania also raised concerns over the lower digital literacy of the older generations. Problems with digital literacy levels in the Czech Republic, Lithuania and Latvia are additionally compounded by the growing digital divide between the urban centres and the rural areas.

[118] The table has been compiled from descriptions of factors in Chapter III in country reports

Table 21 : Education drivers and barriers for eLearning[119]

Educational factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Digital literacy level in general	B	B				B		B		B
Level of basic education		D	D						B	D
Lifelong education						B		B	D	
Teachers' skills and attitudes in computer usage				B	B	B	D		D	
Number of ICT specialists		B					B			
Training of employees in companies	D					B	D			

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

Most of the country studies[120] regard the quality of the education systems and their output levels as high and point to them as drivers. Demand for eLearning is affected by the high level of formal education among the adult population and the share of the population with tertiary education, both of which are high (the latter is also fast increasing) in the EU10. Overall one may expect the high level of education to serve as a driver for eLearning in the future. The EU10's major education indicators (see Chapter I.4) do not lag far behind the EU15 and the ongoing reforms of the education systems may serve as important stimuli for eLearning. Those involved in the educational system naturally use eLearning services and are better prepared for them after their formal education.

While education is considered to be a driver, the level of teachers' skills in computer usage and the overall attitude of teachers towards the information society is a barrier. International comparisons confirm that some teachers' eSkills levels are low, their capabilities to use computers innovatively in education is limited and they do not possess very strong eLearning abilities themselves. As it is also a generation issue, it will be time consuming to overcome and will represent a significant barrier for eLearning for a long period.

> Older Lithuanian teachers lack skills in computer usage. Latvian teachers who are ageing are reluctant to change as well. In Malta's country report cultural resistance to changing current teaching and learning practice is also mentioned as an obstacle to eLearning. Slovenia on the other hand has an established segment of experienced teachers who grew with school informatisation project in the period of 1993-1999; these teachers are already involved into ICT seminars for teachers and can represent the core for the next wave of eLearning. In Poland teachers' and instructors' digital skills have risen.

eLearning and its support is influenced by not only teachers' ICT skills, but also the skills of other important actors and training providers. The level of these skills and awareness of their importance is generally low in the EU10, and with large divides. The average level of eSkills in education and teaching institutions is also low with high variance depending on the institution.

Enterprises' demand for employees skilled in ICT increases as the structure of the economy changes. To remain competitive, many corporations are motivated to use ICT and to engage skilled workers or to provide current workers with ICT training. A positive factor in this respect is the relatively high level of ICT equipment and its usage in the business sector when compared to the EU15 average (with the exception of broadband penetration, which is in the majority of the countries significantly lower than in the EU15). A positive environment is ensured by the EU10's growing economies.

5.1.5 Socio-cultural drivers and barriers

Socio-cultural factors include the digital gap, the range of usage of ICT, the overall interest in the use of ICT tools and eServices, and changes in the age profile of the population.

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[119] The table has been compiled from descriptions of factors in Chapter III in country reports

[120] Among them especially the county reports of Cyprus, Estonia and Hungary mention their high level of education as a driver for eLearning developments, whereas Slovenia considers its level of education to be low and sees it as a barrier to eLearning.

The presence of a significant digital divide represents the single most important socio-economic barrier for eLearning developments in the EU10. Since the digital divide coincides with high levels of other social divides, it is difficult to overcome as a barrier for eLearning developments. In the Czech Republic, Hungary, Latvia and Malta, matters are additionally complicated by anxieties about using ICT in everyday life. This is the result of the low general level of digital literacy level, the low levels of literacy of some age groups, and digital divides between urban and rural areas in these countries. In recent years, the gaps in many countries between those included in the information society, and those excluded from it, has widened due to the remaining regional, economic and social disparities described above. This significantly reduces the scope of those who access these services, who generate demand for them and who enjoy their benefits.

Besides digital divide, country size can be a barrier. Small countries with respectively small native population groups offer a limited market for local language content, decreasing the profitability of eLearning services developed for these countries. Country size was especially mentioned by the small countries. In Cyprus, Estonia, Hungary and Slovenia development of eLearning is also being driven by the general interest in the use of ICT tools and eServices. In smaller countries especially, eLearning applications and content are often available only in English, which may form an additional barrier for starting to use ICT for different purposes.

Table 22 : Socio-cultural drivers and barriers for eLearning[121]

Socio-cultural factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Digital gaps (urban–rural, young-old)	**B**		**B**	**B**	**B**					
Size of the country						**B**			**D**	**B**
Anxiety about using ICT (especially among older people)	**B**		**B**		**B**	**B**				
Interest in the use of ICT tools and eServices		**D**	**D**						**D**	**D**
Number of children	**B**				**B**					**D**

Source: Country reports "Next Steps in Developing Information Society Services in the EU10 – The Case of eLearning"

An important socio-cultural driver is the favourable evolution of demographics in some countries amidst overall worsening demographic conditions. The high number of children in Cyprus helps eLearning development there, since younger generations are more open to new technology. The Czech Republic and Latvia, on the other hand, have ageing populations, which affects eLearning negatively, since older generations are more reluctant to use ICT and have lower digital literacy levels. This has also been recognised as a barrier in the Czech Republic's and Hungary's country reports.

Another factor that influences eLearning take up is the general public's low awareness of the potential of ICT. Some population groups' attitudes towards ICT are characterised by anxiety about the first, elementary steps in ICT usage, and about their alleged complexity and intricacy. Most people who do not have computer at home do not see any reason to use a computer, and the share of this group is larger in EU10 than in EU15. Some countries report that the motivation of individuals is suppressed by anxiety, especially in the case of older generations. On the other hand, some countries such as Slovenia report that people are open to adopting new information society technologies.

However, because of the growth of the service sector in the economy and because of the integration of ICT into daily life, ICT skills have started to be considered as a part of general knowledge, especially among the younger generation. ICT knowledge also strengthens the chances of job applicants. Thus unemployed people, for whom the ICT skills would constitute a comparative advantage on the labour market, are motivated to become digitally literate. This influences the motivation of older generations, as the average digital literacy of this population group is lower and thus the comparative advantage gained from acquiring digital literacy is stronger.

[121] The table has been compiled from descriptions of factors in Chapter III in the country reports

5.1.6 Infrastructure drivers and barriers

Infrastructure factors are related to the accessibility, to the general population or different population segments, of ICT infrastructure, accessibility of e-services, and general characteristics of ICT.

Table 23 : Infrastructure drivers and barriers for eLearning[122]

Infrastructure Factors	CZ	EE	HU	LT	LV	MT	PL	SK	SI	CY
Access to ICT infrastructure and e-services		B				B				
Expanding access to Internet and mobile phones			D				D			D
Developing ICT infrastructure		D	D				B		D	D
Level of ICT equipment at schools	B					B			B	
Level of ICT equipment at universities	D								B	
Level of ICT equipment in business sector	D								D	

Source: Country reports "Next Steps in Developing Information Society Services in the NMS – The Case of eLearning"

A technological factor that influences eLearning in most EU10 is the state of ICT infrastructure. Well-developed ICT structure is expected to stimulate eLearning in Cyprus, Estonia, Hungary and Slovenia. In Poland's rural areas, the lack of ICT structure presents an obstacle to eLearning development. As regards eLearning drivers, the two main ones mentioned by most studies were the expanding access to Internet and mobile and the increasing levels of ICT infrastructure.

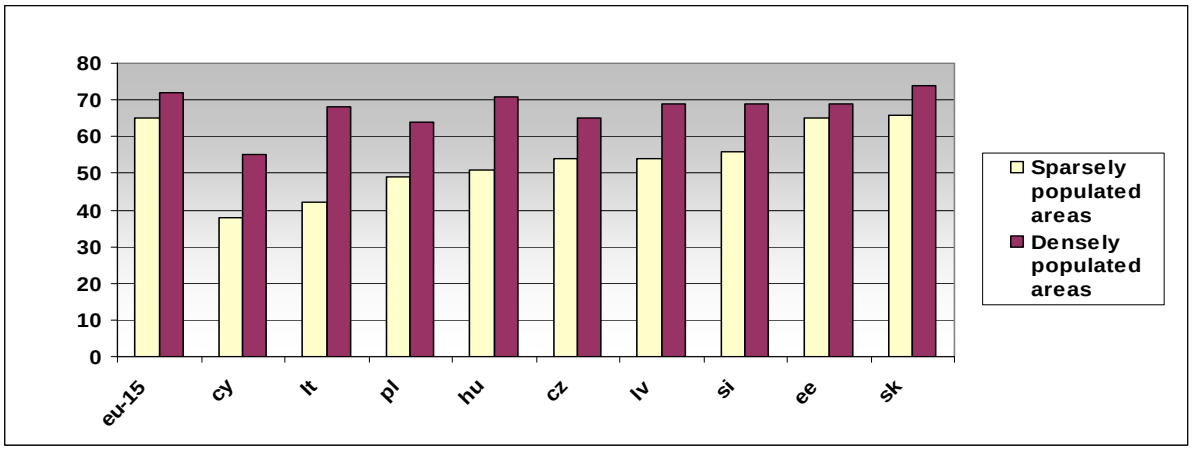
5.1.7 An overall barrier: economic and social differences

Uneven regional development is a negative factor. Most of the EU10 is characterised by development that is highly concentrated in larger cities and exceptionally high in their capitals. As a result, there has been a tendency in recent years for internal migration to the surroundings of bigger towns. Also, as these towns are the main centres for providing tertiary education, the educational level of the labour force is the highest there.

Many eLearning and general information society developments are concentrated in the cities and there are only a few specific eLearning programmes targeted at rural, poorer or remote area populations. There are substantial differences between internet use in densely and sparsely populated areas, as shown in Chart 21. Lithuania, Cyprus and Hungary show the largest differences. In towns, people's living standards are better, technological infrastructure is more developed and eLearning services are more available. However, both demand and supply for eLearning services seem to be weaker in smaller municipalities than in towns.

[122] The table has been prepared from descriptions of factors in Chapter III in the country reports

Chart 21. Percentage of population using internet in last year, by area, 2007



Source: Eurostat database

The density of educational infrastructure is also higher in towns. Students have the possibility to choose from more schools with different levels and specialisations. Due to the higher number of students per school, there are more teachers who are specialised in ICT subjects, which allows them to apply eLearning more easily. The public companies which provide eLearning education and training are in towns, and the distance from training centres is a factor which influences the accessibility of eLearning services to the inhabitants of smaller municipalities.

The economic situation differs greatly from region to region. Some regions and the capitals are prosperous, with per capita GDPs equal to the eastern regions of the neighbouring EU15 countries, and experience high growth. However, in areas in the eastern parts of the countries of the Central European and Baltic States, which are affected adversely by structural changes, development is plagued by high unemployment (in several counties, this exceeds 25%) and overall low economic activity.

> Within the regions of the Czech Republic, there are also strong differences in many areas that influence eLearning. The economy of some regions has been historically based mainly on industrial production. With change of the structure of the economy characterised by the shift from industry towards services, in these regions structural unemployment has emerged (regions in Northern Bohemia, unemployment rate in the most region 20%.

High unemployment influences people's income levels and their purchasing power, which in turn affects their motivation to increase their ICT skills.

The digital divide is also an important factor in the speed and structure of the spread of eLearning. The digital divide in the EU10 has been greater than it is in the EU15. Moreover, it has generally remained unchanged in recent years, though overall internet penetration and other major information society indicators have improved. Digital divide is a special problem in the EU10 due to the fact that it coincides with other income and regional, skill and generation divides, and weakens access to eLearning services.

5.2 Policy Options for eLearning in the EU10

This chapter summarises the policy options for the EU10 governments that have been suggested in the national reports as means of addressing technical, social, economic and institutional challenges in eLearning.

Generally, while governments can take measures to support digital literacy, eLearning at schools and universities and can be helpful in the organization of ICT-related re-qualification courses and courses for specific target groups, their capacity to influence developments at the workplace (except for public administration) and lifelong learning outside organizations is rather limited. Hence this section is mostly concerned with organized learning, but it is worth remembering that developing openly-

available educational resources within the institutions, for example, also supports informal learning and information searching among individuals.

5.2.1 Policy institutions

Policies and institutions should aim to take advantage of existing, successfully implemented eLearning services and projects in other EU countries and promote the dissemination of good practice. At both national and international levels, it would be beneficial to clarify which past efforts in eLearning were effective. Public institutions should provide and administer public research grants which support innovative projects on eLearning for both primary and secondary schools and also for universities. The findings of such research grants should be shared, and the results of resulting publicly-funded projects should be made freely available.

Responsible institution

It should be considered whether there is a need for an autonomous institution, specifically for co-ordinating ICT developments at national level. The majority of the experts agreed that there should be one institution with comprehensive responsibility for eLearning, support of Internet access and broadband penetration. In addition, this entity should have considerable political power and executive responsibility. Up until now, numerous policy proposals have not been implemented due to the lack of executive power of the institution responsible. In the case that no such specific institution is established, the division of responsibilities to other institutions should at least be clarified. In addition, some experts suggest that an operations centre administering the development of eServices might be established. This centre should co-operate with partners from local governments, local R&D units, academia and organisations representing ICT firms.

Generally, it would be helpful to strengthen cooperation and dialogue at all levels - local, regional, national and European - for measures, initiatives, and sharing of expertise and best-practice between the institutional players (i.e. universities, schools, training centres, decision-makers and administrators responsible for selecting equipment, software, content or the services themselves).

Public-private partnerships

Cooperation between the public sphere and private enterprises in the form of public private partnership projects should be supported. So far, however, this scheme has only been successfully applied in a few cases. Some kind of framework to cover cooperation between secondary schools and private enterprises would also help to accelerate the development of eLearning content. Since schools have the knowledge necessary for content preparation and commercial enterprises have the appropriate technology and know-how in the design of courses, their mutual cooperation would be beneficial.

Educational institutions and teachers do not need to master all the required areas of expertise in eLearning. Partnerships would allow them to concentrate on their core competence – teaching. Partnerships would also increase the distribution of knowledge and best practises within the network. This would provide added value to all public and private partners.[123]

Promotion

Several national studies have pointed out that the lack of knowledge of eLearning as such is one of the biggest problems for eLearning development. After all, even the best content, technology and models are of little value if no one knows about them and does not use them. In order to exploit the existing ICT potential for the development of eLearning services, it is important to create social awareness of the importance of ICT skills and the opportunities ICT can bring for learning. Besides promotion to the general public, e.g. through the media, it is important for education policy to promote ICT tools through school programmes for children. In turn, these will encourage their families and parents to acquire ICT knowledge. More information activities should be focused on the decision makers of

[123] Such type of cooperation of schools and private enterprises is described in the Finnish research "Enhancing Content Production in ELearning by Public Private Partnerships", where a model of enhancing content production was built. While the teachers brought the expertise about the substance of the content, the private companies provided appropriate technology. *(Partanen and Kilpio; 2002)*

education institutions. eLearning conferences should also be organised in order to disseminate information on eLearning opportunities among the different levels of actors in institutions.

Regarding the education of the general public, the state should continue to support digital literacy initiatives in order to ensure equal learning opportunities for all society members, and to address the problem of digital divide between cities and regions and between different education sectors. Thus, affordable starting courses, which could help to overcome initial anxiety and insufficient self-confidence, could be provided. Programmes for specific target groups (such as handicapped or seniors) should also be supported.

5.2.2 Legal and regulatory framework

A general question remains: should eLearning issues be covered by a specific eLearning strategy, by a general eServices strategy, by learning strategies for different educational levels or by an overall learning strategy? In this respect, the opinions of national experts in the country reports differ, though they agree that some level of coordination and focused effort for developing eLearning is needed, as suggested above.

Another important question is ICT's role in general educational curricula. Should it be only a horizontal topic covering all other subjects or should there be specific classes? From the country reports, it seems that the horizontal approach does not guarantee similar levels of basic ICT skills for all students and in all schools, hence ICT literacy as a compulsory subject at the general educational level would guarantee more equal opportunities for students. Best results for advanced digital competence, i.e. learning to apply the basic ICT skills to different contexts might be achieved by combining both.[124]

Certification

One problem that has emerged for eLearning in non-formal education and training context is that there is no means of predicting the quality of an eLearning course before deciding to purchase it. The quality of eLearning is not a well-defined measure and potential users seem to have more distrust for online learning solutions than traditional face-to-face learning. Therefore, the introduction of a quality certification system, both for schools and commercial training providers, would be beneficial. This view has been supported by an eUser study which states that "mechanisms for quality assurance, accreditation, certification and other related aspects of adult education need to be put in place" *(eUser, 2005)*. This would give customers common criteria for distinguishing between different courses before choosing one, and it would also give eLearning certificates credibility in the eyes of employers. This work should be carried out at European level, in collaboration with organizations such as EFQUEL.[125]

Recognition of teachers' eLearning efforts

Teachers' motivation and opportunities for further education in ICT skills and ICT usage for education could be solved by the implementation of a promotion ladder within the education system. The ladder should be incorporated into the legislative framework and a set of qualifications in particular fields would support its transparent usage. If the teachers could get promotion, higher wages and also higher social status, and the training courses were encouraged by their institution, they would be encouraged to participate in further educational courses in eLearning didactics.

Similarly, a more flexible financial system and greater freedom to evaluate the teachers' work and above-standard activities – including development of eLearning content and performing online tutoring activities – should also form part of an encouragement scheme. Encouraging greater use of financial rewards for good performance could be part of the solution to teachers' widely-reported low motivation.[126] On the other hand, if such a system were applied, detailed conditions for awarding bonuses would have to be defined and controlling mechanisms would have to be established in order

[124] See IPTS policy brief on Digital Competence for Lifelong Learning (Ala-Mutka et al., 2008): http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html.

[125] European Foundation for Quality in eLearning, http://www.qualityfoundation.org/

[126] See for example as a reference the OECD study on the Economic Survey of the Czech Republic (2006)

to ensure fair and efficient use of financial resources. There are also arguments against rewards for teachers, e.g. the difficulty of fairly and accurately evaluating performance since it cannot be observed objectively. Rewards could also reduce cooperation between teachers. However, there are a number of performance-evaluation mechanisms in other European countries, which could serve as a starting point for the EU10. In Denmark since 1999, for example, teachers' wages have been made up of four components: a basic wage, a function wage, a qualification wage, and a results wage. The results wage is based on the attainment of quantitative and qualitative results, and operates as an individual performance-based reward. (Harvey-Beavis; 2003)

5.2.3 Infrastructure and technology

In order to make ICTs at schools more user-friendly, governments should consider investing more in human resources and in ensuring that IT support is available for any difficulties both teachers and students could have. Technology expenditures must balance the need for investment in infrastructure and the training and technical support required to maintain the systems.

ICT equipment

Although the indicators of ICT equipment at schools have remained below the EU average, in some EU10 countries there has been a clearly positive trend. Furthermore, Internet penetration development at schools has been very good. For further support of ICT usage, governments could share their experience, exploit the existing framework, and continue with supportive activities. All educational institutions should be connected to a broadband network and equipped with appropriate technology, both in terms of hardware and software. It would make economic sense for appropriate government bodies to centralise purchases of equipment for schools. However, as municipalities own most of their education institutions, they should be largely free to decide on infrastructure and distribution of equipment locally since this is their responsibility. The estimated costs of sustainability (maintenance, technical support, upgrading, and replacement) should be included in all ICT investment plans.

Skills for ICT didactics

It is important to take into account the fact that ICT equipment is only a part of eLearning take-up. A crucial element is the training of teachers in basic skills for using ICT and implementing and innovating educational processes using the opportunities that ICT offer. Reports suggest that those teachers who have used ICT in their own training are more motivated and skilled in using innovative ICT-enabled approaches in their classes. Therefore attention should be paid to teachers' educational curricula and to regular in-service training. While in some countries, strategies for teacher education have already been implemented, they are lacking in the rest where they would be beneficial. As mentioned above, these strategies could be supported by legislative measures for recognizing the eLearning competences teachers achieve by increasing their salaries and promoting them. Besides training, another very important aspect is the development of support systems for teachers, which would give them direct guidelines on how to develop and incorporate eLearning materials and approaches into their subjects.

eLearning Content

Based on this argument, it is recommended that a central portal – or repository – is established, where all eLearning applications and services, the development of which was subsidized by the state, would be stored and kept accessible for others. Additionally, evaluation of eLearning content gathered at the portal would provide the users with information on particular eLearning-related content and would make it easier for them to choose the most appropriate one. Consequently, the financial resources would be used more efficiently since the development of eLearning content would not be duplicated and the products could be used by more users.

The purchase of school learning and content management systems would allow content creation that would further support nation-wide sharing of best practices, within interoperable environments. Similarly, co-operation with digital libraries and other initiatives in order to integrate and re-use available resources in eLearning environments should be encouraged. In addition, the public authorities could define specific requirements for new content to emphasize those aspects considered

most important, such as interactivity of the learning solution, or a certain quality mark for institutional materials. The responsible institutions could support quality improvement of materials by opening competitions for their development

Open source software

Another measure, by which the development of eLearning services and the usage of ICT in general could be accelerated, would be to support open source software at schools. A study dealing with open source software at schools, published by the British Educational Communications and Technology Agency[127] in 2005, demonstrates that although the implementation of open source software in schools needs careful planning and support, its usage can offer a cost-effective alternative to proprietary software. For the schools, the main driver for introducing open source software was the potential cost savings and also its transparency, flexibility and the educational value of providing pupils with a broader experience of operating systems and software. On the other hand, one of the main disadvantages to open source software was the fact that teachers and pupils were not familiar with its use and resistant to it.

5.2.4 Financing

The financing scheme related to eLearning is derived from state interventions in particular areas. Governments should financially support digital literacy, eLearning development at schools and universities and courses for specific target groups.

In its financial decision-making, the state has to take into account future expenditures related to both maintenance and renewal of ICT equipment at schools. It is also necessary to ensure the availability of financial resources for programmes supporting the general public's digital literacy and for grant schemes focused on the development of new products. In some countries (e.g. Estonia) where a significant share of ICT expenditures is administered by foundations, there is a need for additional financial support from the public sector.

One possible recommendation would be for governments to introduce tax allowances on ICT equipment for individuals. This, however, is controversial as many share the opinion that equipment of households with ICT should be left to market forces. Another possibility would be to pay subsidies to teachers to purchase computers, or even to provide every teacher with his/her own laptop. Several country reports also considered subsidising a PC for each new primary school pupil. Should governments decide in favour of tax allowances, they should be careful to pick the right group of recipients,[128] and impose a limit on the amount reimbursed.

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[127] British Educational Communications and Technology Agency; Open Source Software in Schools: A study of the spectrum of use and related ICT infrastructure costs. (2005)

[128] There are several groups in the EU10 which face the risk of exclusion, including the long-term unemployed and those who quit the labour market reflected in very low employment rates in many countries, those living in collapsing or disadvantaged regions, and those belonging to ethnic minorities.

6 IMPACTS AND R&D CHALLENGES OF ELEARNING DEVELOPMENTS

6.1 The impacts of eLearning developments on growth and competitiveness

In previous chapters, descriptions were given of EU10 government activities for the development of the Information Society. The need for modernisation, the new competitive global environment, the social inequalities (especially in the post socialist EU10 countries) and also the need to fulfil the conditions of EU accession and the related policy, strategy and legislative unification issues, forced the leaders to incorporate ICT-related technology and innovation into their basic educational activities. A plethora of strategies, variously named National Development Strategies, National Information Development Strategies, National Broadband Strategies, and Development Strategies for the Information Society have emerged between the mid 1990's and today, all of which have emphasized the importance of the investments into education related to computerisation and supported by ICT.

When it comes to the success of these strategies, it is interesting to look at the Networked Readiness Index (NRI) as computed by the World Economic Forum in its *Global Information Technology Report 2004-2005*.[129] The NRI measures how prepared economies are to participate in and benefit from ICT developments. This Index takes into account the effects of the macroeconomic and regulatory environment on three important stakeholders – individuals, businesses and government – and their degrees of ICT usage and ICT readiness.

The EU10 are in the middle of this list, starting with Estonia (25th) and ending up with Poland (72nd). From an eLearning point of view, the NRI shows how prepared the EU10 are and how deeply they are involved in educational eServices. This is also supported by the ten country reports – however, there has been continuous development in these countries since the last available NRI report – as Estonia and Slovenia are apparently the leaders of eLearning deployment while the rest of the countries, especially the post socialist Central and Eastern European states, have some serious deficiencies.

6.1.1 Changing structures

In the past 15 years, the economies of the EU10 have gone through major political and economic transitions. The Central-Eastern European and Baltic countries have had to transform their industry and agriculture-based economies into service-oriented structures, where knowledge-based activities are dominant. The ten country reports show that this revolution is clearly in progress. The share of services oscillates around 60% of the GDP. The growing need for ICT-supported human capital, and information workers in the service sector create a significant demand for fast increase in the supply of the relevant ICT skills.

The reports also show that the existence of this demand foments a spiral of investments into ICT-related service industries. The initial push, made by several national governments (including the establishment of the national telecommunication infrastructure, various forms of tax concessions and allowances for ICT-related investments, mandatory ICT education, etc.), increased the value of knowledge-intensive FDI. This improvement is not sustainable without a sufficient, well-educated knowledge intensive sector, which implies that local policy makers and legislators should support the reform and modernisation of all levels of education. Information Society developments attract more investors and force the state to improve the underlying nationwide IS infrastructure, with attention to the digital divide. eLearning – especially if it is defined broadly as it has been in this report – is one of the key contributors to a valid and reliable IS infrastructure, which can push the EU10 towards structural transformation resulting in a growing proportion of knowledge intensive industries.

6.1.2 Push or Pull?

A question emerges from the previous section: Is the development of eLearning services driven by demand or supply? Do people use these services because they have no other option or does society and

[129] See: http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/GITR_2004_2005/Networked_Readiness_Index_Rankings.pdf

industry have a significant need for these services? According to the country studies, the picture is quite diverse. On the one hand, the big private sector players (especially large multinational companies) have a growing need for IS infrastructure. They need a skilled labour force, and they use their ICT infrastructure in their internal educational and core business processes.

On the other hand, several layers of society still possess insufficient information about the importance and the possibilities of ICT-supported learning. However, individuals are aware that, after the political transition of Central-Eastern Europe, unemployment is a real danger, which contributes to the recognition of the importance of learning, especially ICT-related learning. ICT skills provide remarkable advantages for individuals in the labour market, but overall eLearning is still not considered to be a tool for enhancing competitiveness, and improving employment prospects. More promotion and awareness of the opportunities of eLearning is needed to improve the low take up in SMEs, to support innovative ICT use at the classrooms in primary and secondary education, to develop training opportunities for fighting the structural unemployment andthe inclusion of citizens living in rural areas or living with disabilities.

The telecommunication and information technology sectors and their influence on manufacturing and service industries (and also on organisations) require fast adjustments by higher education institutions. The continuous and rapid change of the technology, economy and society, force these actors to be flexible and adapt educational processes to the current needs of the IS-driven labour market. This results in skilled workers, which increases employment, productivity and through these factors the general competitiveness of the EU10 as well.

Unfortunately this elasticity is not yet a common practice in all the EU10. There are immense differences between the leaders (Estonia or Slovenia) and the less developed countries (Slovakia, and Poland). In those EU10 countries which have fallen behind, the above mentioned sectoral push has not yet resulted in government pull. eLearning is still not considered to be a major cornerstone of the advancing knowledge and information-based societies. However, when it comes to innovation and competitiveness, the term ‘knowledge’ is among the first key elements that policy makers emphasise.

As the surveys and country reports show, the share of private companies providing ICT courses and opportunities is greater than the share of public sector organizations providing similar courses. This market-driven push from companies continuously forces employees to use technology to keep their factual knowledge and labour skills up to date. This form of lifelong Learning is becoming more and more accepted, resulting in a better-qualified workforce and enhanced productivity.

The growth of the EU10 has also been discussed earlier in this report. Three groups have been identified in terms of pace of growth. It is worth checking whether there are similarities regarding eLearning activities by members of the different group:

- **The “Mediterranean group”.** Cyprus and Malta have minimal or even declining growth. There was no great economic transformation, as they were not part of the former eastern block. As regards eLearning developments, both countries have made IS issues part of other strategies, like national development plans. Their eLearning and educational programmes are subsets of policies dealing with issues of various industrial and human capital developments. This is why the implementation of diverse eLearning-related programmes also concentrated mostly on infrastructure-related issues: thus broadband networks, ICT penetration in schools, and internet access of the population were successfully deployed in these countries.
- **The Central-European Countries.** These ex-socialist countries (the Czech Republic, Hungary, Poland, Slovakia and Slovenia) had higher growth rates than the EU15 countries. This group is quite heterogeneous: several models were applied for modernising the economies and the same applies to eLearning developments. However, the general level of eLearning is more or less the same in these countries. The leader of the group is obviously Slovenia, where the ICT-related industrial and educational investments are the most coordinated and monitored. The country reports forecast a strong growth in IT and telecommunication markets, which could even surpass the average GDP growth of these countries.

- **The Baltic Countries.** The Baltic countries (Estonia, Latvia, and Lithuania) are the fastest growing countries in Europe today. Their strong economic positions, and bright future growth prospects make them very attractive for investors. As a result of this success, their national governments are strongly committed to establishing the domains of the Information Society. According to the country studies, the investments into the ICT-related sectors (including education) made a valuable contribution to their economic success. In fact, however, the picture is more differentiated. In Estonia and Lithuania, the general productivity of knowledge-based industries is still falling behind the EU25 leaders, as these countries cannot exploit all the benefits of rapid modernisation. The difference between the level of digitalisation of SMEs and large enterprises in the provision of learning and training activities is significant. While bigger companies already use educational eServices in their everyday activities, the SMEs are still trying to adapt to eLearning. In the case of Latvia, the country is still struggling with the heritage of the political transformation, and has been putting more emphasis on developing infrastructure than on creating a modern ICT market.

6.2 The R&D challenges facing eLearning in the EU10

As regards future research, it is crucial to identify the most important future technical and non-technical R&D challenges specific to eLearning. Similar to some other eLearning challenges, most of the R&D challenges, especially the technical ones, are not specific to the EU10. However, those R&D challenges that are specific to the EU10 generally arise for the following reasons:

- The effects of the old, inherited education models of the EU10
- The EU10 have a different business environment from the EU15,
- The EU10 countries are mostly small nations. Hence, the fact that the population speak the same language does not always allow for commercial business models, or solutions.

Technologies

There are many technologies available for learning purposes, both locally and internationally developed, and international standardisation schemes have been emerging to ensure the interoperability of systems. However, learning solutions still call for better usability and user interfaces. In the EU10, where the general digital literacy is low, especially among older people and the unemployed, and there is a risk of deepening divides, there is a need to develop technological solutions that are easy to use and could bring learning closer to the people.

In terms of software, open source solutions could make learning platforms and applications available without large initial costs for users and institutions. They could also allow the customization of user interfaces to take into account special needs and local languages, which is important in the EU10. However, there are several different options available, and research is needed to find and develop the best solutions.

Going back to the general information society issues that affect eLearning developments, broadband and wireless Internet are of key importance. R&D in wireless communications is bringing eLearning closer to users step by step – WiFi is already available in many public places, such as cafés, hotels, etc. The situation is dramatically different in rural areas and towns. Furthermore, the progress with VoIP (Skype) contributes to accessibility. Mobile technologies are another channel that could be used by potential learners, as many of them may have mobile phones even though they do not have access to computers. While these technologies are already available, more research should be conducted on how they could be effectively used for developing learning processes and reaching learners in EU10.

Interoperability

Currently various service providers, public or private insurance units, public administration units, national and regional education units and institutions all possess varied information. The possibility to access and integrate services from different organizations would allow more education-related exchanges, be they e.g. course, material or learner-related. This could increase the availability of learning resources and learning opportunities for learners at different educational institutions or those who are studying from a distance. R&D efforts could be steered towards improving the

interoperability of systems and materials, so that institutions could better share their resources and allow student mobility. This requires that attention be paid to software interoperability, and management of personal and education-related data, taking into account privacy and security issues.

Financing issues and challenges

Financing the costly primary investment needed for the implementation of eLearning (e.g. learning management systems, and staff skills) remains an important challenge for schools, universities and many small and medium enterprises. To solve this issue, research is needed to find and document effective implementation practices and strategies. Private enterprises could be encouraged in the future to use eLearning services by sound macroeconomic growth or falling prices. Furthermore, it would be helpful for these companies to prepare an analysis of returns on such an investment and express possible benefits numerically.

An important R&D issues is the ex-post evaluation of the many programmes that have run in the EU10 for the equipment of schools with ICT. These national programmes usually consumed a rather sizeable budget but no internationally-available, comparable information on them has been gathered. This would allow the decision makers to draw conclusions as to how successful they have been, and recognize best practices, in order to support better financing decisions in the future. It is crucial to develop appropriate indicators and procedures to measure the real usage and impact of eLearning. Research should consider the goals for the eLearning solution in question and evaluate its impact on learning instead of simply measuring number of web pages, or other technical aspects. Currently, the actual and potential usage of eLearning is scarcely measured and, as a result, rarely considered. Usage and impact should be evaluated better by providers and also by policy makers and public authorities.

Developing content

For developing digital learning materials, one of the obstacles in the EU10 is the size of the individual national markets (except in Poland). For private training providers, it may not be profitable to develop specific national eLearning content for such small markets. Supplying content in English is not a solution, because of the relatively low level of English language knowledge,. Opportunities offered by automatic translation services on the Web and user-generated content approaches should be explored. Furthermore, research efforts are needed to find sustainable co-operation models between public and private actors, such as universities, schools, training organizations and companies to develop training solutions that can be used in different spheres. Most of the EU10 countries have recently put more emphasis on digitalising their cultural heritage and it would be worth looking for opportunities to create stronger links between this digitalised heritage and eLearning.

The eLearning solutions described in the country reports often reflect simple digital content provision, not digitally-supported online courses with active interaction between participants and tutors. Hence it seems that a research and development effort is needed to improve the quality of eLearning courses so that they shift from being simple digital material provision to approaches which take into account the needs of the users and support them in the learning process.

Meeting the needs of learners and teachers

Research is required into where and how ICT-enabled learning could best reach new groups of lifelong learners in the EU10. High levels of basic education suggest that the necessary capability is there, while high unemployment rates indicate that there is a need for training, which could be implemented in new and effective ways with ICT. Research should look into the barriers to eLearning and the needs of citizens and civil users whether they be individuals, families, households, communities, civil sector organisations, NGOs, or people in specific localities or regions. This includes the context of use, service initiation and control, the delivery environment, service visibility/fundability, utility/usefulness, access/availability, and service quality and fulfilment in relation to the specific citizen user or group.

The country studies mention the opportunities of integrating social computing into education, with a view to developing locally-applicable materials and learning approaches with collaborative efforts and without investing much in the software. Research should be targeted to find effective ways for implementing social computing solutions in specific situations in the EU10. In general terms, teachers

seem to be interested in using ICT for learning, but they are hindered by different factors. Research efforts should be made to find practical models for taking up the opportunities of ICT in learning, within different subjects and for different levels. Supporting the dissemination and sharing of these practical solutions would help teachers in EU10, who often have little experience of using ICT for teaching, to take up these opportunities, and show headmasters the value ICT can offer for learning and teaching.

7 CONCLUSIONS

Some of the lessons and issues of eLearning in the EU10 may have research implications which go beyond policy issues relevant for the European Union. This chapter analyses some of these issues.

One overall lesson from eLearning developments in the EU10 is the importance of appropriate physical infrastructure and human skills. The physical and human aspects serve as a horizontal precondition for the development of eServices, among them eLearning. As regards physical infrastructure, the main access, penetration, content and usage indicators show that, while the gaps between the EU10 and EU15 have narrowed in recent years, the EU10 as a whole and as individual countries lag behind the EU15 in ICT diffusion. Besides the overall gaps, a particular problem faced by various types of eLearning users (for example, public education institutions or small and medium sized companies) is the uneven access to physical infrastructure, and the presence of digital divide in this area. Therefore, while affordability and access no longer constitute the main problem for eLearning, appropriately-targeted public policies, and well-designed and competition-enhancing regulatory measures are still needed to increase user access to physical infrastructure.

On the human side, the background context of eLearning is the population's level of computer literacy and the level of skills needed to apply ICT for new learning approaches. In the EU10, the patterns of people with ICT skills are similar to those of the EU15. The share of people with high levels of computer literacy decreases with age, increases with income level and is positively related to employment status. However, the differences between the different groups in the EU10 are greater than in the EU15, and in some EU10 countries older people tend to have no experience of computers. One of the most important socio-economic barriers for eLearning developments in the EU10 is the wide and persistent digital gap, which coincides with high levels of other social divides. Additionally, learning ICT and using ICT in many of these countries is often hindered by lack of English skills.

Statistics show that the use of eLearning in enterprises is considerably more common in the EU10 than in the EU15, with Lithuania, Slovakia and Malta taking the lead. Though training – including ICT training - is provided by enterprises for their employees, it seems at the same time that the shares of employees who do not regularly access the internet at work, or use internet for training are lower than in the EU15. This again suggests divides in the access and use of ICT, even within companies with ICT facilities.

Reports have shown that eLearning is most developed at universities, where distance education has been used to cope with space and human resources limitations. At primary and secondary schools, the majority of projects have focused on the improvement of ICT infrastructure, and have been successful as such. However, reports have not shown many examples of innovative learning approaches that deploy the opportunities ICT provide in education. Hence, the approach and problems in the EU10 seem to be similar to those of the EU15 and worldwide, where digital materials have been used to replicate traditional instruction, sometimes even reducing the interaction between learner and teacher or other learners. Europe as a whole, and not only the EU10, needs to develop ways of taking advantage of the potential offered by ICT to modernize and transform educational institutions and practices.

The country reports show that the rigidity of curricula and institutional structures has been a barrier for eLearning developments. Public policies should increase the role of ICT education in national curricula and teacher training strategies, encourage in-service teacher training and lifelong learning for the general public, finance or co-finance training for special disabled groups, and enhance the motivation of users to deepen their ICT-related knowledge. It seems that the most obvious target groups for eLearning (e.g. lifelong learners needing to update their skills) are not interested in it. This may be related to the low level of awareness of the benefits of eLearning and the low motivation among employers, employees and also some teachers and students to use eLearning solutions, as well as the access and affordability problems described above. More freedom to offer financial incentives to teachers for above-standard activities could encourage the development of new learning approaches, which could then also better reach the lifelong learners. Fiscal incentives and awareness-raising campaigns about the benefits of eLearning could stimulate the use of eLearning in the enterprise sector, especially among small and medium-sized enterprises.

An overall lesson from the experiences of the EU10 countries is the need for the design of appropriate policies targeted at special groups. There is a strong negative correlation between age and levels of computer and Internet use. Use by the elderly is affected by strong digital divide, which hinders significant groups of users from using eLearning services on a regular basis. Public policies could directly address the special needs of these disadvantaged groups (unemployed, disabled, elderly, living in socially disadvantaged and remote areas, etc.). These policies could include special labour market and retraining programmes built on eLearning applications, and the use of public funds or Structural Funds to provide better education, schooling and employment conditions, and access for disadvantaged groups to physical infrastructure. Since these social groups represent a sizeable part of the people who could benefit from eLearning opportunities, policies should address their specific needs.

Finally, the country studies point out that, up until now, eLearning has been treated as a part of broader information society and education policies in the EU10 and emphasise the fact that the lack of specific policies has adversely affected eLearning. Realising more of the potential of eLearning requires dedicated strategies and policies, while recognising at the same time its importance for several policy areas such as employment, labour market, social policies and education. Attention to these areas needs to be developed within a holistic approach.

LIST OF ABBREVIATIONS

ASEAN	Association of South East Asian Nations
B2A	Business to Administration
B2B	Business to Business
B2C	Business to Consumer
CAGR	Compound Annual Growth Rate
CEDEFOP	Centre Européen pour le Développement de la Formation Professionnelle; European Centre for the Development of Vocational Training
CEE	Central and Eastern Europe
CERME	Congress of the European Society for Research in Mathematics Education
CIP	Competitiveness and Innovation Framework Programme
CMS	Content Management System
CZK	Czech Koruna
E&T	Education and Training
ECDL	European Computer Driving Licence
EDEN	European Distance Learning and ELearning Network
ERDF	European Regional Development Fund
ESF	European Social Fund
eTEN	Trans-European Telecommunications Networks
EU	European Commission
EU10	The New Member States joining the European Union on 1 May, 2004.
EU15	The member states of the European Union before 1 May, 2004.
EU-8	The new member states joining the European Union on 1 May, 2004, except for Cyprus and Malta
EU-RA	European Research Associates
EUROCALL	European Association for Computer-Assisted Language Learning
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ICT	Information and Communication Technologies
ICEG EC	International Center for Economic Growth – European Center
IDA	Interchange of Data between Administrations
IPR	Intellectual Property Rights
IS	Information Society
ISCED	International System of Classification of Education
ITC	Information Technology and Communication
LEONIE	Learning in Europe: Observatory on National and International Evolution
LieDM	Development of Distance Education Network in Lithuania
LLL	Life Long Learning
LMS	Learning Management System

MST	Maths, science and technology
NGO	Non Governmental Organization
NMS	New Member States
NRI	Networked Readiness Index
ODL	Open and Distance Learning
OECD	Organisation for Economic Cooperation and Development
OTS	Off-the-shelf
PC	Personal Computer
PHARE	Pologne-Hongrie Aid a la Reconstruction Économique, the European Union's financial and technical cooperation programme with the countries of Central and Eastern Europe before the accession
PIAP	Public Internet Access Points
PISA	Programme for International Student Assessment
PPP	Public Private Partnership
PPS	Purchasing Power Standard
R&D	Research and Development
ROI	Return on Investment
SEEQUEL	Sustainable environment for the evaluation of quality in eLearning
SME	Small and Medium Sized Enterprises
UK	United Kingdom
UOE	Joint statistics of UNESCO Institute for Statistics, OECD, Eurostat
VoIP	Voice over Internet Protocol
WiFi	Wireless Fidelity
WLAN	Wireless Local Area Network

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REFERENCES

Aceto S., Dondi C, Kugemann W. (2004) Technologies for the Knowledge Society & Lifelong Learning - Key Findings and Suggestions for Action, MENON Network available at: http://www.education-observatories.net/pole/key_report_web.pdf

Ala-Mutka, K. (2008). Social Computing: Use and Impacts of Collaborative Content. IPTS Exploratory Research on Social Computing. JRC Scientific and Technical Reports, Institute for Prospective Technological Studies. EUR 23572 EN. http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1885

Ala-Mutka, K., Punie, Y. & Redecker, C. (2008). Digital Competence for Lifelong Learning. Institute for Prospective Technological Studies (IPTS), European Commission, Joint Research Centre. Technical Note: JRC 48708, http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1820

Ala-Mutka, K., Punie, Y. & Redecker, C. (2008b). ICT for Learning, Innovation and Creativity. Institute for Prospective Technological Studies (IPTS), European Commission, Joint Research Center. Technical Note: JRC 48707, http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1819

Bacsich, P. and Ash, C. (2001). The Costs of Networked Learning" Springer Computer Supported Cooperative Work Series, 2001

Boehle S. (2005), The State of the ELearning Market, Training magazine,

Brook M. (2003), Organizing Enterprise-Wide ELearning and Human Capital Management, Chief learning officer, May-June http://www.clomedia.com/content/templates/clo_feature.asp?articleid=170&zoneid=32

Communication from the Commission to the Council and the European Parliament: The eLearning Action Plan – Designing tomorrow's education, Brussels, 2001

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions (2005): "i2010 – A European Information Society for growth and employment", Brussels

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions (2006): i2010 – First Annual Report on the European Information Society

Dondi C., Moretti M., Nascimbeni F. (2006). Quality of eLearning: negotiating a strategy, implementing a policy in European Quality Handbook. CEDEFOP.

Empirica (2006), Benchmarking Access and Use of ICT in European Schools 2006: Final Report from Head

Teacher and Classroom Teacher Surveys in 27 European Countries, European Commission. http://europa.eu.int/information_society/eeurope/i2010/benchmarking/index_en.htm

European Commission (2002), eEurope 2005: An information society for all – An Action Plan to be presented in view of the Sevilla European Council, 21/22 June 2002

European Commission(2005). i2010 - A European Information Society for growth and employment. COM(2005) 229 final

European Commission (2006): Classification of learning activities – Manual. Luxembourg: Office for Official Publications of the European Communities.

European Commission (2008a). Progress towards the Lisbon Objectives in Education and Training. Indicators and benchmarks. Commission staff working document. http://ec.europa.eu/education/policies/2010/doc/progress08/report_en.pdf

European Commission (2008b). Commission Staff Working Document. The use of ICT to support innovation and lifelong learning for all - A report on progress. SEC(2008) 2629 final.

European Council, (2006), Decision of the European Parliament and of the Council establishing an integrated action programme in the field of lifelong learning, http://europa.eu.int/comm/education/programmes/newprog/index_en.html

European Council (2006). Recommendation of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning. Official Journal of the European Union, L394.

Fukuhara, Yoshimi. NTT Resonant Inc Learning Trends in Japan presentation at the ASEAN eLearning conference the 16 December 2004. Understanding Change, Adapting to Change, Shaping the Future MENON Network EEIG, 2005

i2010 - A European Information Society for growth and employment. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, COM(2005) 229 final, Brussels, 1.6.2005: http://europa.eu.int/information_society/eeurope/i2010/index_en.htm

L-change consortium, (2003) Change in European Education and Training Systems related to Information Society Technologies (IST), IST 2000-26226 project report

Law, N., Pelgrum, W.J. & Plomp, T. (eds.) (2008). Pedagogy and ICT use in schools around the world: Findings from the IEA SITES 2006 study.

Morgen W., (2005) A new era for digital learning, Financial times, 6/10/2005, available at: http://news.ft.com/cms/s/0bb99646-3651-11da-bedc-00000e2511c8,dwp_uuid=b1b2f39a-364b-11da-bedc-00000e2511c8.html

ODL Liaison Committee (2004), Distance Learning and eLearning in European Policy and Practice: The Vision and the Reality, Policy Paper approved by the Member Networks the 17/11/2004

Page K. (2006), A preliminary study on the current state of eLearning in lifelong learning, CEDEFOP Panorama Series, 123, Luxembourg, Office for Official Publications of the European Communities.

Punie, Y., Cabrera, M., Bogdanowicz, M., Zinnbauer, D. & Navajas, E. (2006). The Future of ICT and Learning in the Knowledge Society, Report on a Joint JRC-DG EAC Workshop held in Seville, 20-21 October 2005, EUR 22218 EN. http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1407

Punie, Y. & Cabrera, M. (2006). A review of the Impact of ICT on Learning. Working paper prepared for DG EAC. Institute for Prospective Technological Studies (IPTS), Joint Research Centre, European Commission.

Redecker, C. (2009). Review of Learning 2.0 Practices: Study on the Impact of Web 2.0 Innovations on Education and Training in Europe. Institute for Prospective Technological Studies (IPTS), European Commission, Joint Research Centre.

Srikanthan, Gitachari; Dalrymple, John F. (2003) Developing a Holistic Model for Quality in Higher Education, Vol. 8, No. 3, pp. 215–224

ANNEX: THE CONSORTIUM MEMBERS

The present Synthesis Report is built on a series of national studies prepared in the framework of the project. The national studies are the following:

The Development of eServices in an Enlarged EU: eLearning in the Czech Republic
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1573
Responsible institute: EEIP, A.S.
Author: Julie Chytilová

The Development of eServices in an Enlarged EU: eLearning in the Cyprus
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1880
Responsible institute: Department of Computer Science, University of Cyprus
Author: Panagiotis Germanakos

The Development of eServices in an Enlarged EU: eLearning in Estonia
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1576
Responsible institute: Tallinn University of Technology
Authors: Margit Suurna
Rainer Kattel

The Development of eServices in an Enlarged EU: eLearning in Hungary
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1575
Responsible institute: ICEG European Center
Authors: Pál Gáspár
Renata Anna Jaksa

The Development of eServices in an Enlarged EU: eLearning in Latvia
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1574
Responsible institute: Baltic International Centre for Economic Policy Studies (BICEPS)
Author: Martins Kalis

The Development of eServices in an Enlarged EU: eLearning in Lithuania
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2039
Responsible institute: Lithuanian Free Market Institute
Authors: Remigijus Simasius
Prof. Renaldas Gudauskas

The Development of eServices in an Enlarged EU: eLearning in Malta
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1741
Responsible institute: Projects in Motion Ltd.
Author: Brian Restall

The Development of eServices in an Enlarged EU: eLearning in Poland
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1742
Responsible institute: Leon Kozminski Academy of Entrepreneurship and Management
Transformation, Integration and Globalization Economic Research Center
Author: Małgorzata Runiewicz

The Development of eServices in an Enlarged EU: eLearning in Slovakia
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1881
Responsible institute: Slovak Governance Institution
Author: Peter Druga

The Development of eServices in an Enlarged EU: eLearning in Slovenia
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1743
Responsible institute: University of Ljubljana, Faculty of Social Sciences
Author: Vasja Vehovar

European Commission

EUR 23831 EN – Joint Research Centre – Institute for Prospective Technological Studies

Title: The Development of eServices in an Enlarged EU: A Synthesis Report on eLearning

Authors: Julie Chytilova, Claudio Dondi, Claudio del Rio, Pál Gáspár, Renata A. Jaksa, Gábor Kismihók, Katarina Krapez, Vasja Vehovar and Kirsti Ala-Mutka

Luxembourg: Office for Official Publications of the European Communities
2009
EUR – Scientific and Technical Research series – ISSN 1018-5593

Abstract

In 2005, IPTS launched a project which aimed to assess the developments in eGoverment, eHealth and eLearning in the 10 New Member States at national, and at cross-country level. At that time, the 10 New Member States were Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia. A report for each country was produced, describing its educational system and the role played by eLearning within both the formal education system and other aspects of lifelong learning. Each report then analyzed, on the basis of desk research and expert interviews, the major achievements, shortcomings, drivers and barriers in the development of eLearning in one of the countries in question.

This synthesis report developed in the final phases of the project offers an integrated view of the developments of eLearning in the New Member States. Furthermore, the project has prepared a prospective report looking across and beyond the development of the eGoverment, eHealth and eLearning areas to summarize policy challenges and options for the development of eServices and the Information Society towards the goals of Lisbon and i2010.

The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.