

USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATIONAL MANAGEMENT

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Abstract: The paper outlines the role of information and communication technology in educational management within the knowledge-based economy and society. There is also a comparative approach of using information and communication technology in European schools, taking into consideration the number of computers, the internet access, the use of computers and Internet in classrooms etc. In the end of this paper are presented some actions to develop lifelong learning based of information and communication technology.

1. Role of information and communication technology in educational management

The computer, as auxiliary element of the teacher, is used since few decades, but the new technologies appeared in computer science lead to the necessity to adapt the learning/ teaching methodologies in such way to be based increasingly on information and communication technology (ICT) [Pănoiu Manuela, 2006]. For the past few years, there has been a growing understanding of the important role of information and communication technologies in education. Various new models of education are evolving in response to the new opportunities that are becoming available by integrating Web-based technologies [Barak Miri, 2007]. The necessity to prepare the people for a future where the computer science is a dominant area could be one of the reasons for this fact. Using new teaching methods based on educational software could contribute to the development of the teaching-learning process [Pănoiu Manuela, 2006]. When teachers are using the ICT in learning activities these become more attractive. The ICT activities, which the teachers promote for learning, require and support the development of good ICT skills. The intensive use of laptops both at school/university and at home helps all pupils/students to function constructively in the emerging knowledge society. They all have basic ICT skills, a realistic understanding of the possibilities of ICT in the future, and they learn how to use ICT as a meaningful tool. [Ilomaki Liisa, 2007].

The priority of education and training in policy agendas has dramatically risen in the last years, as it has become clear how crucial human resources are for innovation and development in Europe. The overarching objectives set by the Lisbon Council, by prompting for the boosting of Europe as a knowledge society and economy and for the implementation of education policies in a lifelong learning perspective, have highlighted the need to focus on a set of crucial policy priorities. It has also become clear that new technologies, if effectively integrated in learning, could actively support the development of strategies related to the above mentioned priorities and that e-Learning could play a key role in enhancing the development of Europe towards

becoming a competitive knowledge society. In this context, e-Learning is contributing to achieve the following set of policy priorities: access to learning, employability, personal development and citizenship, internationalisation of Education and Training, organisational change, innovation of Education and Training systems [Helios, 2006].

Policies for education and training form an important part of the European Union's Lisbon strategy. Heads of States and Government asked for not only a radical transformation of the European economy, but also a *challenging programme for modernisation of social welfare and education systems*. In 2002, they set the objective of *making European education and training systems a world quality reference by 2010* [European Commission, 2007].

The knowledge-based society presents the European Union and its citizens with many potential benefits as well as challenges. Citizens have vast new opportunities in terms of communication, travel and employment. Taking advantage of these opportunities, and actively participating in society, is reliant on the ongoing acquisition of knowledge and competences. At the same time, competitive advantage is increasingly dependent on investment in human capital. Knowledge and competences is therefore, also a powerful engine for economic growth. Given the current uncertain economic climate, investing in people becomes all the more important [European Commission (a), 2001]. If Europe is to benefit fully from its economic potential, *a proactive policy approach* is needed to stimulate favourable market developments and the promotion of the knowledge society (e.g. lifelong learning, creativity and innovation), consumer protection and a healthy and safe European information society. [European Commission, 2005].

The rapid development within society of the use of information and communication technologies has meant a revolution in the way schools and training institutions work, as indeed it has changed the way in which very many people in Europe work. As far as the education systems are concerned, there are three challenges [European Commission (b), 2001]:

- Equipping schools for the Internet and the use of multimedia resources and also equipping teachers and learners with free and easy access to computers.
- Training teachers, because all Member States recognize the importance of providing good training for teachers. Perhaps more importantly, though, new pedagogical issues arise around ways to encourage people to develop the specific skills to use information and communication technologies well – skills such as the selection of information, its analysis and its subsequent transformation into knowledge and skill.
- Networking and Resources. The use of school networks is developing rapidly. Many Member States have specific networks for education and training, which they use to provide teachers with training and materials, classes with means and methods of cooperation both within and between schools, and individual learners with access to materials related to curricula or indeed with e-mail facilities. At the same time, the availability of multimedia resources and their linguistic diversity is expanding, and schools and teachers are becoming more accustomed to their use. The challenge now is to integrate these new resources within normal teaching practice, and to evaluate in which subject areas they are currently best used, and where they need further development before being able to make a worthwhile contribution to group learning.

Today the real challenge is to ensure that enough equipment and broadband connections exist for pupils to be able to get real advantage from the Internet and, to ensure that appropriate learning content and adapted pedagogical frameworks are set up so that the new learning paradigm (e.g. using collaborative work over the internet) can be fully exploited. For teachers the issue is not just about training, it is about equipping them with the skills and the software to integrate the information and communication technologies into their daily practice, and in this way increase the learning capacities of the people they work with. “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” are known as “lifelong learning” [European Commission (a), 2001].

Improving the quality of education thanks to multimedia and Internet technology is one of the priorities of European cooperation. All schools, if not all classes, should be highly computerised, all teachers should be able to use the technology to enhance their working methods and all young people should be able to broaden their horizons by using it comfortably though with the necessary critical perspective. These goals are among the priority objectives for 2010 that the education and training systems of EU countries have set themselves in the follow-up to the Lisbon strategy [Eurydice, 2004].

The development of new multimedia technologies and the growth of the Internet in recent years have given Europeans access to an incredible range of information and resources. Successfully exploiting this potential for improving education and training depends far more on pedagogical and organisational issues than on the technologies themselves. The introduction of information and communication technology has to be accompanied by a far-reaching reorganisation of learning structures. It is also vital that technological innovation is developed to serve education in highly diverse learning contexts, while respecting linguistic, cultural and social differences. Offering more Europeans the opportunity to develop new skills at any age and to any standard will not only improve the competitiveness of European Union enterprises and the employability of European Union citizens, but will also promote social inclusion, active citizenship and personal development. Lifelong learning has therefore been a core European Union policy since 2001, when EU Member States agreed, in a Council Resolution on e-Learning, to act together to enable easier integration of information and communication technology into education and training systems.

It is common understanding that information and communication technology can offer the degree of flexibility and adaptability to the individuals’ needs not in reach for the conventional education and training and therefore has to play and will play a paramount role in any policy towards adaptive, inclusive, mainstreamed and high quality lifelong learning. *The e-Learning has opened new learning opportunities, but has not extended enough the number of adult learners, nor the range of contents available for adult learners* [Aceto Stefania, 2004].

Although ICT can serve as a tool for designing new learning environments, integrating virtual models, and creating learning communities, not all teachers are convinced that ICT should be an integral part of their teaching strategies. This is one of the most difficult barriers for effective ICT integration. [Barak Miri, 2007] However, this resistance to change is more specific to older teachers that were not used to the new technologies.

With the development of the Internet and its communication and sharing affordances such as Email, chat, Web discussion forums, and other technologies, people

are being exposed to more varied and frequent interaction opportunities than humans have ever experienced before [Woo Younghee, 2007]. This fact could lead to a better learning and teaching process and also to the development of new and attractive methods for teaching and learning. [Zamfir Andreea, 2008].

2. Comparative approach of using information and communication technology in European schools

The *use of computers* in European schools has reached almost the 100% saturation point in all member states. However, there are large variations in the *number of computers per 100 pupils*. The clear European leaders are Denmark, Norway, the Netherlands, the UK and Luxembourg (figure 1). The figures in these countries are significantly higher than the European average of 11 computers per 100 pupils (of which 10 are internet computers) [Empirica (a), 2006]. Also, *the use of computers in classrooms* has reached more than 80% and *the number of computers connected to the internet via broadband connection* has reached more than 75% in countries like Denmark, United Kingdom, the Netherlands, Luxembourg or Norway (figure 2).

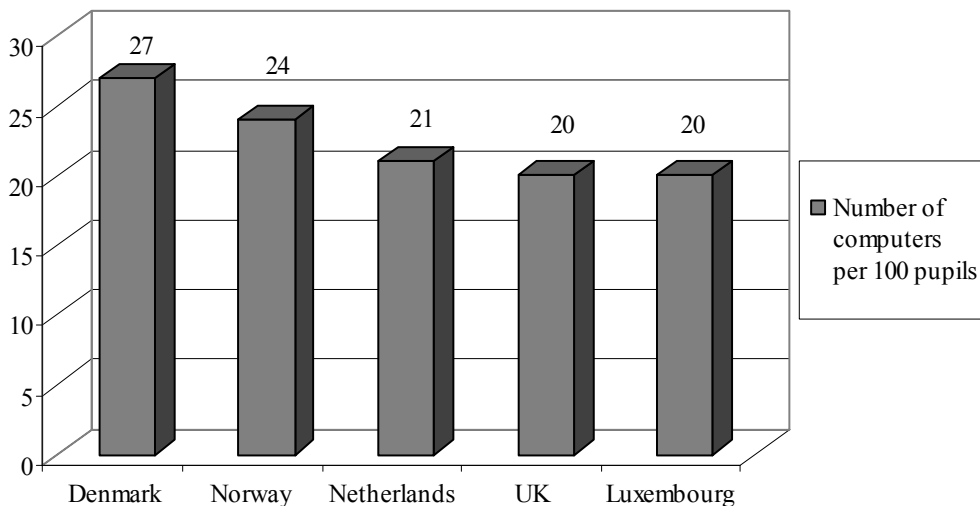


Fig. 1: European leaders by the number of computers per 100 pupils

Source: Empirica (a) (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, Information Society and Media Directorate General, Lisbon Strategy and Policies for the Information Society, Lisbon Strategy and i2010, Empirica, Bonn, last accessed 05.07.2008, http://www.empirica.biz/publikationen/schriftenreihe_en.htm

Denmark is one of the European frontrunner in terms of information and communication technology use in schools. All Danish schools use computers for teaching and have Internet access. With 27 computers per 100 pupils, Denmark is the European country where schools are best equipped with computers. The same holds true for the Internet access, virtually all schools use the Internet in class. With 95% of schools connected to the Internet through broadband, Denmark is about to reach the 100% saturation point. Information and communication technology and Internet in general and mostly broadband Internet are ubiquitously available and in use in all schools in Denmark. It is remarkable that 95% of classroom teachers have used

computers in class in 2005/2006. For most teachers, this includes not only using a computer for presentation purposes but also the use of computers by pupils in class. Almost 50% of teachers use computers in up to 25% of their lessons, and slightly more than 50% in more than 25% of their lessons with hardly any difference according to age of teachers. Only 5% of teachers do not use computers in class in Denmark. [Empirica (b), 2006].

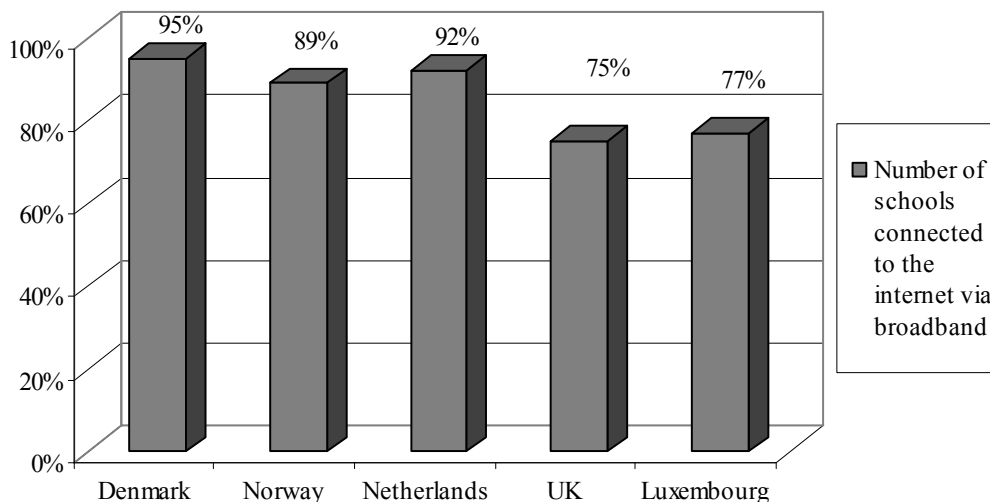


Fig. 2: European leaders by the number of schools connected to the internet via broadband connection

Source: Empirica (a) (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, Information Society and Media Directorate General, Lisbon Strategy and Policies for the Information Society, Lisbon Strategy and i2010, Empirica, Bonn, last accessed 05.07.2008, http://www.empirica.biz/publikationen/schriftenreihe_en.htm

In Norway there are 24 computers per 100 pupils with the upper level schools providing around 40 computers per 100 pupils resulting in almost one computer for two pupils, which again compares to one computer for 20 pupils in the European countries at the tail end. All Norwegian schools now use computers for teaching and have Internet access. A very high 89% use the Internet via a broadband connection. Only 84% of the Norwegian schools using computers for teaching use them in classrooms with the highest percentage being achieved in primary schools (89%). Computer labs are also popular and provided in 82% of Norwegian schools. The 100% figure is reached in upper secondary schools and in almost 100% of vocational schools. 83% of teachers have integrated the use of information and communication technology into the teaching of most of their subjects, placing Norway at rank 7 in Europe. A very high 89% of Norwegian classroom teachers had used computers in class in 2005/2006. A majority (59%) of teachers using computers use them in less than 10% of all lessons and only a low 4% use computers in more than half of their lessons. [Empirica, (c), 2006].

Virtually all schools are equipped with some computers in the Netherlands and the number of computers in total and per 100 pupils is high with an average of 21, 20 of which are connected to the Internet. The Netherlands ranks at the top in Europe and

only Denmark achieves a higher figure. All schools in the Netherlands now use computers for teaching and have Internet access and 92% use the Internet via a broadband connection. With this figure the Netherlands ranks at number 4 in European top. A very high 90% of teachers use computers in class in the Netherlands. A majority (51%) of the teachers using computers use them in between 10% and 50% of all lessons. A rather low 12% of teachers use computers in more than half of their lessons. [Empirica (d), 2006].

In the United Kingdom there are 20 computers per 100 pupils, 19 of which are connected to the Internet. All British schools use computers for teaching and have Internet access. 75% use the Internet via a broadband connection. Also, 95% of British schools using computers for teaching use them in classrooms, with the highest percentage being achieved in primary schools (80%). The United Kingdom takes the first position in Europe on this indicator. Computers in the school library are also popular in Britain. Almost 50% of the schools offer them as additional Internet access points and for learning purposes with upper secondary and vocational schools exceeding the 80%. A very high 96% of British classroom teachers have used computers in class. This is the top score in Europe. [Empirica (e), 2006].

In Luxembourg there are 20 computers per 100 pupils, 18 of which are connected to the Internet. Almost all schools in Luxembourg now use computers for teaching and have Internet access. 77% use the Internet via a broadband connection. It appears as if information and communication technology has almost entirely become an integral part of any subject without any further need of training pupils in its use as part of a dedicated subject. More than 90% of teachers use computers and the Internet integrated into the teaching of most subjects. A high 88% of the Luxembourgian schools using computers for teaching use them in classrooms with the highest percentage being achieved in primary schools (99%). 70% of Luxembourgian classroom teachers had used computers in class in 2005/2006. [Empirica (f), 2006].

The differences observable in the number of computers per 100 pupils by school types may point to the current focus of information and communication technology investments in schools, which in most European countries seems to be on upper level schools where more attention and investment are placed. Information and communication technology investments in primary schools are probably not (yet) seen as the top political objective at which to aim, with few exceptions. [Empirica (a), 2006].

As the latest evidence confirms teachers that assess to experience a more positive impact of information and communication technology are most likely to be found in schools where headmasters have used information and communication technology to support the development of the school's values and goals. If the information and communication technology strategy is integrated into the schools overall strategy information and communication technology has the greatest potential to act as a catalyst for change. Furthermore this overall strategy needs to be developed and evaluated by all school actors and not only by the headmaster in collaboration with the information and communication technology coordinator, thus establishing a culture of collaboration and commitment and making it more likely that the policy is actually solving a problem that teachers and students are facing. The headmaster must communicate about the school's objectives with teachers, students and parents in order to take away wrong expectations, unnecessary fears and manage doubts. [Balanskat Anja, 2006].

3. Actions to develop lifelong learning based of information and communication technology

If the organisational and institutional context does not support new working methods, educational practices will not change. Taking into account that most teachers embrace new technologies in a step-by-step process, systematically but slowly, any change should be supplemented by process management and connected to realistic visions. This means allowing schools to experiment within given boundaries. The same holds true for more drastic changes, which are more difficult to achieve. [Balanskat Anja, 2006].

New approaches to teacher training should be much more related to the concept of lifelong learning, knowledge sharing and peer learning. To be confident teachers must be able to upgrade their information and communication technology skills and gain more pedagogical knowledge and this in a much more active way than previously. Teachers have to become active shapers of their own learning process, which requires a professional environment and culture that allows teachers to do so. Therefore, training programmes should be more school-based and adapted to the particular needs of teachers and fit to personal and subject specific needs, or project related needs. Continuous professional development should be in the foreground enabling teachers to learn how to upgrade their skills. Initial teacher training for information and communication technology is an important area for improvement in the future. [Balanskat Anja, 2006].

The necessity to promote the information and communication technology for learning conducted at establishing an action programme in the field of lifelong learning at the European Union level. The general objective of the Lifelong Learning Programme is “to contribute through lifelong learning to the development of the European Union as an advanced knowledge-based society, with sustainable economic development, more and better jobs and greater social cohesion, while ensuring good protection of the environment for future generations. In particular, it aims to foster interchange, cooperation and mobility between education and training systems within the Community so that they become a world quality reference”. One of the specific objectives of the Lifelong Learning Programme is “to support the development of innovative information and communication technologies-based content, services, pedagogies and practice for lifelong learning”. [Decision No 1720/2006/EC , 2006].

In order to achieve these objectives, the Lifelong Learning Programme shall comprise support for the following actions [Decision No 1720/2006/EC , 2006]:

- The mobility of individuals in lifelong learning;
- Bilateral and multilateral partnerships;
- Multilateral projects especially designed to promote quality in education and training systems through the trans-national transfer of innovation;
- Unilateral and national projects;
- Multilateral projects and networks;
- Observation and analysis of policies and systems in the field of lifelong learning, the establishment and regular improvement of reference material, including surveys, statistics, analyses and indicators, action to support transparency and recognition of qualifications and prior learning, and action to support cooperation in quality assurance;

- Operating grants to support certain operational and administrative costs of institutions and associations active in the field covered by the Lifelong Learning Programme etc.

Today's educational policies are largely devoted to fostering the development and implementation of information and communication technologies in education. The new competences and skills needed for the knowledge-based society demand the continuous change of educational practices. Learners growing up in the digital age are far more experienced and able to process information rapidly than were their predecessors. Therefore, policies for education and teachers should give priority to learners' own explorative, constructive and communicative activities based on information and communication technology.

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