Szakdolgozat

Fazekas Sarolta

Debrecen
2010

Debreceni Egyetem
Informatikai Kar

Információs Társadalom

Témavezető:
Dr. Papp Zoltán
egyetemi adjunktus

Készítette:
Fazekas Sarolta
angol-informatikatanár
szakos hallgató

Debrecen
2010

University of Debrecen
Faculty of Informatics

A Study on Information Society

Supervisor:
Dr. Papp Zoltán
assistant professor

Written by:
Fazekas Sarolta
english and informatics teacher

Debrecen
2010

1. Table of Contents

2. Introduction

In the 1940s the first digital computers appeared and were used for military purposes in World War II. The computers then were as huge as a room, and the speed at which they calculated and performed complex mathematical operations was very slow, sometimes several hours. The 1970s brought the first personal computers. These were much smaller in size but exponentially faster than the earlier computers. Even individual people could afford them, thus enabling the use of personal computers for private or business purposes. Towards the mid-1990s even smaller, so-called laptop computers had been developed. Nowadays the average number of personal computers worldwide increases year-by-year. Current tendency suggests that computers will continue to become smaller and more powerful (iPhone), and they have a constantly growing influence on the lives of everyday people. Today, the next step concerning the development of information technology is a network, which connects computers to each other, through which people can communicate. Shopping, business administration, mailing and real-time communication is now possible with the help of computers. The revolution of information technologies has a measurable effect on society as a whole. This effect can be compared to that of the Industrial Age, according to Bill Gates, founder of Microsoft Corporation. He predicted that the increased level of communication made possible by computer networks will bring many benefits in the areas of business, education, and social interaction, producing widespread sharing of knowledge and wealth and a worldwide cultural renewal. Individual people, teachers, the government and society as a whole has to adapt to these changes.

Science and scientists have both the possibility and responsibility to examine the nature of technological developments. It is important to know, how they influence the everyday life of people, what opportunities and dangers lie beneath new discoveries and what today's education systems can do in order to prepare future generations to cope with and

carry on these developments. There have been many researchers examining the issue; institutional collaborations between countries and universities are trying together to lead the way and find the best choices of information technology development.

This study aims to describe past and present contributions to the development of recent technology, how associations (especially in Europe) try to form the route and determine the best use of this new technology and examine the actual and possible effects of the inventions on society. Information technology has run a long way to reach its current state, and my main interest is to examine how informatics has evolved from being the vision and invention of a few extraordinary people to become a phenomenon intertwining society on a global scale, eventually creating Information Society. These social aspects can be strengthened and controlled, when teaching of and with computer science expands in the educational systems extensively. The current stage of this expansion is also discussed here.

3. Defining computers and society

In order to summarize it briefly, we could say that "Computers and Society" is a relatively new subarea of information science, and its main purpose is to explore the social, cultural, political and individual effects and side effects of information technology via and inter disciplinary approach.

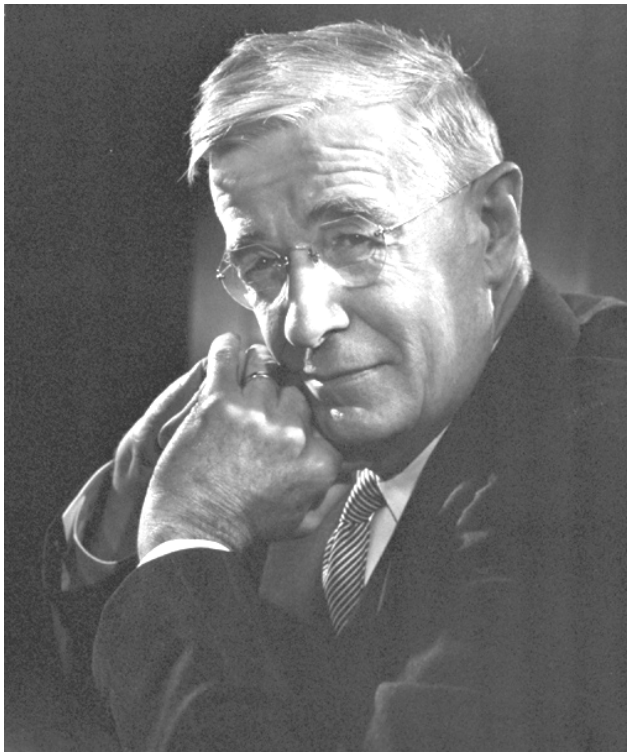
The Computers and Society area addresses a broad field within information science and offers themes in a great variety of research areas. Topics include the history of informatics, the influence on information society as well as the debates between informatics and law. Recently digital media, electronic publication and thus Open Access, the question of mental property, plagiarism and long-term archiving are of special interest to researchers. Another relevant field in this area is the phenomenon of Open Source, where licence models, motivation and effects are of particular importance. Furthermore, discussing the relationship

between privacy or data protection and monitoring technologies and biometrical systems also belongs to the field of Computers and Society.

4. Background - Technical and Philosophical Development

There are several basic components that make today's information society a reality, without which such a fast and complex technological development would have been impossible. These components can be linked most closely to four researchers in particular: Marshall McLuhan, Tim Berners Lee, Douglas Engelbart and Vannevar Busch.

4.1 Vannevar Bush

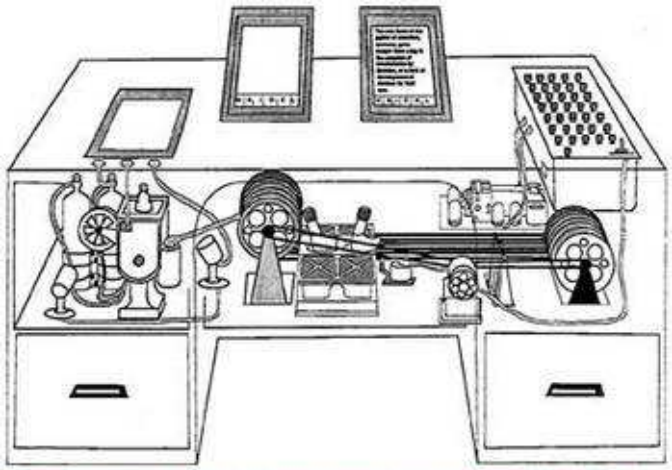


Vannevar Bush

Vannevar Bush (1890-1974) was an American engineer who did a pioneering work in analog computing (he invented the differential analyzer which could solve differential equations up to 18 individual variables – a basis for the digital circuit), and whose essential political and scientific role in World War II is indisputable. During World War II Bush was the president of the Carnegie Institution of Washington, chairman of the National Advisory Committee for Aeronautics, chairman of the National Defence Research Committee and later became the director of its successor, the Office of Scientific Research and Development. He was also the founder of the later Raytheon, a large electronics company and defence contractor. Bush had unique insight on the warfare of the United States and he had a great influence on the actual

presidents, he was the first presidential science advisor to Roosevelt, and he counts as one of the founders of the military-industrial complex. His most relevant work to this study was his essay written during World War II and was published in 1945 with the title “As we may think”, where he defined the concept of memex.

The essay was published twice, the first time in July 1945 before the nuclear attacks on Japan, and the second one after them in September 1945. Here Bush defines how the scientific developments are directed in favour of war and destruction, rather than general development and understanding, and in order to prevent further damage he proposes a kind of augmented, collective memory device which would make it possible for people to access knowledge easily. According to Bush with the help of this device huge information could be controlled and collided into knowledge. Further on, he predicts some part of the technology that would be accessible in the future, just as the Internet, the underlying World Wide Web and hypertext, online encyclopaedias and dictionaries, and he envisioned also some applications, which are still not fully realized, although attempts have been made to do so, like a device capable of speech recognition (speech recognition applications exist, where the program transforms the heard text into a written format, but there are restrictions on the style a speaker can use, and the program must be calibrated to recognize the speaker). This article has been regarded by many as the basis of new media. Bush inspired other researchers with his article, like Douglas Engelbart (see later) and Ted Nelson (who is



"Memex in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofil filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference" [LIFE 19(11): 123]

known for coining the term hypertext for the first time).

Memex is considered to be a forerunner of personal computers and of the hypertext, and its principle served as a basis for Emanuel Goldberg's statistical machine. The word is most likely blended together from memory extension. According to Bush's essay, it is an adjustable microfilm viewer, which worked like a memory bank with the help of which data could be retrieved and organized, and its structure is similar to that of the World Wide Web. He wanted to create a "device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory."[1] This device was supposed to work like the human brain, store data, connect them, and it has to be easily accessible.

He compared the ways in which human storage methods are categorized, and realized how different information was stored and retrieved in the brain. For example names in a telephone book are stored alphabetically, if people want to find someone, they have to trace the book and search in the subclasses. However, the human brain works rather via associations (if we think of names, someone pops into our mind based on the closeness of acquaintance).

As Bush writes in his essay, "every time one combines and records facts in accordance with established logical processes, the creative aspect of thinking is concerned only with the selection of the data and the process to be employed and the manipulation thereafter is repetitive in nature and hence a fit matter to be relegated to the machine."[2] Since the human brain is considered to be perhaps the most complex and logical tool, technology, and thus storage should aim to use it as an example and learn as much as possible from it.

[1] http://www.w3.org/History/1945/vbush/vbush0.shtml (2010-11-19)
[2] http://www.w3.org/History/1945/vbush/vbush0.shtml (2010-11-19)

4.2 Tim Berners-Lee

Sir Timothy John Berners-Lee

Sir Timothy John Berners-Lee (1955-) is a British engineer and computer scientist. He is renowned for inventing HTML (Hypertext Markup Language) and for founding the World Wide Web, due to which he was also nominated for the Peace Nobel Prize in 2010. Today he directs the World Wide Web Consortium (W3C) and he is a professor of the Massachusetts Institute of Technology (MIT).

Berners-Lee is the son of the Mathematician couple, who contributed to the development of the Manchester Mark I. Even as a child, he was interested in computers. He studied physics at the University of Oxford in England. From 1984 he worked for the European Organization for Nuclear Research (CERN).

A major problem arose at CERN. A considerable part of the laboratories was located on French soil, and another part was on Swiss territory. There was a different kind of network infrastructure, which made information flow and sharing problematic if not impossible. In 1989 Berners-Lee proposed a project to CERN, which was based on the hypertext principle, and the project would have enabled a global sharing and updating of information between scientists. He saw an opportunity to join hypertext with the Internet: "I just had to take the hypertext idea and connect it to the Transmission Control Protocol and domain name system ideas." He implemented this project. He managed to develop the world's first browser under the name *WorldWideWeb* and the first Web server that was running on the NeXTStep operation system.

Berners-Lee built the first web site that was put online on 6 August 1991 with the page address: *http://info.cern.ch.* , and it comprised the information on the WWW project. According to CERN, "visitors could learn more about hypertext, technical details for creating their own webpage, and even an explanation on how to search the Web for information. There are no screenshots of this original page and, in any case, changes were made daily to the information available on the page as the WWW project developed. You may find a later copy (1992) on the World Wide Web Consortium website."[3] Basically it was a kind of tutorial describing how a web server could be set up, how to use it and what it should be like. Originally this was also the first basic search engine, since Berners-Lee also maintained other websites than his own.

The world's first Web server,
used by Berners-Lee at CERN

The general idea of the World Wide Web is by way of comparison quite easy to understand. However, even today Berners-Lee's implementation is not yet utilised.

In 1994 Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology. It is important to know, that he made his ideas and technical implementations freely available without patent. The W3c' aim is that anyone should be able to adopt its standards, thus these are also based on royalty-free technology. He published a book in 1999 entitled *Weaving the Web* where he emphasises the following points:

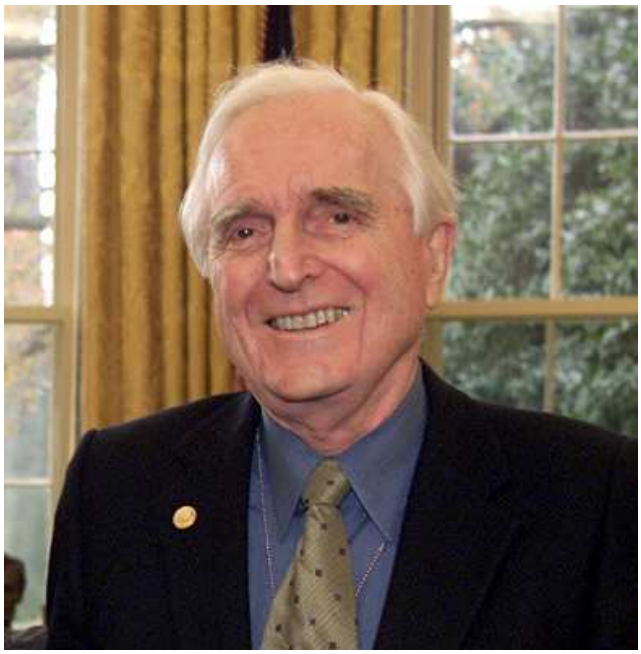
[3] http://en.wikipedia.org/wiki/Tim_Berners-Lee

- It is just as important to be able to edit the Web as it is to browse.
- Computers can be used to solve problems in the background, so that groups can work together more effectively.
- Each area of the internet should have a network structure rather than a tree structure. Possible exceptions are the *Domain Name System* and the rules for giving out domain names through ICANN.
- Computer scientists take a technical as well as a moral responsibility.

Berners-Lee‘s current work involves the creation of the semantic web. Originally, if machine-readable metadata was available, then automated agents and other software could access the web more intelligently. They would be in the position to solve problems automatically and find information related to each other for the user. Primarily the term gives a description on the model and technologies that the W3C proposes, and these aim to provide a formal definition of ideas, concepts, terms, and relationships that are included in a specified knowledge domain. The main purpose for creating the semantic web is the problem, that although humans are capable to extract information and carry out tasks on the web, such as searching and finding the appropriate translations of words, or to find the author of a book, but computers need human directions, otherwise they are not capable of solving any problems. This is expected, since web pages are created for people. The semantic web would contain information that is interpretable for computers, so they could find, combine, and act upon information more effectively on the web.

Tim Berners-Lee’s contribution towards establishing an information society is essential. He created a tool, and with the help of this tool people can communicate with each other in various ways via the internet and they now have access to a near-limitless, ever-growing amount of information.

4.3 Douglas Engelbart



Douglas Carl Engelbart

Douglas Carl Engelbart (1925-) is a German-Norwegian-American engineer and inventor. He is acknowledged as a pioneer of computer-human interaction and counts as a forerunner of the personal computer. In 1997 he was rewarded the Turing Award.

As a radar technician during World War II he read Vannevar Bush's "As We May Think" article, which had a crucial influence on him. Engelbart got carried away by the idea of making knowledge as widely available as possible. Beginning from that moment his primary goal and focus of work was to realise the concept of the memex and to harness collective intellect which is communicated by interactive computers. He was and is still committed to help cope with the world's global, complex issues by developing and using computers and networks.

In the early 50s Engelbart reasoned for his theory and described on what basis he would build up his research and why he decided to build a career connected to computers: his aim was to make the a world a better place; therefore he needed a kind of organized effort; it was important to collect and store the universal knowledge of those people who could help finding effective solutions; if the method of the previous point could be improved, this would speed up the processes and thus make it both easier and faster to solve essential problems;

and computers may be the best devices for storing collective knowledge.[4] In 1962 he published his vision, the technological representation of the ideas with the title *Augmenting Human Intellect: A Conceptual Framework*.

Engelbart is mostly known for the invention of the computer mouse. He developed the "X-Y Position Indicator for a Display System" together with Bill English at the Stanford Research Institute in 1963, but he presented it in 1968 to the public. The device "used two gear-wheels perpendicular to each other: the rotation of each wheel translated into motion along one axis"[5]. By that time a Germany company called Telefunken developed another kind of mouse, which had a ball in it. This mouse was the basis for later mouse-types. In the presentation Engelbart also introduced his ideas concerning human-computer interaction, graphic user interfaces (GUI), hypertext and computer networks. His research was financed by ARPA, where he set one of the first nodes of Arpanet, the precursor of Internet. To summarize it, together with his team, Engelbart "developed computer-interface elements such as bit-mapped screens, the mouse, hypertext, collaborative tools, and precursors to the graphical user interface. He conceived and developed many of his user interface ideas back in the mid-1960s, long before the personal computer revolution, at a time when most individuals were kept away from computers, and could only use computers

The world's first computer mouse

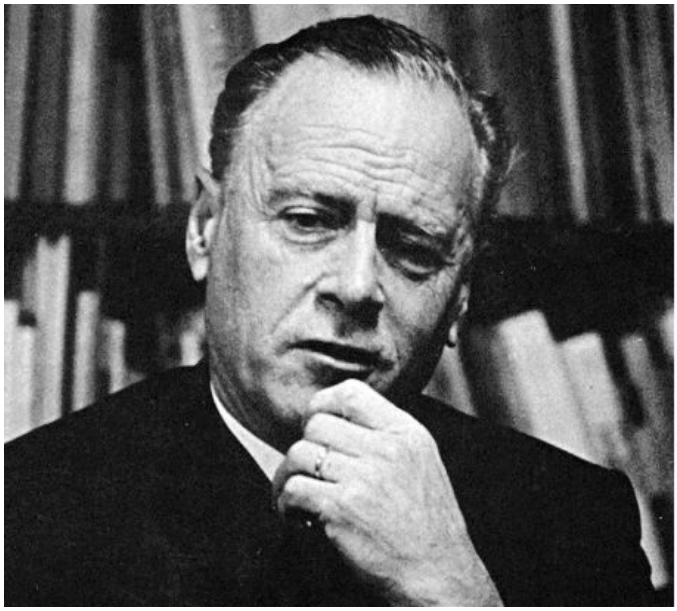
[4] http://en.wikipedia.org/wiki/Douglas_Engelbart (2010-11-19)
[5] http://en.wikipedia.org/wiki/Mouse_%28computing%29 (2010-11-19)

through intermediaries (see batch processing), and when software tended to be written for vertical applications in proprietary systems."[6]

Today he is supported by Logitech and he does research aimed at enhancing human-computer interaction.

4.4 Marshall McLuhan

Herbert Marshall McLuhan (1911-1980) was a Canadian philosopher, a scholar, a professor of English Literature, literary critic, rhetorician and communication theorist. McLuhan was a critic of mass communication, and his works build the basis for media theory. He is best known for coining the expressions "global village" and "the medium is the message".



Herbert Marshall McLuhan

In one of McLuhan's first works is *The Mechanical Bride: Folklore of Industrial Man* published in 1951, he focused on examining and explaining many examples of manipulation in actual popular culture. The book is composed of essays, each of them presenting some kind of advertisement, followed by an analysis of them. The essays dealt with the influence of communication media upon society, he reveals the implications and symbolism of the images and the phrases, thus calling attention to what the ads suggest about the targeted society.

[6] http://en.wikipedia.org/wiki/Douglas_Engelbart (2010-11-19)

The well-known phrase "the medium is the message" stems from his 1964 book, Understanding Media: The Extensions of Man, probably his most widely known book, in which he further examines and calls attention to the various effects of communications media. Here he suggests that media themselves should be studied, without the consideration of the carried content. He reasoned that the medium affects the given society by its own characteristics, not by the meaning and content that is delivered with it. He offered an explanation with a light bulb. A light bulb can be regarded as a medium that affects society, namely by creating light at night time, at places where otherwise it would be dark, although it does not have content. Therefore, McLuhan argues that it is the medium that is important, not the message or content it carries, and the effect of each type of media is different (radio engages the person's ears; a film engages the viewer's eyes). In his next book's title, he makes a reference to the famous catchphrase: The Medium is the Massage: An Inventory of Effects (1967). McLuhan consciously changed the term "message" to "massage", because he emphasizes the massaging effect of a medium on the human senses.

The Gutenberg Galaxy: The Making of Typographic Man was published in 1961. In this book, McLuhan describes the influence of mass media on culture and consciousness. He examines the shift from oral and aural to visual culture based on the emergence of writing and later printing and argues that it had a crucial effect on human cognition, on the way people think. However, since electronic media (television) is developing rapidly, it will again bring about a cultural shift from visual to aural/oral. The most important terms in his book are the Gutenberg Galaxy, the Gutenberg Man, the Movable Type and he introduces here the well known term, Global Village. The Gutenberg Galaxy is regarded as the collected amount of recorded works of human knowledge, mostly books. The Gutenberg Man is the product of the change of self-awareness caused by the invention of the printed book. Further on, he elaborates on the effects of the Movable Type. By definition, it is "the system of printing and

typography that uses movable components to reproduce the elements of a document".[7] McLuhan argues that the appearance of movable type resulted in faster, more intense cultural and cognitive changes. This invention led from the usage of all senses in communication and information gathering to the dominance of the visual sense, and the appearance of the printing press is the reason for the development of nationalism, the dominance of rationalism, the automation of scientific research, uniformity and standardisation of culture and for the alienation of individuals. In McLuhan's view, new technologies have an effect on cognition, which further affects social organization and interactions.

Global Village: According to McLuhan, the earth can be seen as a village, because it was shrunk by new electronic technology and by the rapid movement of information. The village metaphor is used due to the implications and characteristics of the word. The focus is on the two ideas that in a village every person knows each other, and that information spreads very fast. He argues that mass media and mass communication enables the application of a village-like way of thinking to the whole globe. "Instead of tending towards a vast Alexandrian library the world has become a computer, an electronic brain, exactly as an infantile piece of science fiction." (McLuhan, 32) He foresaw that electronic media would eventually replace visual culture with aural/oral culture, and he also prophesied today's web technology: "The next medium, whatever it is - it may be the extension of consciousness - will include television as its content, not as its environment, and will transform television into an art form. A computer as a research and communication instrument could enhance retrieval, obsolesce mass library organization, retrieve the individual's encyclopedic function and flip into a private line to speedily tailored data of a saleable kind"[8]. Although McLuhan was mainly concerned with the effects of the radio, nowadays "Global Village" is usually applied to define the Internet and World Wide Web. On the Internet, real-time communication is enabled without any restrains on physical distance; therefore the social

[7] http://en.wikipedia.org/wiki/Movable_type (2010-11-19)
[8] http://www.utoronto.ca/mcluhan/marshal.htm (2010-11-19)

spheres of people are immensely extended. Everyone may find online communities and talk to other people even from other countries, share interests, discuss and react to news rapidly, thus creating a kind of global community. The enhanced speed of information flow and this interconnectedness puts a pressure on people to get more involved with each other not depending on country, and calls attention to the fact that we have global responsibilities. Moreover, today's people can even link their websites together, which makes it possible to establish new sociological structures.

McLuhan was a forerunner of computers and society theory. He was among the first people who took an interest in examining the effects of twentieth century media inventions upon humans. He was also a fore thinker regarding electronic communication, since during his lifetime, there was no internet, and despite this fact, he predicted the emergence of the "global village", to which nowadays everyone, who uses the web, can belong.

5. Collaborations of Development

5.1 The eEurope Initiative

In 1999 the European Commission (the executive body of the European Union) accepted and started the *e*Europe initiative (a political initiative which is introduced so that the European Union benefits fully from the changes which the information society is bringing), a program by which information technologies should become as widespread as possible. This includes the creation of and transition to an electronic knowledge based economy, that could significantly improve any country's social and economic development, their competitiveness, and it would lead to the creation of more jobs, which would be accessible in an easier way to the potential employees via the internet. This, as a result, would mean a positive change in the quality of the people's life and environmental matters would also be dealt with more efficiently. It also encompasses the introduction of computational applications into the education system (eLearning).

The primary emphasis is put on the idea that the digital age should be introduced to every area of life, either business or home, into schools and administration; digital literacy should be achieved throughout all Europe. Further on the Commission proposed ten objectives to the Member States, to the industry and to the citizens of Europe:

"1. Bring European youth into the digital age: computer literacy must be turned into one of the basic skills of young Europeans. The Internet and multimedia resources must be introduced in schools and education must be adapted to the digital age.

- By the end of 2001 the Member States must ensure that all schools have access to the Internet and multimedia resources and by the end of 2003 that all pupils are computer literate by the time they leave school.

2. Cheaper Internet access: competition must be increased to reduce prices and boost consumer choice. Despite the liberalisation of the market for telecommunications infrastructure and services, the incumbent operators are still in a dominant position, particularly in the local loop. These obstacles (which are analysed in the 1999 communications review) must be overcome as soon as possible to give consumers more choice and competitive prices for high-speed Internet access.

- By the end of 2000 incumbent operators should offer unbundled local loops to allow all operators access to the market. Frequencies for multimedia wireless systems should also be allocated by the end of 2001.

3. Accelerate e-commerce: Europe needs to accelerate the growth of e-commerce, especially for SMEs. To this end, a reliable legal framework for the internal market must be established as soon as possible (notably the Directive on the legal aspects of e-commerce). Europe must also ensure that the public administrations facilitate use of electronic public procurement procedures.

4. Fast Internet access for researchers and students: as regards researchers and students, the objective at European level is to open up access to the Internet for all education and research communities. This will allow more effective cooperation and interactive research between different universities and laboratories in Europe, to the benefit of research and training.

- By the end of 2001 every Member State should have at least one university and one scientific research faculty with a campus network capable of supporting multimedia communications. This should be extended rapidly to all other universities.

5. Smart cards for secure electronic access: "Smart cards" means cards giving access to health services, electronic payment, mobile Internet, public transport, pay TV, etc. New infrastructure must be established across Europe so that such cards can be used everywhere. For this to happen, European suppliers, service providers and public administrations will have to work together closely to define common specifications in areas such as mobility, security, privacy and user control.

- Implementation of these common specifications should begin by the end of 2001 to ensure open access to basic payment services in various sectors.

6. Risk capital for high-tech SMEs: the European risk capital market is still underdeveloped, directly affecting the EU's performance in the new economy. The conditions should therefore be created to develop ideas for commercial applications and to finance them within the Union in order to make maximum risk capital available to high-tech SMEs.

- By the end of 2003 all the obstacles to the creation of a fully integrated pan-European risk capital market should be removed. The level of early-stage funding should have at least tripled.

7. e-participation for the disabled: the Commission intends to ensure that development of the information society takes full account of the needs of the disabled.

- By the end of 2001 the Commission and the Member States should commit themselves to making the design and content of all public websites accessible to persons with disabilities.

8. Online healthcare: use of intelligent networks and technologies for health monitoring, access to information and healthcare could genuinely improve the efficiency of health services for all citizens.

- By the end of 2003 all European citizens should have the possibility of having a health smart card providing secure, confidential access to networked patient information.

9. Intelligent transport: with digital technologies, it is possible to make transport safer and to enhance the quality of public transport.

- By the end of 2001 all citizens travelling in Europe should have access, wherever they are, to multilingual support, call localisation and emergency services by dialling 112. By the end of 2004 all major air routes should be serviced by airborne, ground-based or space-based infrastructure capable of contributing to reducing congestion while raising safety standards.

10. Online government: the Internet could give all citizens and undertakings easier access to the public sector. The public sector is therefore called on to give all citizens easier online access to administrative information, services and decision-making procedures.

- By the end of 2000 Member States and the Commission should ensure that citizens have two-way electronic access to basic interactions enabling them both to receive information and submit returns."[9]

Many of these goals were not achieved until the given date by most of the countries, but they all adjusted the direction of development to the appropriate route.

5.2 Information Society for All

In the next year (2000), a conference was held with the title 'The Information Society for All' in Nice, and it looked at how the Information Society affects Europe and how we can cope with the challenges it brings. Some essential questions have been raised: Building an information society for all is the ambition for Europe, but how far have we come at the dawn of the 21st century? Is the information society a real chance for everyone? Will it strengthen competitiveness in Europe? What technological challenges are at stake, and how should we change the rules to support this process in a sustainable way? The event brought together almost 2000 delegates from 80 different countries at the Nice Akropolis. The conference offered an assessment of the achievements made so far, and addressed the central challenges for the future.

Representatives from EU, from the French Government, and various people from different research areas and industries contributed to the program. The vision of an information society for all will only be achieved when all citizens, regardless of age, nationality and social standing share the opportunities offered by the rapid technological development. Everyone is supposed be able to benefit from the new opportunities for easy access to information on the Internet, and take part in the new economy.

[9] http://europa.eu/legislation_summaries/information_society/l24221_en.htm (28.02.2010)

Building an information society for all is of course a technological and economic challenge, but it is also a human challenge. Knowledge is as important as technology, and it is therefore vital to invest in human resources in primary, secondary and tertiary education, as well as in lifelong learning. It is also important to ensure a global approach.

The importance of ensuring access to Internet resources and participation in the new economy for all citizens was further emphasised in the session about 'An Inclusive Information Society'. "Strategies for enabling teachers and students to take advantage of the opportunities offered by the new technology and new pedagogical challenges related to e-learning were discussed in the three sessions devoted to education and e-learning."[10] The goal was that all European schools should have Internet access by 2001, and that all students should have been digitally competent by 2003. Knowledge is the key to evolution, and it is essential to provide future generations, not depending on social, geographic and economic position, with the appropriate knowledge to be able work and live in the upcoming technological age. Therefore, new learning methods, such as lifelong learning become more-and-more of importance in a rapidly changing environment, and it is necessary to ensure equal possibilities for everyone. Development should take place where the user is in the foreground, and technology in the background, and where individually set products would replace collective solutions.

A global approach was also recommended for the research policy for the future. The speakers stressed that it is important to ensure a better co-ordination between national and central research policies. Researchers do not care about nationality and borders, and the EU should not impose unnatural limitations on the research communities.

"During the conference, the following sections have been classified:

[10] http://www.cultivate-int.org/issue3/nice/ (2010-11-19)

5.2.1 eEconomy for All

eWork looks at new ways of interacting in the workplace as well as away from it. eSecurity explores security and privacy solutions. eBusiness looks at business-to-business and business-to-consumer issues within the expanding digital economy.

5.2.2 Technology for All

Beyond the Small explores cutting edge micro, nano and photonetic research. Essential Broadband and Mobile Infrastructure projects show the applications and services that enhance our quality of life and mobility. The Control and transport zone depicts a wide range of industrially oriented activities within the robotic, automotive and aerospace sectors.

5.2.3 Vision for All

Visualisation and interaction in three or more dimensions is a challenging field with popular appeal. View the latest trends in Entertainment fuelled by the emergence of digital Content across multiple-media-platforms.

5.2.4 Open Access for All

eHealth illustrates examples of how we can all benefit from improved methods and integrated approaches to healthcare. eAccess explores and expands the horizons of uniform accessibility for all members of society regardless of (dis)ability or age. eAdmin illustrates open access to public and other administrations within the society. The eLearning zone is an introduction to novel approaches to learning and training."[11]

[11] http://www.cultivate-int.org/issue3/nice/ (2010-11-19)

5.3 The Lisbon Agenda

As mentioned above, apart from economic and technical development, one of the most essential objectives is the improvement of the education systems throughout the European Union. This issue was also discussed and emphasised in the Lisbon Agenda – an action and development plan for the European Union between 2000 and 2010. According to the idea, 'learning economy' or more frequently termed as 'knowledge economy' should be introduced, which refers to a knowledge-based economy, in which knowledge is regarded as a productive asset or a business product, and can be defined as follows: 'The concept that supports creation of knowledge by organizational employees and helps and encourages them to transfer and better utilize their knowledge that is in line with company/organization goals'.[12] The Lisbon Strategy did not achieve most of its goals, but it still initiated a route for development in the educational perspective, resulting in a 10-year work programme, Education and Training 2010, approved by the European Council. Member States have agreed on three major goals to be achieved by 2010 for the benefit of citizens and the EU as a whole: to improve the quality and effectiveness of EU education and training systems; to ensure that they are accessible to all; and to open up European education and training to the wider world. Actions to achieve these goals are based around specific objectives covering the various types and levels of education and training (formal, non-formal and informal) and aimed at making a reality of lifelong learning (discussed later). Systems have to improve on all fronts: teacher training; basic skills; integration of ICTs; efficiency of investments; language learning; lifelong guidance; flexibility of the systems to make learning accessible to all; mobility; citizenship education, etc.

[12] http://en.wikipedia.org/wiki/Knowledge_economy (2010-11-19)

5.4 Informatics Europe

The idea of a collective association of European university's computer science departments and public or private research laboratories arose first in October 2005 at the European Computer Science Summits (ECSS) in Zurich. It was further discussed in next year's summit, and as a result the Informatics Europe organization was established in 2006. The members are PhD-granting universities and research institutes from Europe and the surrounding area, including also other professional industrial organizations such as Google, Intel Corporation and Microsoft Research. Informatics Europe tries to facilitate the advance of computer science research and the development of teaching informatics.

The organization formulates several main objectives as their goals:

- To act as the representative of the European Computer Science (Informatics) research and education community.
- To foster high-quality research in the field.
- To keep improving the quality of computer science teaching.
- To help the public understand the contribution of computer science to economic development and the scientific challenges of the discipline.
- To foster the cooperation between education, research and industry.
- To establish effective relations between the computer science community and governmental authorities.
- To provide links to other national and international organizations with complementary aims.[13]

Informatics Europe has started several projects which should be able to fulfil these goals. One of them is The Computer Science Event List, where all relevant conferences and special

[13] http://www.informatics-europe.org/about.php (2010-11-19)

events related to computer science and information technology are listed. Any registered user of the page can submit an event from all over the world. The listed conferences are ordered by date, and past events are also indicated. By clicking on the names, the reader can access further information regarding the event. This is a helpful site where researchers can browse and find conferences relevant for their interest. The association has a documents page where the gathered data from previous working groups and summits can be found.

The Research and Education initiative is another project, which aims to create a portal that would include a large database of European university departments and institutions engaged in Informatics Research and Education. This initiative is under construction, though, when successful, this would enable a faster and more effective access to the databases of these departments, because of the links that provided detailed descriptions on the institutions. Hereby, the readers would be provided the sufficient amount of information in order for them to be able to decide, whether they should search on that particular department's website for further sources or not. Moreover, this portal could become a gateway to an even larger database, which is yet to be created in the future, but would then contain statistical data concerning research and education in Europe. Now the project is in the first phase of data collection, trying to gather enough information about the institutions.

Informatics Europe also plans a "Department Evaluation" project, although the initiation has not been launched yet. The main idea of the project is that Informatics Europe would act as an evaluation agency evaluating research quality of informatics, IT and computer science departments and institutions. This rating will be based on research results, it will focus on management issues and research policy, facilities, Ph.D.- training, since all contribute to and are part of an institute's work. The resulting analysis is supposed to include the necessary improvements, everything that has to be changed so that the institution in question can make progress, as well as the strengths and possibilities of the evaluated institution, what it is

particularly good at and where further possibilities of development are to be found. This project is probably the most important contribution of Informatics Europe to enhance the development of Europe's technology.

6. An Educational Perspective

6.1 Innovation in Education, new Learning Methods

"Education is a primary concern in all European countries. It has a particular importance in boosting EU growth: the emerging knowledge-based economy success – both for individuals and for Europe as a whole - depends mainly on realizing human potential. Making this happen requires a very thorough change in education and training all over Europe. This process of shift is being carried out in each country based on national standards and traditions and is being driven forward by co-operation between Member States. By 2007, almost 16% of young people in the EU still left school early, often without any qualifications. Only about 77% of 18-24 year-olds completed upper secondary education – still far below the EU's target of 85% – and only 10% of adults aged 25-64 took part in lifelong learning. The role of traditional educational institutions – schools, colleges and universities – in educating younger generations has never been more important than it is now."[14]

Learning today is no longer restricted to educational institutions, companies or training centres. A variety of technologies and tools offer learners greater flexibility, easier access to information and the opportunity to match learning to their specific needs, circumstances and learning profile. The home is increasingly important as a learning environment. So too are other contexts, from community centres to care homes. The boundaries of learning are changing all the time. Technological developments, such as the

[14] http://www.google.hu/url?sa=t&source=web&cd=1&ved=0CBYQFjAA&url=http%3A%2F%2Fec.europa.eu%2Finformation_society%2Fnewsroom%2Fcf%2Fdocument.cfm%3Faction%3Ddisplay%26doc_id%3D210&ei=5NvlTJKEPcvxsgaawoiKCw&usg=AFQjCNHPXlLGoLSODuSBH11v6gWxeHcxsQ&sig2=E2B3e_UyCtmb7jzUCHxAxA (2010-11-19)

internet, mobile communications and virtual environments, create possibilities to support learning in new ways. In addition, our definitions of learning are changing, as we gain new experiences and insights into how people learn and what they need to learn to adapt to changing economic and social conditions. Later on we will focus on discussing the latest ideas, tools, initiatives and strategies managed by the European Commission in the last ten years.

6.1.1 ICT

Information and Communication Technology allows users to participate in a rapidly changing world in which work and other activities are increasingly transformed by the access to varying and developing technologies. From an educational point of view, these tools deal with the use of Information and Communication Technologies (ICTs) within educational technology. It is used generally to familiarize students with the use of and working with computers. ICT has also enabled learning through multiple intelligence as ICT has introduced learning through simulation games; this enables active learning with the help and enhancement of all senses. Information and communication technologies have the potential to significantly advance the progress towards the overall goals of the previously mentioned conferences. New open and flexible forms of ICT-supported learning (eLearning) are being used more often and are opening the way to new forms of education and training for the knowledge society. Consequently, ICT is a cross-cutting theme in the new Lifelong Learning programme, which aims to promote greater mobility and stronger links among education and training institutions. The crucial role of ICTs in building Europe's social and human capital is reflected in the strong emphasis given to technology in educational action programs. Computer-enhanced tools and methods of education have the potential to raise the performance and extend the availability of Europe's educational systems. Open and flexible forms of technology-enhanced learning play a great role and add to the quality of educational

and training systems. ICTs make teaching and training processes more adjusted to the needs of the learner, help to enhance and support new methods in pedagogy, and make learning more motivating. They also support organisational changes within education and training institutions, which will help to improve educational quality, and to extend access to learning beyond traditional educational settings. The eLearning Program for example supports actions that foster new approaches to education and training and the development of quality multimedia content and services. The opportunities brought by ICT also feature prominently in the EU's policy on lifelong learning.

6.1.2 Lifelong Learning

'Adult learning: It is never too late to learn' is the slogan of Lifelong Learning. Also known as LLL, by definition it is the 'lifelong, life wide, voluntary, and self-motivated pursuit of knowledge for either personal or professional reasons. As such, it not only enhances social inclusion, active citizenship and personal development, but also competitiveness and employability. The term recognises that learning is not confined to childhood or the classroom, but takes place throughout our whole life and in a range of situations. During the last fifty years, constant scientific and technological innovation and change has had a profound effect on learning needs and styles. Learning can no longer be divided into a place and time to acquire knowledge (school) and a place and time to apply the knowledge acquired (the workplace).'[15] On the contrary, learning can be regarded as a process that takes place constantly and is influenced by our own activities and our interactions with other people. Some essential environments are acceptable for lifelong learning: "home schooling where this involves learning to learn or the development of informal learning patterns, adult education or the acquisition of formal qualifications or work and leisure skills later in life, continuing education which often describes extension or not-

[15] http://en.wikipedia.org/wiki/Lifelong_learning (2010-11-19)

for-credit courses offered by higher education institutions knowledge work which includes professional development and on-the-job training, personal learning environments or self-directed learning using a range of sources and tools including online applications."[16] Building on the achievements of earlier education and training programmes such as Socrates, the Commission is launching a new Integrated Lifelong Learning programme for the period 2007-2013. There are four sub-programmes focusing on different stages of education and training and continuing previous programmes: Comenius for elementary and secondary schools, Erasmus is aimed for higher education, Leonardo da Vinci for vocational education and training and Grundtvig for adult education.

6.1.3 eLearning

The term is difficult to define precisely, and within its diverse disciplines it has a variety of meanings to various people. "For example at companies it often refers to the strategies that use the company network to deliver training courses to employees and lately in most Universities, e-learning is used to define a specific mode to attend a course or program of study where the students rarely or never meet face-to-face, nor access on-campus educational facilities, because they study online."[17] In the latter understanding, this project can be divided into four objectives: to equip schools with modern computers, to prepare teachers so that they will be able deal with new technologies, to create an extensive amount of useful educational services and software, and to enhance the speed of school networks. eLearning aims to develop new forms of learning within and beyond the education and training systems. eLearning is developing from the initial application of ICT (e.g. as a research tool and substitution for printed text), to new possibilities – which focus on innovative and mutual work – and new skill demands in order to be prepared for the knowledge society. "This, in turn, requires a significant change of emphasis, away from a

[16] http://www.unesco.org/uploads/media/confinteavi_ws1-3_world-of-work_en.pdf (2010-11-19)
[17] http://www.iathink.com/E-Learning.html (2010-11-19)

focus on technology, connectivity and the internet, towards a greater consideration of the context of learning, and of the need for collaboration, communication and innovation. Despite the considerable efforts undertaken, the eLearning sector is still fragmented and there are many open questions on how to exploit the potential of ICT in education and training. A broad partnership between the various stakeholders of industry, education and training, public sector and civil society is needed for Europe to gain the full benefits of ICT and learning in the knowledge society. "[18]

Different types or forms of e-learning can be built up by a scale resulting in a kind of continuum, where no e-learning, i.e. the avoidance of the usage of computers for educational purposes is one end, and through particular aids, like sharing lecture PowerPoint slides with students, and through a collaborative web site or some kind of educational management system, towards programs, where students are required to use computers as part of an ordinary class, to hybrid learning, which requires less time in class but more time is required to be spent on online learning, and the other end is complete online learning, an actual form of distance education.

As suggested above, there are many types of applications that E-learning can describe. 'There are three basic types which are associated with e-learning.

Computer-based Learning

It is sometimes abbreviated to CBL, and refers to the use of computers as a key component of the educational environment. While this can mean the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes. The concept is generally seen as being different from the use of

[18] http://ec.europa.eu/information_society/tl/edutra/index_en.htm (2010-11-19)

computers in ways where learning is at least a peripheral element of the experience (e.g. computer games and web browsing)…

Computer-based Training

…CBTs are self-paced learning activities accessible via a computer or handheld device. CBTs typically present content in a linear fashion, much like reading an online book or manual. For this reason they are often used to teach static processes, such as using software or completing mathematical equations. The term Computer-Based Training is often used interchangeably with Web-based training (WBT) with the primary difference being the delivery method. Where CBTs are typically delivered via CD-ROM, WBTs are delivered via the Internet using a web browser. Assessing learning in a CBT usually comes in the form of multiple choice questions, or other assessments that can be easily scored by a computer such as drag-and-drop, radial button, simulation or other interactive devices. Assessments are easily scored and recorded via online software, providing immediate end-user feedback and completion status. Users are often able to print completion records in the form of certificates.

CBTs provide learning stimulus beyond traditional learning methodology from textbook, manual, or classroom-based instruction. For example, CBTs offer user-friendly solutions for satisfying continuing education requirements. Instead of limiting students to attending courses or reading printing manuals, students are able to acquire knowledge and skills through methods that are much more conducive to individual learning preferences. For example, CBTs offer visual learning benefits through animation or video, not typically offered by any other means.

CBTs can be a good alternative to printed learning materials since rich media, including videos or animations, can easily be embedded to enhance the learning. Another

advantage to CBTs are that they can be easily distributed to a wide audience at a relatively low cost once the initial development is completed.

However, CBTs pose some learning challenges as well. Typically the creation of effective CBTs requires enormous resources. The software for developing CBTs (such as Flash or Adobe Director) is often more complex than a subject matter expert or teacher is able to use. In addition, the lack of human interaction can limit both the type of content that can be presented as well as the type of assessment that can be performed. Many learning organizations are beginning to use smaller CBT/WBT activities as part of a broader online learning program which may include online discussion or other interactive elements….

Computer-supported Collaborative Learning (CSCL)

…CSCL is one of the most promising innovations to improve teaching and learning with the help of modern information and communication technology. We have to distinguish collaborative learning from the traditional 'direct transfer' model in which the instructor is assumed to be the distributor of knowledge and skills, even though this direct transfer method most accurately reflects Computer-Based Learning systems (CBL). A good example of the many 21st century technological devices in the classroom is the so called ’Smart Board’, which is a specific computer-supported collaboration space, a 72-inch, rear projection, touchscreen, intelligent whiteboard surface for work. The Smart Board system offers an information space that allows his students to engage in active collaboration. Functionally it allows users to work with large amounts of information, it offers an information space that invites active collaboration, and the work produced is often “dynamic and contingent”. ’[19]

[19] http://en.wikipedia.org/wiki/E-learning (2010-11-19)

6.1.4 Technology-enhanced Learning (TEL)

The aim of TEL is to provide socio-technical innovations for e-learning, regarding individuals and organizations, not considering time and location. The area that TEL is dealing with therefore applies to the support of any kind of educational activity with the help of technology. It features a research initiative, and its goal is to improve our knowledge of how education can be supported by information and communication technologies. The focus is on intelligent solutions tailored to individual learners, motivating and supporting people who learn on their own or collaboratively with others. In general it deals with the technological support of any pedagogical approach that utilizes technology.

6.1.5 Other eInitiatives

Apart from e-learning, the European Commission has started several other (e-) initiatives in support of educational development.

eInclusion – In other words electronic- or digital inclusion is one of the pillars of the i2010 initiative on the Information Society. It is an initiative, which tries to transmit the benefit of the Internet and modern technology to all parts of the population, including people who have a disadvantage for some reason (education, age, gender, disabilities, ethnicity, and/or those who are subject to geographical conditions (living in remote regions)). eInclusion covers mainly the development of appropriate policies, maintenance of a knowledge base, research & technology development and deployment, & best practices dissemination.

eSkills (electronic skills) – The primary goals of the program are to improve the digital literacy of 1 million people in five years, and to set 20 to 25 thousand companies on a developing route.

eTEN – It is concerned with the large-scale roll-out of public interest services, primarily based on the i2010 initiative. In this context, eTEN projects address eLearning as a

main action line. Activities support the efforts of the Member States to accelerate the adaptation of education and training systems for all in the EU and the development of virtual campuses.

eContentplus – It supports the production, use and distribution of European digital content and promotes linguistic and cultural diversity on global networks.

CELEBRATE – It is an abbreviation for Context eLearning with Broadband Technologies. A project of IST (Information Society Technologies), CELBRATE created an internet portal of "learning objects", that is, small, digital lesson units that can be reused and combined to build tailor-made courses for lessons. Over its lifetime, the project built a critical mass of over 350 learning objects, mainly in the fields of maths, science, languages and art. It was supposed to outline the pedagogy for collaborative learning involving the creation and use of these interoperable learning objects in a new generation of integrated managed learning environments, which was made available via a Demonstration Portal to a select set of schools across Europe.

CALIBRATE – It is a multi-level project designed to support the collaborative use and exchange of learning resources in schools. It develops and helps ensure the take-up of an open source technical architecture and an open source learning toolbox that supports the collaborative use of learning resources. CALIBRATE can validate results in up to 100 schools using an advanced methodology. By linking with a number of other European Schoolnet projects and initiatives, it will build a wider framework and foundations for policies and for the implementation of a new European Learning Resource Exchange.

iCamp - has the vision to become the educational web for higher education in the enlarged Europe. It will provide an infrastructure, the 'iCamp Space', for collaboration, content sharing and social networking across systems, countries and disciplines.

Interoperability amongst different open source learning systems and tools is the key to sustainability of iCamp.

6.2 Goals and Achievements in Education

eLearning, eInclusion, Lifelong learning, etc., can provide benefits for all participating organizations and individuals. Statistics show that they achieve a better performance: A 12-year meta-analysis of research by the U.S. Department of Education found that higher education students in online learning generally performed better than those in face-to-face courses. They have increased access: Instructors of the highest calibre can share their knowledge across borders, allowing students to attend courses across physical, political, and economic boundaries. Recognized experts have the opportunity of making information available internationally, to anyone interested at minimum costs. For example, the MIT OpenCourseWare program has made substantial portions of that university's curriculum and lectures available for free online. E-learning is convenient and flexible to learners: in many contexts, eLearning is self-paced and the learning sessions are constantly available. Learners are not bound to a specific day/time to physically attend classes. They can also pause learning sessions at their convenience. The High technology is not necessary for all online courses. Basic internet access, audio, and video capabilities are common requirements. Depending on the technology used, students can begin their courses while at work and finish them at home on a different computer. To develop the skills and competencies needed in the 21st century, in particular to ensure that learners have the digital literacy skills required in their discipline, profession or career scientists (Bates 2009) state that a major argument for e-learning is that it enables learners to develop essential skills for knowledge-based workers by embedding the use of information and communications

technologies within the curriculum. Using e-learning in this way has major implications for course design and the assessment of learners. [20]

There are some additional advantages of computer-based training over traditional classroom training: thereby learners have to pay less per credit hour, they can reduce overall training time, or spread training out over extended periods of time (even months), they can bookmark and save their progress (computers can remember where the student left off so they can resume the courses from that point), the setting is more comfortable, since learners can remain at one location (e.g., home, office, school, airport, coffee shop, etc.) with no need to travel and they receive quality training that bolsters job performance.

The goal of lifelong learning implies a culture where people regard knowledge and skills acquisition as a continuous part of everyday life. Learning cannot, therefore, be confined to traditional settings, such as school or university, and then left behind as a finished and acquired asset. It must be maintained, refreshed and extended. Learning needs to coexist harmoniously alongside normal life, and must be accessible whatever a person's inherent intellectual capability, family situation, health, culture, gender, language or geographical context. Education has to break down the barriers of distance. ICT has an indispensable role to play in the process. It can bring educational materials to people. It can bring people together in real and virtual communities. It can help them find what is available, and to match aspirations to resources. And ICT can provide measurement and assessment services, defeating some of the cross-cultural and interpersonal biases that creep into traditional systems of reward and assessment. Since 2000, the European Union has stepped up its activities to improve learning and to develop skills in the context of the knowledge society. The eLearning Initiative and Action Plan – linked to the eEurope Action Plan – have put eLearning and eSkills high on the political agenda. Nevertheless, integrating ICT as a natural

[20] http://www.unccd.ch/electronic-learning (2010-11-19)

part of teaching and learning at all levels in educational and training systems remains a major challenge for Europe.

I think that there is still a gap between the possibilities that science and technology can offer and what the average man can cope with. Europe's teaching society still has to catch up with the rapid technological evolutions of today. The European Commission has introduced many initiatives that were aimed to reduce this gap, some of these failed, some were more successful, but the general notion has started a process of development that changed the attitude of the people in a positive way, which will surely have its influence on future generations.

7. Effects of Computers on Society

The fact that the appearance of computers and the development of new technology do have an effect on society is quite obvious. Every person surrounded by the electronic device is aware of its influence, and since computers are now essential parts of people's life, several questions arise: Why is the computer different from any other previous invention? How can we benefit from their usage? What are its disadvantages or even dangers?

7.1 Positive Changes

Computers are tools in people's hands. We have various kinds of tools, which made our lives easier, candles and later light bulbs make it possible for people to see when otherwise it would be dark, special levers enhance the strength and allow us to lift and move heavy objects, but most of these tools usually affect one of the senses and they are physical by nature, extensions of our physical abilities. Computers, however, were first designed to carry out calculations, which were too slow or difficult for humans to execute. In this perspective computers can be considered to be extensions of our brain, a much more complex system, therefore its application and influence on everyday life is accordingly greater. The

opportunities of information technology are not yet exploited, and day-by-day new applications, programs and underlying hardware are developed. Together with the initial calculating feature, computers can now be used for almost every imaginable activity.

The possibilities of educational usage have already been discussed, but every working place ranging from multinational companies to educational institutions is equipped with computers as well, at some places with specialised hardware or software. They are used for various tasks and activities, to store and retrieve files and data, to communicate, and they generally improve the speed and overall efficiency. The application of computers at companies, industries, and educational institutions also generated new departments, professions, even completely new industries and therefore a large amount of workplaces for many people. The search for jobs is also simplified by the internet. Most people today browse online job advertisements to find the appropriate offer.

New communicational opportunities are available today, people can socialize, chat, write short messages and interact with each other with the help of a variety of applications, or they can write longer e-mails, blogs, share information and send files (documents, pictures, music) or programs, engage themselves in online forums or any kind of social media. Since the appearance of GUIs computers are a means of entertainment. There is a great industry dealing with the development of engaging games for users, but there are also other forms of entertainments, computers replace televisions in the aspect that people can watch films and listen to music or they can read articles and news on the internet. Looking for information is faster and easier when using search engines, like Google or Yahoo for example, and with online dictionaries and encyclopaedias we can access basic, relevant information on various terms and issues. People can bank online, ask for appointments at several governmental institutions or at hospitals, do shopping online and order products from the farthest places of the earth, all without moving out of the house. Basically very few activities remain that

cannot be carried out with the help of computers, and today people can live their lives sitting in front of the screen. There are even special programs which make it possible for the user to live a second life in a virtual world with a chosen, preferred identity.

7.2 Problematic Issues

Due to the immense amount of possibilities that it carries within itself most people and computer scientists have a positive view of technical development. However, not all of these applications are free of errors, and they can also be tools of manipulation and therefore attract dangers. It seems appealing to have an enormous amount of data available when we are looking for something specific, but sometimes it is exactly this large amount, and the lack of possibilities by which the settings of most search engine can be modified, which makes it difficult to distinguish between relevant links and those that we are not interested in. Furthermore, since there are many websites that are not under any kind of editorial control or supervision, and the realization of McLuhan's "global village" actually suggests by definition that anyone can put anything on the web, there is a chance that some of the information we find is erroneous, incomplete or even manipulative. In the case of Wikipedia, there is a kind of editorial control. Although the project is built up by the cooperation of everyone who wishes to contribute to Wikipedia, thus providing the "Wisdom of crowds" to the site, several authorised expert users oversee every newly submitted or edited article, and several topics and articles can only be modified by them. Updates and corrections are carried out rapidly, and a large range of topics is covered, but this democracy holds also problems. Every user can choose the theme which he wants to write about or edit, and thus many areas are poorly covered and incomplete, whereas too much emphasis is put on pop culture. Probably the most problematic issue (especially because it concerns an encyclopaedia) is the lack of neutral perspective, particularly in the case of political articles.

7.3 Ethical and Practical Considerations – Neo-Luddism

Not everyone sees technology positively. A philosophy called neo-luddism protests against modern technology. Although the ideas of the theory may be too radical, neo-luddism reasons with issues some of which are definitely worth thinking about. They argue that although computers and automation are said to make our lives easier people do not always use computers out of need, but mostly because they are there. These products are rather expected to be used. In most of the cases it is exactly people's own social environment that puts pressure on a person to attain technological products. Today, almost everybody has mobile phones for example, and those few people, who do not, are mocked by their acquaintances to get one. Researchers at industrial companies constantly try to develop new applications and products, that may not have been invented yet, and people could easily live their lives without them, but once something new has been invented and put out on the market, they will realize their need for the product, and they will buy it eventually. From this perspective, technology does not satisfy existing needs, it creates them. Computers are consumer products, which support big market and business. As mentioned above, there are very few activities, which cannot be carried out via computers. They enable us to live, work or socialize online without any physical contact to the outside world. Their constant usage empowers social isolation and this weakens social thinking and communities, leading to the dominance of the government, capitalism and large corporations, and altogether people will be alienated from nature and industrialism will eventually destroy the environment. Moreover, society tends to become more and more dependent upon technology, which makes it an influential tool for manipulation in the hands of whoever controls the route of its development. The decision makers are usually research-funding agencies, which are controlled by the government or greater companies with sufficient funds for a research and development department, whose perspective is driven by the market. Neo-luddists therefore think that there is not much role for everyday people. Of course there is a point in the notion,

but when looking at the other side, it is actually the everyday person in most countries who chooses the representatives of his government, and it is therefore also his responsibility, and the market-driven policy of companies makes future technologies dependent upon the needs of people and their willingness to buy the offered products.

8. Convergence of Technologies

By the end of the twentieth century the development of sciences did not only accelerate significantly, but became constantly more interlocked with each other, and from the interdisciplinary sciences new, separate disciplines evolved. This phenomenon is evaluated as the *Convergence of Technologies*.

An example for the convergence of such technologies is the interconnection of telecommunication technologies, telecommunication media and information technology. According to a seemingly realistic vision, in a usual family apartment or house soon there will be one technological device capable of carrying out video calls.

9. Conclusion

As a matter of fact, the history of the development of information technology is actually the history of the humanisation of computers. This can be either viewed as an extensive process or an intensive process. In an extensive view, at the early stages of computer development, the use of computers was a privilege to the prominent few people, who worked as a staff at computer science centres. By now, this has changed. Today, even in the homes of average families more than one computer can be found, the available information technological capacity grew hyper exponentially.

Intensive process view: the platform of the human-computer interaction constantly developed from the machine-close level to the human-close level. From the initial machine-code throughout the assembly programming, the auto-code, the high-level algorithmic

programming languages and various programming paradigms, today it is possible and available to use communicational channels that are natural for humans, namely picture and sound. A variety of pattern-recognizing and artificial intelligence applications play an emerging role in our present life.

Since nowadays together with the development of computational networks, computers have become an important tool for the communication between people; therefore it plays an important role in the forming of 21st century society. The reason for this theory has even got biological roots. Society evolves among a group of living beings only if there is some mutual form of communication present between them. Many kinds of examples could be taken from the animal world, like the community of bees, how they share information on the whereabouts of food by dancing, or the hierarchical system of a pack of wolves. Given the fact that computers have become tools of communication, the current stage of the development process could be characterized briefly as the development level of the *socialisation of computers*. This is the evolutional process of the so called *Information Society*.

Selected Bibliography

Altman, Christopher. 2002 “Converging Technologies: The Future of the Global Information Society”. http://altman.casimirinstitute.net/convergence.pdf 2010-11-19

Brooks, Chris. “Computers and Society: Evaluating the Impact of Technology”. http://www2.cs.usfca.edu/~brooks/S08classes/cs480/slides/evaluating.pdf 2010-11-19

Hassan, Robert. 2008. *The Information Society*. Cambridge: Polity Press

Hermann, Ákos. 2000. “Dokumentumellátás Magyarország információs társadalmában”. In: Demetrovics-Keviczky (eds.) *Az információs társadalom*. Budapest: Magyar Tudományos Akadémia.

Messerschmitt, David G. 1996. “Convergence of Telecommunications with Computing”. http://www.eecs.berkeley.edu/~messer/PAPERS/96/TechSoc1/ 2010-11-19

Salvaggio, Jerry L. *The Information Society: Economic, Social, and Structural Issues*. New Jersey: Lawrence Erlbaum Associates, Inc.

Schelhowe, Heidi. 1997. *Das Medium aus der Maschine: zur Metamorphose des Computers*. Frankfurt: Campus Verlag.

Thabet, Wessam. *Lifelong Learning in a changing world of Work*. Webster, Frank. 1995. *Theories of the Information Society*. Oxon: Rutledge.

http://ec.europa.eu/education/lifelong-learning-programme/doc78_en.htm 2010-11-19

http://ec.europa.eu/information_society/newsroom/cf/itemlongdetail.cfm?item_id=3293 2010-11-19

http://ec.europa.eu/information_society/tl/edutra/index_en.htm 2010-11-19

http://ec.europa.eu/information_society/tl/edutra/inno/index_en.htm 2010-11-19

http://en.wikipedia.org/wiki/As_We_May_Think 2010-11-19

http://en.wikipedia.org/wiki/Douglas_Engelbart 2010-11-19

http://en.wikipedia.org/wiki/E-learning 2010-11-19

http://en.wikipedia.org/wiki/Knowledge_economy 2010-11-19

http://en.wikipedia.org/wiki/Information_and_communication_technologies 2010-11-19

http://en.wikipedia.org/wiki/Lifelong_learning 2010-11-19

http://en.wikipedia.org/wiki/Lisbon_Strategy 2010-11-19

http://en.wikipedia.org/wiki/Marshall_McLuhan 2010-11-19

http://en.wikipedia.org/wiki/Neo-Luddism 2010-11-19

http://en.wikipedia.org/wiki/Technological_convergence 2010-11-19

http://en.wikipedia.org/wiki/Tim_Berners-Lee 2010-11-19

http://en.wikipedia.org/wiki/Vannevar_Bush 2010-11-19

http://europa.eu/legislation_summaries/information_society/l24221_en.htm 2010-11-19

http://www.cultivate-int.org/issue3/nice/index.html 2010-11-19

http://www.google.hu/url?sa=t&source=web&cd=1&ved=0CBYQFjAA&url=http%3A%2F%2Fec.europa.eu%2Finformation_society%2Fnewsroom%2Fcf%2Fdocument.cfm%3Faction%3Ddisplay%26doc_id%3D210&ei=5NvlTJKEPcvxsgaawoiKCw&usg=AFQjCNHPXlLGoLSODuSBH11v6gWxeHcxsQ&sig2=E2B3e_UyCtmb7jzUCHxAxA 2010-11-19

http://www.iathink.com/E-Learning.html 2010-11-19

http://www.iisd.org/security/tas/research_ko.asp 2010-11-19

http://www.informatics-europe.org/about.php 2010-11-19

http://www.unccd.ch/electronic-learning 2010-11-19

http://www.unesco.org/uploads/media/confinteavi_ws1-3_world-of-work_en.pdf 2010-11-19

http://www.utoronto.ca/mcluhan/marshal.htm 2010-11-19

Acknowledgements

I would like to express my thankfulness and respect towards the people, who helped me and contributed to writing this thesis.

I am particularly thankful for the professional help of my supervisor, Dr. Papp Zoltán, who was very open-minded and committed to provide me with many ideas and new perspectives during my research.

I would also like to express my gratitude towards my kind and supportive family. Throughout my study years they always surrounded me with their love and appreciation, and during the last months, while I was writing my thesis, they were patient and tried to create an appropriate, calm environment where I could work under optimal conditions.