

Learning and Teaching in the Information Society. eLearning 2.0 and Connectivism

Author: István Bessenyei

Sopron, March 2007

Table of contents

<u>The crisis of education - finding a way out.....</u>	<u>3</u>
<u>Network learning on web 2.0. - Connectivism.....</u>	<u>5</u>
<u>1. Connectivism.....</u>	<u>8</u>
<u>2. Network learning – the utopia of restored unity?.....</u>	<u>9</u>
<u>Summary.....</u>	<u>10</u>
<u>Review questions.....</u>	<u>11</u>
<u>Bibliography.....</u>	<u>12</u>
<u>Glossary.....</u>	<u>15</u>

The crisis of education - finding a way out

1. From pedagogical reform to web 1.0

In pre-modern societies, children grew up in a world whose norms and behaviour system was inherited from their elders. Parents got the children involved in their everyday work, into the life of the family and the community, and all the ceremonies. Socialization, work, living conditions and relationships – **informal learning** according to present day terminology - were uniform within the framework of family, relatives, village and church.

In modern industrial societies, specialized institutions took over the tasks of teaching and educating. The school system became multifunctional and performed a range of duties, such as childminding and nurturing, ensuring equal opportunities and mobility, transmitting knowledge, providing a moral upbringing, a general education and satisfying the demands of the labour market. After a while, with the general introduction of compulsory education and the accessibility of higher education, carrying out the mass of heterogeneous tasks became impossible, and the contradictions that ensued led to a growing number of critical phenomena¹.

There were several answers to the crisis. Pedagogical reformers tried *to model, in a school form, the organic unity of the pre-modern world*, and its most famous representatives chose *child-centeredness, activity centeredness and independence* as their slogans. These experiments all aimed to create islands within which the distances arising from the modern alienated world could be eliminated.²

Radical critics of the school system imagined its renewal taking place *outside the institution of school*. In his book on the worldwide crisis of education Philip H. Coombs (Coombs 1971), dreamed of revealing its ills with the help of scientifically based systems analysis, and of solving the crisis with comprehensive, institutional reforms initiated from the top. The ideologists of de-schooling, on the contrary, question the very right of schools to exist. They regard school as a bureaucratic, factory-like institution, an education “kolhoz”, the scene of social taming. Their most famous representative, Ivan Illich, outlines the re-socialization of teaching and education, where individuals bypass the formal school system by learning in a self-organising way, from life, contemporary groups and from their elders with the help of critical reflection (Illich 1971). A system of informal and accidental activities and the exchange of abilities take the place of bureaucratic, industrialized teaching, organised from the top. This model defines public education as a service centre and suggests that a “free choice of partner” in education can be realized with the help of a great communication network.³

¹ Just think of the radical student movements of the 1960's.

² The starting point for Freinet was the unity of activity and cognition and the necessity of democratic education. His pedagogy was child-centered, and independent activities (among others handicraft) were important elements of his methodology. Montessori also based her educational system on her faith in the skills/abilities of children. The basic paradigms were “self-chosen work”, independence of the child and freedom. Waldorf schools stress the importance of the unity of aesthetic, intellectual and emotional education and of being close to nature. Their slogans are: autonomy, problem-solving learning and child-centeredness. Dewey's key idea was learning through experience (activities, creation, observation). In his school he tried to model the socialising medium of performing tasks at home, and introduced students' self-government. Rogers advocates that the individual needs personality-centered, helpful interpersonal communication instead of traditional “teaching”. (See Pukánszky-Németh 2001).

³ In his book entitled “*Deschooling Society*”, published in 1971, Ivan Illich states that the future lies in abolishing institutional education. He defines school as an institution which stifles creativity and makes children lose interest in learning, due to its formal rules, hierarchical structure and standardizing effect. As opposed to formal regulations and obligatory curricula/syllabuses, Illich stresses “Most learning happens casually, and even most intentional learning is not the result of programmed instruction. (...)a great deal of learning even now seems to happen casually and as a by-product of some other activity defined as work or leisure”. Thus, according to Illich, learning is, on the one hand, a subjective, individual activity, which is squeezed within unnatural borders by the formal school order, on the other hand it is a process which, in most cases, comes about as a component of another activity. In an uncompromising manner, Illich suggests that the only possible solution is to „abolish the obligatory school system and develop individual and collective forms of self-education and self-training. Instead of school, he wished to create something less restricted, a system based on voluntariness and individual freedom, which he called an educational network, the basis of which would be made up of all sorts of educational-training communities. According to his ideas the school without walls appears, which is no longer a school (it should rather be called an anti-school), but rather a network of the possibilities of learning, expanded in time and space,” explains Zoltán Czeizer (Czeizer 1997:617), summing up Illich's book.

Thus, already in Illich's time, the notion appeared that *networking was able to create completely new tools for knowledge production and knowledge exchange*.⁴ The "de-schoolers" based their vision of re-socialization, of open, self-organising, networking public education on this idea. However, at the time, their reform proposals – open educational institution systems for every generation, organically integrating everyday operators into studying, learning based on cooperation and dialogue, making use of different sources of knowledge, integrating the experience of older and peer groups – remained utopias. Their ideas concerning the realization of the "educational web" – for example establishing a database for learning, making public individual ability-portfolios (**e-portfolios**), organising a network for contemporary groups to pool their expertise, or a reference service of those individuals and institutions who are potential participants in teaching – lacked the necessary highly developed, widely accessible technological infrastructure, and the market pressure of the IT industry did not yet exist.

The situation changed radically when networking technology – at least in the developed countries of the Northern Hemisphere and in Australia – reached the critical level of accessibility and prevalence. There was widespread demand for informal learning and with the slogan of lifelong learning, the political will emerged. These facts caused significant changes in the nature of the criticism against schools: *Illich's utopia of re-socialized learning and socialization within networks suddenly became a real possibility*.⁵

2. Web 1.0, eLearning 1.0

As the use of the Internet spread, it became possible to acquire and store digitised versions of many different kinds of learning content (texts, pictures, audio and video). Although it was possible to access a wide range of information with by this means (known as web 1.0), *it was not yet truly interactive*. Contents could be placed on the homepages and databases, but it was not easy to create one's own content and share it with others. The typical Internet user browsed the web pages and downloaded content, but did not actively participate in the content-creation process.

Parallel to web 1.0 becoming more widespread, **learning management systems, (LMSs)** based on the internet became popular as well: these systems organised the databases, communication tools, task solutions, administration – in other words the whole learning process – into units. *Online* courses, which copied traditional educational patterns, appeared on the World Wide Web in the form of replica modules and lessons. Standardized, time limited, linear courses were created, with tutors and formalized, automatically verifiable tasks. This form of education, eLearning 1.0, is actually the *technologically supported variant of traditional knowledge distribution, the virtual extension of textbooks and classroom teaching*. Even in this environment, learning remained a passive process, managed from above or outside. *The formalized, centralized, bureaucratic world of education of industrialized societies was extended into a digital environment*. (For further details see Downes 2005a).

⁴ Illich writes the following: „I will use the words "opportunity web" for "network" to designate specific ways to provide access to each of four sets of resources. "Network" is often used, unfortunately, to designate the channels reserved to material selected by others for indoctrination, instruction, and entertainment. But it can also be used for the telephone or the postal service, which are primarily accessible to individuals who want to send messages to one another. I wish we had another word to designate such reticular structures for mutual access, a word less evocative of entrapment, less degraded by current usage and more suggestive of the fact that any such arrangement includes legal, organizational, and technical aspects. Not having found such a term, I will try to redeem the one which is available, using it as a synonym of "educational web."

⁵ We shall not discuss the general questions of lifelong learning or e-learning in this chapter, or their relation to the traditional educational system, or the prevalence of IT tools in education. From the point of view of the subject, these are general questions that are assumed to be known. For those who wish to gain in-depth knowledge of these questions before reading the chapter, we recommend the writings of Bertalan Komenczi (e.g.:2001), Kristóf Nyíri (e.g.:2000), Seymour Papert (e.g.:1993) or Field (e.g.:2006).

Network learning on web 2.0. - Connectivism

1. Web 2.0 and eLearning 2.0 as an answer to the political challenge of lifelong learning

The situation changed completely when the phenomenon called **web 2.0** started to spread. “Digital natives” (Jukes/Dosaj 2003) of web 2.0 not only searched for information on the web, *but also became content providers themselves*. The areas and tools of interactivity have become practically unlimited. Personal and institutional information is freely available on the World Wide Web and the technology exists to allow individuals to harness collective knowledge and entertainment portals for their own purposes. Students can create and exchange content in a cooperative way, within networks of their contemporaries. Blogs, forums, chats, wikis, newsgroups, and networks of friends and acquaintances provide an immense communal information production and exchange framework. The belief of hitherto criminalised file-sharers – that information is not for hiding but for passing on to others – became widespread. Increasingly sophisticated tools, from refined search engines through Wikipedia to well-maintained debate- and knowledge portals, are available. *By this means it has become possible to construct personally reflected knowledge adapted to one’s individual needs from information represented in cyberspace*. These characteristics form the didactic basis of eLearning 2.0.

In the field of eLearning 2.0, knowledge chosen, organised, distributed and controlled by the authorities has been replaced by personal information management based on immediate needs. Consequently, the importance of official intermediaries and institutions is decreasing. Within networks of contemporaries, cooperation, learner-centeredness and the ideal of self-organised learning become a real possibility. The boundary between learning and teaching becomes less distinct. For the “*download generation*”, the Internet is not a medium for learning; it is the *platform and the centre of personal study*. *In the milieu of eLearning 2.0, the opportunity exists to reconstruct an organic learning environment⁶*.

Which developments have generated these changes?

- High-speed broadband Internet (access) has become accessible to large numbers of people, significantly increasing the rate of data acquisition.
- Information has become ubiquitous and can be reached with mobile tools.
- As **open source software** has spread, so content management is very cheap and simple making possible the creation of personalized **e-portfolios** .
- A wide range of new, free tools is at our disposal: blogs, wikis, file exchange programs, forums and tools that make collaborative content development possible.
- Freely usable content has appeared (*open courseware, open content, CCL – Creative Commons Licence*)

⁶ Kristóf Nyíri writes the following about this: “It’s time we reconsidered Dewey’s thesis. He reasoned that we need schools, artificial educational environments because the era when young people spontaneously learned while growing up into the world of adults was over. I believe this situation is rapidly changing nowadays. The environment in which today’s children play, communicate and learn is becoming more and more similar to the world in which adults communicate, work, do business and find entertainment. The world of mobile phones and the internet unmistakably becomes an organic learning environment.” (Nyíri 2001)

- New software supporting social networks is spreading rapidly.
- The changeable, uncertain employment situation and the rapid technological changes that school curricula cannot follow have brought about the political challenge of “**lifelong learning**”. As an alternative to formal education, company retraining and private courses try to compensate for the shortcomings of the education system. In many cases, companies prefer independently organised, *online* training and the exchange of expertise outside working hours.

It has become a political requirement that students be given the opportunity to participate in web 2.0-based, eLearning 2.0-based education in addition to the traditional, basic school training. As adults, they will only be able to keep up with the challenge of global knowledge exchange and be able to use interactive networks if they become familiar with these tools and opportunities at an early stage. Thus, one of the tasks of formal school training is to develop, in addition to the basic ones, skills that ensure that students feel at home in the 2.0 interactive knowledge-management environment. The most important competences should be searching for and evaluating information and making connections between different fields of knowledge, ideas and concepts. The real didactic question is how, according to their individual needs, students can be brought to the point where they can contextualize and connect information originating from different sources, using the exchange of thought (by way of a network-enabled discourse) and aided by other web 2.0 tools.

The phenomena of web 2.0 pose a new challenge to the traditional school system. If it does not want the gulf between this generation’s culture and school to deepen even more dramatically, education must inevitably incorporate the elements of eLearning 2.0 into its repository of tools.

The Apple Education portal demonstrates the cultural differences between the new generation that uses web 2.0 (digital native users) and the teachers who were socialized in the paradigm of industrial society (digital immigrant teachers) as follows:

Digital Native Learners	Digital Immigrant Teachers
Prefer receiving information quickly from multiple multimedia sources.	Prefer slow and controlled release of information from limited sources.
Prefer parallel processing and multitasking.	Prefer singular processing and single or limited tasking.
Prefer processing pictures, sounds and video before text.	Prefer to provide text before pictures, sounds and video.
Prefer random access to hyper linked multimedia information.	Prefer to provide information linearly, logically and sequentially.
Prefer to interact/network simultaneously with many others.	Prefer students to work independently rather than network and interact.
Prefer to learn “just-in-time.”	Prefer to teach “just-in-case” (it’s in the exam).
Prefer instant gratification and instant rewards.	Prefer deferred gratification and deferred rewards.
Prefer learning that is relevant, instantly useful and fun.	Prefer to teach to the curriculum guide and standardized tests.

2. Network theories and eLearning 2.0

According to Castells, the basic paradigm of the information age is networking and the space of flows which “reigns above the historically constructed space of places...In other words, flows become the units of work, decisions and **output-control**, instead of organisations” (quoted by Nyíri 2006). These prophetic words convey the most important feature of the organisation of learning in the information age. An ever greater part of the processes of learning and socialisation can be moved from the “institutions of stone” to decentralized, self-organising networks supported by information technology - the “space of flows”. Learning in this de-institutionalised space is not about an organisation centrally defining the input and expecting that every learner reach the output result within a certain unit of time on a pre-defined, uniform route. In this learning paradigm, the guiding principle is considered to be the common definition of outcomes. *However, the roads leading there are not common – they are individual routes developed from flows within networks connecting personal knowledge with knowledge from external sources.*

Network theory, based on Granovetter’s article on the nature of strong and weak (network) ties (Granovetter 1973), was given a new impetus by the work of Barabási and Buchanan (Barabási 2003, Buchanan 2003) at the turn of the millennium. It supports the basic, decentralized, “de-schooled” learning-organisational principles of eLearning 2.0. Barabási and Buchanan pointed out that many networks were scale free. “Scale free distribution means that many network elements have very few neighbours. At the same time, the number of elements with many neighbours is not zero.” (Csermely 2005a:35). Distribution according to power functions characterises these networks. “Power functions mathematically define the fact that in real networks, the majority of points have only a few ties, and these numerous little points coexist with a few large central points that have an unusually large number of ties” (Barabási 2003: 100). In his book, Péter Csermely endeavours to prove that *weak ties are what make networks strong*. “A tie between two elements of the network is weak if taking away or adding the tie does not influence in a statistically sensitive way the average of the network’s typical characteristics (usually one of the group-defining characteristics of the network). Weak ties stabilize networks” (Csermely 2005a: 363).

Jones and his co-authors (Jones et al. 2006) examined the role of weak ties in network learning. They interpreted learning as a network process, which includes the ties between the students and their tutors, and the ties between the students and other sources of knowledge. Within this process, all ties are equal and none of them are privileged. (This notion differs considerably from the hierarchical network interpretation of eLearning 1.0, which only concentrates on the strong ties between humans).

Imagine a centralized learning network, in which the professor, or the compulsory, very formalized syllabus or department represents the central, strong tie, while the interconnections between the students (the exchange of knowledge amongst student), and the connections between students and other information sources are insignificant. The network has few weak ties. If the central element is damaged (the professor becomes ill, the department is closed down, or there is a shortage of the required textbook, which is the unique source of knowledge), the network collapses. *This is because the various weak ties that make the networks strong are missing.* Scale free learning networks, supported by information technologies, are a lot less vulnerable to this kind of disturbance. In such a network, knowledge sharing amongst students is much better developed. Students store a vast amount of the curriculum in their own **electronic portfolios**. Learning blogs, wikis, forums, social networks (independently created contents) offer additional resources. Students can also be connected to experts, students and lecturers from other institutions. and older people. They can intensively use the syllabus-archives created by students from other institutions. Assistant lecturers participate in the network and preserve the knowledge of their professors in their own e-portfolios. Learning becomes collective knowledge management based on many weak ties, and not on the central role of the professor or the formalized syllabus. Apart from a few strong ties, (since the strategic guidance of the professor may still

remain important), the network is made up of very varied, heterogeneous weak ties. The network becomes strong: if the professor falls out of the system, the stored knowledge elements and the weak ties that can be mobilized do not allow the network to collapse or weaken.

Perelman, who produced a radical criticism of the school system in the early 1990's, created the concept of hyper learning (HL) to denote this type of network learning:

“HL is not a single device or process, but a universe of new technologies that both possesses and enhances intelligence. The "hyper" in hyper learning refers not merely to the extraordinary speed and scope of new information technology, but to an unprecedented degree of connectedness of knowledge, experience, media, and brains - both human and non-human. The "learning" in HL refers most literally to the transformation of knowledge and behaviour through experience. “ (Perelman 1993:2)

Perelman says that the ubiquitous, intelligent tools of information technology motivate us to participate actively in learning. Broadband information transmission makes it possible for everyone to call upon knowledge everywhere, at any time. Not only do advanced search-engines make navigation on the sea of information possible and effective, but they also efficiently aid understanding and contextualisation. This is all the more true because those tools, based on artificial intelligence, are becoming increasingly effective in the assistance they provide. In the future, the gauge of individual knowledge and the guarantee of success on the labour market may be the informally acquired competence visible on one's electronic-portfolio, and not an official diploma.

I. Connectivism

The basic level of learning theories based on network theory is concerned with the *organisation of individual knowledge* - , the cerebral system connecting knowledge elements, in fact, the neuro-psychology of individual knowledge organisation. For an individual's knowledge organisation, strong ties are represented by knowledge elements that have been connected into a formal system. To these are weak information ties, which are more accidental and associated with a set of heterogeneous, weakly embedded aspects. The greater the number of weak pieces of information that surround the knowledge with strong ties, the more willing we are to accept them as valid. The strong tie itself may be strong enough for us to consider the information as valid, but such a condition is a lot more vulnerable. If the source of information which is considered universally valid becomes, for some reason, discredited, that immediately causes all information originating from that source to become invalid. If, however, this connection is surrounded by versatile, secondary, weak information, then it ensures stability even in the case of damage.⁷ Siemens writes the following about this:

„How does knowledge flow within a network? Which factors have an impact on the process? If we tentatively ascribe life-like properties to our learning networks, we can partly answer this question. Any living organism seeks two primary functions: replication and preservation. Nodes within our networks follow similar aspirations. Established beliefs and learning often ensure that new information is routed through (i.e., contextualized) the existing network. New information is evaluated and coded with reference to the existing meme⁸ of the learning network.” (Siemens 2005)

Using the tendencies of the network as a basis, Georg Siemens founded a *learning theory of the information age* called connectivism (Siemens 2005). In this theory, Siemens surpasses the traditional theories such as behaviourism, cognitivism and constructivism. (Even this last one - which stresses the socially motivated

⁷ This string of thought is based on Péter Csermely's personal statement.

⁸ For the theory of memes see Kolin: 2002

nature of learning - focuses on individual learning techniques and the processes of inner mental activity, and does not take into consideration the way learning takes place in organisations and network structures.)

Connectivism considers learning as a process in which the role of informal information exchange, organised into networks and supported with electronic tools, becomes more and more significant. Learning becomes a continuous, lifelong system of network activities, embedded into other activities. The motivation for gaining and contextualising information becomes stronger if searching and evaluation becomes a cooperative, network activity. Students can significantly improve the efficiency of their learning if they take part in a network, or virtual community dealing with the given subject. Thus the collective knowledge once again becomes a source of individual knowledge (“cycle of knowledge development”). As the number of cooperative activities increases, personal social networks become the scene of informal exchange of expertise, and “communities of practice” develop. Besides the questions of “how” and “what” to learn, we now have the question of “where to learn”.

Siemens makes it clear that in networks, contextualising information and determining validity may both become collective processes. (A list of popular topics, useful syllabuses, important links, articles and blogs, compiled in a cooperative manner may serve this purpose.⁹) So-called *feed-aggregators* help the collecting and feeding back of information into one’s own knowledge network.¹⁰ *Instead of consuming information that has been embedded in connections by institutions, learning may become an active creation of knowledge.*¹¹

2. Network learning – the utopia of restored unity?

The learning-organisational, knowledge-creating theories of eLearning 2.0, hyper learning and connectivism express the hope that networking supported by advanced technology *can put an end to the modern division between institutional learning and personal knowledge and become a tool of reintegration.*¹²

There is a desire to decrease the alienation of the world of traditional school with the help of the information flow taking place in the social networks of the virtual world and in cooperative, creative areas of learning. We talk about network communities, organic and open learning environments, the intertwining of everyday activities and learning, the gradual disappearance of the border between spontaneous and institutional learning, the intermingling of childhood and adulthood (see Nyíri 2001). Although this desire was just a utopia in the age of the early, radical school criticisms, or when the first network learning theories appeared, today, in the globalised environment of the information society, creating new forms of embeddedness in the virtual space of social networks has become common practice.

The spread of new forms of learning also implies various potential conflicts. There are numerous signs that the new forms of informal network learning can only be fitted into the narrow, bureaucratically controlled framework of traditional institutions that are limited in time and resources, with great difficulty. The pedagogical debate concerning this issue often goes in the wrong direction, because the discussion is between two incompatible conceptual worlds. An important educational-sociological, network-research and pedagogical question of the coming period will be how the institutions of the official school system will accept this phenomenon, to what extent they will integrate or reject it, and what types of conflicts, compromises and solutions this process will develop.

⁹ See, for example, the webpage urlguru.hu.

¹⁰ For example *Google reader*, *xFruits* or *blastfeed*.

¹¹ For the debate about connectivism, see Verhagen’s critique and Siemen’s reply. (Verhagen 2006, Siemen 2006).

¹² Kristóf Nyíri writes the following about this: “The border between practical and theoretical knowledge is becoming fluid. Practical training and theoretical education are extremely close. Education in the humanities and in science is getting closer to vocational training and technical training, research is now closer to teaching. Primary, secondary and higher level education overlap now, just as institutionalized learning overlaps with extra-institutional learning.” (Nyíri 1997a: 699)

Summary

In traditional societies, socialisation did not take place in separate institutions, but rather took place in the family and within small communities. In modern societies, specialized institutions have taken over the roles of teaching, educating and child minding. Mass-education could only be organised in a standardized, industrial way. Pedagogical reformers wanted to change this alienated socialization into socialization based on independence that could be provided in child-centred schools. The radical critics of the school system wanted to de-school the whole of society, saying that spontaneous activities and the network of knowledge exchange could replace formal school.

With the spreading of information technology, the utopia of network learning may become a reality, at least technically. A vast amount of spontaneous knowledge exchange is taking place on the interactive World Wide Web. It is on the basis of this that the theories of eLearning 2.0 and connectivism declare that network participation and access to information and to software that interprets and contextualizes information makes a completely new, cooperative, self-organising form of learning possible. This process questions the role of traditional educational institutions today. While the forms of eLearning 1.0 only meant the mechanical transposition of traditional linear learning to a virtual medium, the mode of operation of eLearning 2.0, (organised into networks, self-organising, embedded into activities) may be the starting point and driving force of a learning-organisational process that takes advantage of the opportunities offered by the information society.

Review questions

- 1) Describe, in a few words, learning in traditional societies.
- 2) What is the difference between the ways in which web 1.0 and web 2.0 work?
- 3) Why are networks that have a lot of weak ties stronger?
- 4) What type of social or learning network (newsgroup, forum, chat room, collective games) do you participate in? Describe them from the aspect of the means and content of communication.
- 5) List what the theory of connectivism says about learning.
- 6) Which software facilitates the operation of social and learning networks? What characterizes it?

Bibliography

Primarily recommended reading:

Downes, Stephen (2005a): *E-learning 2.0* <http://elearnmag.org/subpage.cfm?section=articles&article=29-1>
(Accessed: 10/02/2007)

Siemens, Georg (2006): *Connectivism: Learning Theory or Pastime of the Self-Amused?*
http://www.elearnspace.org/Articles/Connectivism_response.doc (Accessed: 27/03/2007)

Further recommended reading:

Barabási, Albert-László (2003): *Behálózva. A hálózatok új tudománya.* [Enwebbed. The new science of networks]
Magyar Könyvklub [Hungarian Book Club]

Bessenyei, István (1997): *Világháló és leépítés* [World wide web and redundancy] In: *Educatio*, 4:628-644
http://www.neumann-haz.hu/tei/educatio/educatio/1997tel/studies/3bessenyei/3bessen_hu.html
(Accessed: 26/01/2007)

Czeizer, Zoltán (1997): *Játék és tanulás az interneten.* [Games and learning on the internet] In: *Educatio* 4:615-619
http://www.neumann-haz.hu/tei/educatio/educatio/1997tel/studies/1czeizer/1czeizer_hu.html#tfoot7 (Accessed: 16/03/2007)

Nyíri, Kristóf (1997a): *Nyitott oktatás és távoktatás.* [Open education and distance education] In: *Educatio*/4 699-706 old.
http://www.neumann-haz.hu/tei/educatio/educatio/1997tel/studies/8nyiri/8nyiri_hu.html (Accessed: 21/01/2007)

Schuler, Douglas (1996): *New Community Networks: Wired for Change.* Addison-Wesley Publishing Company,
<http://www.scn.org/ncn/> (Accessed: 14/03/2007)

References:

Barabási, Albert László (2005): *Behálózva.* [Enwebbed] Előadás a Mindentudás Egyetemén [Lecture at ENCOMPASS, ENCyclopedic knOwledge Made a Popular ASSet]
<http://www.mindentudas.hu/magazin2/20050913albertlaszlo.html> (Accessed: 01/02/2007)

Buchanan, Mark (2003): *Nexus, avagy kicsi a világ. A hálózatok úttörő tudománya.* [Nexus, or what a little world we live in. The pioneer science of networks] Typotex Kiadó, [Typotex Publishing House] Budapest

Castells, Manuel (2005): *Az információ kora: Gazdaság, társadalom, kultúra. 1. köt. A hálózati társadalom kialakulása.* [The Information Age: Economy, Society, Culture. Volume 1 The Development of Network Societies] Gondolat - Infonia, Budapest

- Coombs, Philip H. (1971): *Az oktatás világválsága. Rendszerelemzés.* [The World Crisis of Education. System Analysis] Tankönyvkiadó, [Educational Publisher's] Budapest., 1971
- Csermely, Péter (2005a): *A rejtett hálózatok ereje. Mi segíti a világ stabilitását?* [The Strength of Hidden Networks. What Helps to Stabilize the World?] Vince kiadó, [Vince Publishing House] 2005
- Csermely, Péter (2005b): *A hálózatok sejtjeinkben és körülöttünk.* [Networks in our cells and all around us] (Előadás a Mindentudás Egyetemén) [Lecture at ENCOMPASS, ENCyclopedic knOWledge Made a Popular ASSet] <http://www.mindentudas.hu/csermelypeter/20050911csermely.html> (Accessed: 14/03/2007)
- Downes, Stephen (2005b): *An Introduction to Collective Knowledge* <http://www.downes.ca/cgi-bin/page.cgi?post=33034> (Accessed: 14/03/2007)
- Downes, Stephen (2005c): *Community Blogging* <http://www.downes.ca/cgi-bin/page.cgi?post=14> (Accessed: 01/03/2007)
- Downes, Stephen (2006): *Learning networks and connective knowledge.* <http://it.coe.uga.edu/itforum/paper92/paper92.html> (Accessed: 17/11/2006)
- Field, John (2006): *Lifelong Learning and the New Educational Order* Trentham Books
- Granovetter, M. (1973): *The strength of weak ties.* In: Am J. of Sociology, 78, 1360-1380 <http://www.stanford.edu/dept/soc/people/faculty/granovetter/documents/TheStrengthofWeakTies.pdf> (Accessed: 23/02/2007)
- Ivan Illich (1971a): *A haladás ritualizálása.* (A Deschooling Society. Ritualization of Progress. New York, Harper & Row Publishers Inc., pp. 34-51, translated by: László V. Szabó) http://www.c3.hu/~prophil/profi991/Ivan_Illich.html (Accessed: 10/03/2007)
- Ivan Illich (1971b): *Deschooling Society.* New York, Harper & Row Publishers Inc., <http://www.preservenet.com/theory/Illich/Deschooling/intro.html> (Accessed: 23/03/2007)
- Jones, C./Ferreday, D./Hodgson V. (2006): *Networked Learning, a relational approach – weak and strong ties.* In S. Banks, V. Hodgson, C. Jones, B. Kemp, D. McConnell and C. Smith (eds) Proceedings of the Fifth International Conference on Networked Learning 2006. Lancaster: Lancaster University. <http://telearn.noe-kaleidoscope.org/warehouse/Jones-Chris-2006.pdf> (Accessed: 12/06/2007)
- Jukes, Ian/Anita Dosaj (2003): *Digital Tools for Digital Students.* The InfoSavy Group. <http://www.apple.com/au/education/digitalkids/disconnect/landscape.html>
- Kolin, Péter (2002): *Evolúció és kultúra.* [Evolution and Culture] In: Információs Társadalom [Information Society], 2:78-128
- Komenczi, Bertalan (2001): *Az információs társadalom iskolájának jellemzői.* [The Typical School of the Information Society] <http://www.oki.hu/cikk.php?kod=informatika-Komenczi-Infomacios.html> (Accessed 12/06/2007)
- MacManus, Richard/Joshua Porter (2005): *Web2.0 for Designers.* Bootstrapping the Social Web. http://www.digital-web.com/articles/web_2_for_designers (Accessed: 14/03/2007)

- Nyíri, Kristóf (1997b): *Információs társadalom és nyitott művelődés* [Information Society and Open Culture] <http://www.hunfi.hu/nyiri/eotvos.htm> (Accessed: 14/03/2007)
- Nyíri, Kristóf (1997c): *Open and Distance Learning in the Information Society* <http://www.eurol.org/materials/contrib/1997/eden97/nyiri.html> (Accessed: 14/03/2007)
- Nyíri, Kristóf (2000): *A virtuális egyetem filozófiájához*. [Concerning the Philosophy of Virtual University] In: the February edition of Liget, http://www.hunfi.hu/nyiri/vil_ve.htm (Accessed: 21/03/2007)
- Nyíri, Kristóf (2006): *Castells, The Information Age. Könyvismertetés*. [Book review] In: Replika, 2006/12 <http://www.replika.hu/archivum/36/12> (Accessed: 05/03/2007)
- Papert, S (1993): *The Children's Machine: Rethinking School in the Age of the Computer*. N. York: Basic Books..
- Perelman, Lewis J.(1992): *School's out. A radical new formula for the revitalization of America's educational system*. New York: Aron Books
- Perelman, Lewis J.(1993): *School's Out. The hyperlearning revolution will replace public education* <http://www.wired.com/wired/archive/1.01/hyperlearning.html> Wired Digital, 03/04 (Accessed: 17/03/2007)
- Pukánszky, Béla/Németh, András (2001): *Neveléstörténet. A reformpedagógia fejlődésének harmadik szakasza* (1945-1989) [History of Education. The Third Phase of the Development of Reform Pedagogy (1945-1989)] <http://magyar-irodalom.elte.hu/nevelestortenet/10.05.html> (Accessed: 14/03/2007)
- Raschke, Carl (1998): *Digitális kultúra, a harmadik tudásforradalom és a hiperegyetem beköszöntése*. [Digital Culture, the Advent of the Third Revolution of Knowledge and Hyperuniversity] In: Világosság, [Light] 11:26-29
- Raschke, Carl (2002): *The Digital Revolution and the Coming of the Postmodern University*. Routledge Chapman & Hall
- Siemens, Georg (2005a): *Connectivism: A Learning Theory for the Digital Age* <http://www.elearnspace.org/Articles/connectivism.htm> (Accessed: 01/03/2007)
- Siemens, Georg (2005b): *Connectivism: Learning as Network-Creation* <http://www.learningcircuits.org/2005/nov2005/seimens.htm> (Accessed: 07/04/2007)
- Siemens, Georg (2007): *Connectivismus blog* <http://www.connectivism.ca/blog/> (Accessed: 14/03/2007)
- Szabó, Katalin/Hámori, Balázs (2006): *Információgazdaság*. [Information Economy] Akadémiai kiadó, [Akadémia Publishing House] Budapest
- Verhagen, Plon (2006): *Connectivism: a new learning theory?* <http://elearning.surf.nl/e-learning/english/3793> (Accessed: 30/03/2007)
- Z. Karvalics, László (2007): *Az iskola az információs társadalomban*. [School in the Information Society] www.oki.hu/cikk.php?kod=nyitott-07-Karvalics-iskola.html (Accessed: 14/03/2007)

Glossary

Lifelong learning. The concept of lifelong learning focuses on the development of a new culture of learning and the dissemination of competency-based education. It encompasses the whole life cycle of the individual, from early socialisation and pre-school education to the post-active age (from the point of view of employment). Its objective is to guarantee access to learning for everyone, and includes forms of learning that are outside the school. Apart from learning within the formal framework of school systems, it regards personality-building experiences taking place in any other area of everyday life (for example through the media), at the workplace or in the family, as learning. (Definition of the Ministry of Education <http://www.okm.gov.hu/main.php?folferID=1027>)

E-portfolio. The function of the electronic portfolio is to compile in one place all the documents related to the studies of a student. The knowledge maps, learning diaries, solutions to problems/tasks, tutor- or self-evaluations, various links stored in a wiki or assembled with the help of other knowledge management tools all promote the pooling/exchange of knowledge among people. Those participating in network learning can form an opinion concerning the previous knowledge of their partners, their sphere of interest and their style of learning on the basis of the e-portfolio, and this can help cooperative learning.

Informal learning. An activity that is realized outside the framework of institutional organisations, aimed at promoting learning, and acquiring and applying knowledge.

Open source code. This expression applies to software where the source code is either public property, or, more often, the owner of the copyright distributes it under a licence that complies with the *open source* definition. This type of licence may, for example, prescribe that the source code must be distributed along with the program, and that it may be modified freely (or at least with minimal restrictions). (Szabó-Hámori 2006:582)

Output-control. In a pedagogical sense, output-control means that it is the desired learning (competency) aims that are defined, and not the input content, broken down into a detailed syllabus divided into time-units. Choosing the individual route leading to these aims depends on the previous knowledge of the individual and on the various time demands. In this system, the output is uniform and the input is different.

Learning management programs (elearning framework systems) (Learning Management Systems, LMS)
Learning management programs based on the Internet contain the following functions:

- Keeps a record of the learners and their results
- Keeps a record of applications to courses and exams
- Gives access to the various materials and elements of the courses
- Keeps a record of the activities of the users: teachers and students
- Usually ensures a primary communication interface
- Endeavours to increase student activity with automatic functions.
- Supports the teacher's evaluation/assessment (both formative and summative)
- Contains elements of self-evaluation and accountability
- Informs users of the latest news concerning education
- Supports the realisation/arrangement of web-lectures and web-seminars
- Supports the work of virtual groups, ensuring collaborative surface.

Web 2.0 The expression web 2.0 is the collective name for those second generation internet services, which depend primarily on the community, in other words, the users, to create the content together, or to share each other's information. (Wikipedia)