INTERPRETATIONS OF KNOWLEDGE IN THE AGE OF THE INTERNET

Anikó MILE[1]

Abstract

Today the term „The Age of the Internet" may appear in different interpretations in relation to pedagogy. On the one hand, we can think of the information and knowledge-based, modern society of the 21st century, which has generated a fundamental change in the interpretation of knowledge, posing great challenges to education systems. On the other hand, in a narrower sense, we can speak about the modern learning environment, which can be created with the help of the World Wide Web. This study covers both interpretations.

Keywords: competence, lifelong learning, life-wide learning, digital natives, digital immigrants

We live in a constantly and rapidly changing world. Due to the scientific-technological, economic and social changes an explosive growth and fast obsolescence of knowledge can be observed. The quantity of scientific information doubles in about 10 years, the scientific principles and explanations of phenomena are converted, hubs are moved (NYIRATI 1997). It is more and more difficult to foresee what kind of knowledge present-day schoolchildren will need when they enter the labour market. It has become clear in Hungary and abroad, too, that the traditional implements of education are not suited to adapt to the economic and social changes. Traditional verbal learning has been receiving a lot of criticism for several years, and hopefully it will soon lose its dominance in education. However, to solve the problem we need to change not only school education, but also the way we think about knowledge (BÁTHORY 2002). Following the economic, social and scientific development, criteria like applicability, usefulness and organization are emphasized in the interpretations of knowledge.

For the research of the interpretations of knowledge and clearing the terminology our starting point may be the theory of the organization of knowledge. Csapó (2004) distinguishes between three system forming principles in the development of the knowledge system: in the first case, knowledge is organized by the logic of a specific field; in the second case the organization is determined by culture and the social environment; and finally, the organization of knowledge ensues from the psychology of human cognition. According to the above mentioned system forming principles we can speak about expert knowledge, literacy and competence.

[1]Ph.D. Student: Eötvös Lorand University Faculty of Education and Psychology, PhD School of Education, Budapest, Hungary

Expert knowledge (expertise, professional knowledge) is the whole bulk of contents, skills and abilities determined by a specific field. This kind of knowledge is very content-specific, and difficult, if not impossible, to transfer. The development of this knowledge is not conditioned by the age of the individual, we can develop our expert knowledge lifelong. Literacy is the totality of contents, skills and abilities, utilizable in a given culture. This knowledge is useful in real life, in the world beyond school. Similarly to expert knowledge, literacy can be developed throughout our life. The content-dependence of this knowledge is at a medium level, and it is transferable within certain limits. The third organizational form of knowledge is competence. In the interpretation of the cognitive sciences competence is a specific organization of skills and abilities in which a relatively small number of elements might be organized in varied combinations. The interpretation takes Chomsky's (1995) generative language theory as a basis, which states that we do not learn a language, but we acquire linguistic competence, so we are able to create an unlimited number of linguistic performances. Young age has a primary role in the development of competence. In comparison with other organizational forms, this form of knowledge is less content-dependent, so it is more easily transferable (Table 1).

Table 1. Dimensions and structure of knowledge

Characteristics	Disciplinary, content-based	Internal, psychological	Social, cultural, application
Goals of learning	Acquisition of canonized content (objective, scientific knowledge)	Development of cognitive functions and intellectual abilities	Acquisition of sociocultural codes and modes of behaviour and action, preparing the individual for integration into society
Emerging knowledge	Expertise, domain specific skills	Thinking skills, improved general abilities	Literacy, flexible and expandable knowledge applicable in a broad range of contexts
Sources for designing standards, curricula, textbooks, learning materials	A systematic body of knowledge of the arts and sciences	Results of psychological and educational research	Analysis of social needs and contexts of knowledge and skills application
Assessment	Same context as learning	Focus on structures; content plays a secondary role	Transfer from school to everyday context

Source: CSAPÓ, 2010

Taking the above mentioned organizational forms as a basis, expert knowledge is the most likely to become useless in our changing world. Due to the looser organization of its elements, literacy, as a relevant knowledge in a culture, may become forfeited less, and much more slowly. Competence is a psychologically determined system, where the opportunities of learning are based on hereditary schemes mostly. Therefore this knowledge is affected the least by the social – economic changes.

Concerning the great challenges generated by scientific and technological development, large international research projects have been started to define what kind of knowledge the modern economy requires of education. It has become obvious that not all content can be learnt, as even the abilities people need to get on in everyday life are constantly changing. So schools cannot assume to provide children with the knowledge they can apply in their

adult life, because that knowledge may not even exist today. Therefore, the abilities to obtain knowledge must be developed, because learning is not completed at the end of institutional education. This realization has put the fifty-year-old the idea of lifelong learning[6] into the focus of pedagogy. The knowledge necessary for lifelong learning has been defined as a competence by the educational professionals. This interpretation is different from the cognitive sciences', it is used in a wider sense. Csapó (2004) permanently argued for a consistent terminology, he trusted that the „competence-craze" would pass, and the notion would return to its scientific career. This has not happened yet, so to avoid misconceptions, Csapó was forced to discontinue using this concept. For some years, instead of using the term „competence", he has been using term „abilities" to describe the organizational form of knowledge.

Let us examine how the international and Hungarian educational policy and professional community interpret the term „competence". It is not easy to answer this question, because, similarly to „personality" in psychology, there are a lot of definitions of competence, there is not one right definition. Some educational analysts speak about the enrichment of the concept compared to the cognitive sciences' interpretation. Others argue that this concept is too complex and elusive, and there are also some researchers who think that this concept is mystified too much in today's educational environment. According to them, the probable reason of this phenomenon is the lack of consensus in the interpretation of knowledge; it is unclear what really relevant knowledge is. Most researchers in Hungary agree that competence is a complex mixture of knowledge, skills and attitudes. The mutual influence of these three components on each other means that the individual is not subordinately but creatively involved in the acquisition of knowledge. Competence is a tool that enables the individual to acquire and exploit his/her knowledge (DEMETER 2006).

Around the new millennium the international studies[7] aimed to determine the key competences as the basis of successful learning indispensable for everyone. The expert group commissioned by the European Council has defined the term as follows: A key competence is a transferable and multifunctional unit of knowledge, skills and attitudes, which is necessary for everyone to improve and fulfill his/her personality, to be able to fit in the society, and to be employable. Individuals are supposed to acquire key competences during the term of compulsory education or training. Later on all forms of lifelong learning are based on these competences.

The expert working group has developed a frame of reference[8] which includes eight key-areas:

(1) Communication in the mother tongue

(2) Communication in foreign languages

(3) Mathematical competence and basic competences in science and technology

(4) Digital competence

(5) Learning to learn

(6) Social and civic competences

(7) Sense of initiative and entrepreneurship

(8) Cultural awareness and expression.

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[6] *The concept of lifelong learning appeared at the beginning of the 70s, as by that time the shrinking of the world of work, the widening of unemployment was predicted. The concept first referred to adult education, professional training, retraining, but later on it became more complex, referring to the whole walk of life.*

[7] *See for example the DeSeCo (Defining and Selecting Key Competencies) program (1997-2002), or the Asia-Europe Meeting (ASEM), conducting research on lifelong learning.*

[8] *Implementation of „Education and training 2010" Work Programme. Working Group B „Key Competences". Key Competences for Lifelong Learning. A European Reference Framework, November 2004*

To the analogy of lifelong learning (LLL), a new expression has found its way into pedagogy lately: life-wide learning (LWL). The expression provides a framework for various modes of learning: formal, non-formal, informal (CSAPÓ 2005). While LLL draws on the vertical opportunity of acquiring knowledge, LWL provides a horizontal view. In modern societies the emphasis has been shifting more and more from formal learning to non-formal learning. Nowadays, due to the use of information and communication technology, learning happens in more and more fields and situations in life, beyond formal, organized education. The Internet can provide world wide access to almost any important information: texts, pictures, audio and video files, mathematical information. The World Wide Web, as a spatially and temporally opened and expanded network of learning opportunities, has fundamentally changed our relationship to knowledge and learning. Landow (1992) points out that in the learning process, the conceptual structure based on the notions of centre, hierarchy and linearity must be changed for another one, based on multilinearity, hubs, nodes, links and networks. There is no main text or a guiding line, at given points in the hipertexts on the Internet we can find reference links, which we can follow and find new texts, unlike in the case of printed texts, where we can only return to the main text. So the school cannot control any more from where, what source knowledge is acquired, or the sequence of acquisition, as students access knowledge browsing the web, in totally varied, unpredictable ways. Using the web requires constant activity on the part of the reader, who is browsing in a non-sequential way, and knowledge acquired this way becomes part of the reader as a component of browsing (CZEIZER 1997).

Using the Internet is different from traditional education not only regarding the quantity of information and its accessibility in space and time, but also in opening new opportunities in creating interpersonal connections. The interaction between students, and students and teachers may multiply, and it is possible to involve in the education the world outside the school in an interactive way.

In view of the effective ways of learning offered by the Internet, many may question if there is a need for formal education at all. The present study is not aiming to discuss this issue in detail, but we must declare that the use of ICT devices and the Internet improves the efficacy of traditional education to a great extent. Digital technology widens learning opportunities and changes teaching methods. This means a new role for teachers. Information boom and digital technology have shaken the traditional teacher identity. The teacher is not the sole depository of knowledge any more. Instead of the traditional mediation of knowledge, lecturing, explanation, his/her tasks will be searching, grading, comparison, evaluation, argumentation, the art of questioning. Traditional teachers' roles will be exchanged for the role of facilitator, consultant (BESSENYEI 1997).

Modern students – including those studying in higher education – represent the new generation, born into this digital world. They have lived all their lives among the achievements of the age of the Internet. The modified environment, the frequency of interactions in that environment and their specific communication has changed the thinking patterns and information-processing of students, compared to their predecessors, including teachers. Some researchers think that the different experiences result in different brain

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[9] *The necessity of organized education has been questioned several times. Ivan Illich in his Depriving the Society of School defines school as an institution which destroys students' interest in learning with its formal rules and uniforming effect. In his opinion, the process of learning is coincidental in most cases, and most of the time it is the „side-effect" of various working and playing activities. Illich would abolish compulsory school education, and create a slacker system based on voluntarism and personal freedom, called knowledge net, which is based on various educational communities.*

structures. Gyarmathy (2009) points out that browsing the Internet activates more parts of the brain than reading does. Those who browse the Internet on a regular basis have a larger short-term memory, and there is more activity in the regions of decision-making and problem-solving. This shows that digital technology concerns not only the content-based and cultural aspects of knowledge, but the inner, psychological dimension as well, that is, the competencies based on the psychology of cognition.

Coining a witty phrase, Prensky (2001) calls the children of the age of the Internet digital natives, and those who were not born into the digital world, but accept and use its achievements digital immigrants. A digital immigrant adapts to his/her environment, but retains the „accent" of his/her original language (before the digital age) till the end of his/ her life. As opposed to this, digital natives are used to speedy information, they are able to deal with several things at the same time („run several parallel programs"), prefer figures, pictures to texts, and need instant positive feedback.

Prensky argues that the problem is that in formal education digital natives are taught by digital immigrant instructors. Jukes and Dosaj (2006) claim that born digital students use the Internet as their mother tongue, while emergent digital teachers acquire it in the course of a long learning process. Due to this difference, there are basic differences between the two parties in the understanding of the learning process (Table 2).

Table 2. Summary of the digital divide

Native learners (Digital Natives)	Emerging Digital learners (Digital Immigrants)
Multiple multimedia information sources rapidly	Slow controlled information release – limited sources
Parallel process & multi-task	Singular process and single or limited task
Processing order: Picture, Video & Sound --> Text	Processing order: Text --> Picture, Video & Sound
Random access to interactive media	Linear, logical sequential access
Interact/network simultaneously to many	Interact/network simultaneously to few
Comfortable in virtual and real spaces	Comfortable in real spaces
Prefer interactive/network approach to work	Prefer students to work independently
"Just in time" learners	"Just in case" learners
Instant access, rewards & gratification	delayed/differed access, rewards & gratification
Learning is relevant, instantly useful and fun	Learning is to teach to the curriculum guide and standardized tests.

Source: JUKES, I.; DOSAJ, A. 2006

We must accept that modern learners are different. The supposition that they can be taught by the same methods as their predecessors is false. Digital immigrant teachers must learn the natives' language, update the „inherited" contents with the contents of digital technology, and certainly fit their pedagogical repertoire to the changed environment. This demands an enormous mental change from present-day instructors. Later on the situation will probably improve, as the first generation of digital native instructors is finishing higher education soon. It will be easier for them to adapt, as they will speak their own, digital language in formal education (RADÓ 2010).

Not questioning the role of the Internet in education, we must mention some criticism, too. As far as the selection of information is concerned, the World Wide Web cannot provide the traditional criteria systems of selection, which have ensured a certain quality. Anybody – without any censorship – can upload materials, and anybody can get access to the information, so instead of official criteria, we must choose from the information based on our inner, individual criteria. The cognitive operations guiding the selection, such as evaluation, interpretation and decision are value-based. Based on all these facts, the main

organizing principle of the learning process may be a partnership, in which „teacher and learner research together the system of criteria for getting about and searching in a set of information, too, in which neither of the parties is obviously and unilaterally the leader or the one who is led, but in which the problems identified together direct them in cooperative choices, systematizing and evaluation" (BESSENYEI 1997, p. 635).

The age of the Internet means great challenges and opportunities for pedagogy. Today educators cannot ignore the expectations of the information society, but they cannot forget about it, either, that the recognition of the real world is based on real sensation, perception, and experiences, which can be extended, but not replaced by the virtual world of the World Wide Web.

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TUDÁSÉRTELMEZÉSEK AZ INTERNET KORÁBAN

MILE Anikó[1]

Összefoglaló

Napjainkban - a neveléstudománnyal összefüggésben - az „internet kora" kifejezés többféle értelmezésben is megjelenhet. Gondolhatunk egyrészt a XXI. század információs, tudásalapú, modern társadalmára, mely alapvető változásokat generált a tudás értelmezésében, nagy kihívások elé állítva az oktatási rendszereket; másrészt – szűkebb értelemben –, beszélhetünk arról a korszerű tanulási környezetről is, melynek kialakítására a világháló használatával nyílik lehetőség az oktatásban. Jelen tanulmány mindkét értelmezésre kitér.

A tudományos, technikai fejlődés által generált kihívásokra reflektálva nagy, nemzetközi vizsgálatok indultak annak érdekében, hogy meghatározzák, milyen tudást igényel az oktatástól a modern gazdaság. Egyértelművé vált, hogy nem lehet minden fontos tartalmat megtanulni, még a mindennapi életben való boldoguláshoz szükséges képességek is folyamatosan változnak. Az iskola így nem vállalhatja fel a felnőttkorban szükséges tudás átadását, mert előfordulhat, hogy az a tudás napjainkban még nem is létezik. A tudás megszerzésének képességeit kell tehát kifejleszteni, hiszen a tanulás nem fejeződik be az intézményes nevelés végén. Ezzel a felismeréssel került újra a pedagógiai érdeklődés homlokterébe a közel fél évszázada létező fogalom, az egész életen át tartó tanulás (lifelong learning – LLL) eszméje. Az egész életen át tartó tanuláshoz szükséges tudást a szakemberek kompetenciaként definiálták, és a szaktudományos, kognitív pedagógiai értelmezéstől eltérően általánosabb értelemben használták, és használják ma is.

Az egész életen át tartó tanulás analógiájára egy másik kifejezés terjedt el a közelmúltban a neveléstudományban: az élet minden területére kiterjedő tanulás (life-wide learning - LWL) fogalma. A kifejezés a tanulás különböző formáit, a formális, nem formális és informális tanulást foglalja keretbe. Míg az egész életen át tartó tanulás a tudás megszerzésének vertikális lehetőségét emeli ki, addig az élet minden területére kiterjedő tanulás horizontális szemléletű. Napjainkban a formális, szervezett oktatáson kívül, az infokommunikációs eszközök felhasználásával egyre több színtéren, élethelyzetben nyílik lehetőség a tanulásra. Az internet képes arra, hogy világméretű hozzáférést biztosítson szinte minden fontos információhoz. A világháló mint a tanulás térben és időben felszabadított és kitágított lehetőségeinek hálózata alapvetően megváltoztatta a tudáshoz, tanuláshoz való viszonyunkat. A digitális bennszülöttek nemzedéke számára teljesen természetes és egyértelmű az ismeretszerzés – és általában a tájékozódás – folyamatában a világháló használata, míg a digitális bevándorlók esetében ez a folyamat nehézkesebb, kevésbé egyértelmű. A problémát az jelenti, hogy napjainkban a formális oktatásban a digitális bennszülött tanulókat digitális bevándorló tanárok tanítják.

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[1]*Ph.D. hallgató: Eötvös Loránd Tudományegyetem Pedagógiai és Pszichológiai Kar Neveléstudományi Doktori Iskola*

A digitális bevándorló tanároknak meg kell tanulniuk a bennszülöttek nyelvét, az „öröklött" tartalmakat a digitális technológia tartalmaival kell kiegészíteniük, és természetesen pedagógiai eszköztárukat is illeszteniük kell a megváltozott környezethez. Hatalmas mentális váltást igényel ez a feladat a ma pedagógusaitól. A továbbiakban a helyzet valószínűleg változni fog, hiszen ezekben az években kerül ki a felsőoktatásból a digitális bennszülött pedagógusok első nemzedéke, akiknek már sokkal könnyebben megy majd az alkalmazkodás, hiszen a formális oktatásban saját, digitális nyelvüket beszélik majd.

Kulcsszavak: kompetencia, élethosszig tartó tanulás, az élet minden területére kiterjedő tanulás, digitális bennszülöttek, digitális bevándorlók