

«WILL E-LEARNIG DIE?»

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Abstract: The World Wide Web is currently changing dramatically. The buzzword Web 2.0 describes how we deal with the Internet. “The user is the content” is one of the famous descriptions. Users create their own (learning) content by blogging, podcasting or producing mashups. Of course the innovations summed up with the word Web 2.0 influence the traditional e-learning world.

In this paper we focus on how learning will change in the future. The combination of traditional research work combined with emerging technologies lead to an assumption of the learning behaviour of tomorrow. Will today’s teaching soon be a matter of the past? How will a lecture look like by integrating emerging technologies? We conclude that information anytime and anywhere influences the world of digital natives arbitrarily and causes the death of e-Learning in present sense. Using computer and mobile technologies for learning purposes will be as normal as writing a letter with pencil.

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1. Introduction

Currently a big change of the user behaviour in the World Wide Web causes a revolution (O'Reilly, 2006). The influence of media in different forms and environments increases rapidly because ordinary Internet user creates content by blogging, podcasting or in wikis. Web 2.0 is not really a big technological change, but helps to bring the first ideas of Tim Berners Lee (Berners-Lee, 1989) realizable: “Anyone can create anything and sharing it with anyone – world wide”.

Of course this change will not stop for the area of education and learning. Especially in the field of e-learning it seems that a little bomb exploded and existing concepts and strategies suddenly become a matter of the past. E-Learning 2.0 was defined (Downes, 2005) and shocked the traditional e-learning world.

On the one hand former technological barriers as bandwidth, accessibility and devices have been minimized; on the other hand the usability of web based applications gets better and better. Innovations like the Open Educational Resources Movement¹ (i.e. OECD, 2007) change the concept of (higher) education. With Ajax the next generation of web programming

¹ http://www.oecd.org/document/41/0,2340,en_2649_201185_38659497_1_1_1_1,00.html

begins; with wikis internet pages are easy to edit and to complement. Blogging as well as podcasting or video sharing has become normal to the everyday life of today's kids. The net generation creates contents, lives in virtual networks and is connected all over the world. Opinion polls pointed out a high acceptance of all new techniques by teenagers (e.g. Lenhart & Madden 2005, Green & Hannon 2007).

The main problem that comes with the revolution of the Web 2.0 is once again the so-called digital gap between digital immigrants (mainly lecturers) and digital natives (teenagers and learners). According Prensky (2001) the use of new media differences exorbitant between these two groups. For our children weblogs, wikis, podcasts belong to their everyday life since birth. For the rest of us these techniques are new; we have to learn and to rethink concepts and workflows. The enormous speed of growing of new techniques leads to an arbitrary problem, which must be taken into account.

In this publication we like to discuss this digital divide and how it will change our learning behaviour in the future. Is microcontent or nanocast a realistic scenario for our children or only hype? Is learning in twenty years comparable to our traditional classroom learning processes? Will informal learning play a more important role, or is face-to-face teaching not replaceable? There are lot of questions, but we should think about appropriate answers that are suitable to the learners of tomorrow and their techniques.

By discussing experiences of current e-learning scenarios of two big traditional European Universities – University of Zurich and Graz University of Technology – the publication concludes what experts in the field of e-learning expect for the future. We take a look into the future of learning: which impact has technology to our education? How will technology change or influence our way to teach and learn?

In the end we try to give an answer to the question “Will e-learning die?” and the result is maybe surprising: YES, we think so. By discussing and strictly reasoning, we hope that the reader of the article will agree to these thoughts and change his personal access to teaching and learning.

2. Changes

The availability of the internet is steadily increasing. Life is going on at the internet: a lots of things from everyday life such as banking activities, booking a holiday trip, and so on are possible at the internet. With an increasing bandwidth it's not only possible to watch TV and films online, but also even to make own live shows by streaming. You don't have to leave your house any longer; you can do nearly everything online. This changes your life and your behaviour tremendous.

The availability of new mobile technologies such as mobile phones, PDAs and so on, implies the use of this technology (Ziefle, 2002) not only in business or private life but also for learning settings (Holzinger et al, 2005a). Technology has impacts on learning settings and learning styles (Holzinger et al, 2005b). If people behave more and more mobile, why shouldn't they learn mobile? Is this the challenge of the future? Why shouldn't we assimilate informal communication, distribution and consumption structures for the learning processes?

But not only technologies are changing. Learning and working processes are changing, as well. Employees, in future mainly knowledge worker, have to be more flexible and mobile. „At the same time, today's and tomorrow's learners will be nomadic and continuously on the move. As learners move from one location to the next, they must be able to use the infrastructure in the different locations to access learning materials. Hence, learning materials must be designed for easy access by the nomadic learners using mobile technology regardless

of where they are located and which network infrastructure they are using to access information“ (Ally, 2007).

Access to information and learning material is getting more and more independent of time and place. Networking with other people grows by the availability of mobile technologies. Mobile learning can be regarded as a special form of e-learning, which enlarges the freedom of place for learners (Sharples, 2007, p.7).

2.1. New learner

The children of today grow up with internet and digital devices. For them it's usual to enter the internet to look for news and information. Researchers in the last years tried to identify the differences between teenagers, so called "net generation" (Oblinger & Oblinger, 2005a) or "digital natives" (Prensky, 2001) and so on, and their lecturers. Oblinger (2005) are talking about some different habits of this generation: they search online first (for example in google or wikipedia), only parts of them use traditional forms like libraries. Their primary communication tool is the internet via MSN or Instant Messaging. They meet each other in social networks, they are blogging, creating online content, sharing files and pictures and so on. They are online socialised: multitasking, time shifting and zapping is usual for them.

„Among other differences are their:

- Ability to read visual images—they are intuitive visual communicators
- Visual-spatial skills—perhaps because of their expertise with games they can integrate the virtual and physical
- Inductive discovery—they learn better through discovery than by being told
- Attentional deployment—they are able to shift their attention rapidly from one task to another, and may choose not to pay attention to things that don't interest them
- Fast response time—they are able to respond quickly and expect rapid responses in return“ (Oblinger, 2005, p. 2.5)

Green & Hannon (2007) recognized “that the use of digital technology has been completely normalised by this generation and it is now fully integrated into their daily lives. The majority of young people simply use new media as tools to make their lives easier, strengthening their existing friendship networks rather than widening them. Almost all are now also involved in creative production, from uploading and editing photos to building and maintaining websites. However, we discovered a gap between a smaller group of digital pioneers engaged in groundbreaking activities and the majority of children who rarely strayed into this category.” (Green & Hannon, 2007, p. 10).

But what is the impact of this net generation on our society? Oblinger and Oblinger (2005) constitute three main changes in societies of the future:

- *Multimodal communication structure*: There are more communication channels available, such as e-mail, chat, instant messaging, sms, twitter, and so on.
- *Culture of «do it yourself»*: Kids are used to make their own things. They choose their own TV program by zapping, they build their own radio program with podcasts, they choose their own information by reading their blogreader. One consequence is that this will influence their way to learn: in future they want to build their own courses, their own personal learning environment (PLE).
- *Culture of choice*: In future you can choose and personalize everything: from your PC desktop to your personal iPod play list, from your own Personal Computer to your own mobile device.

This is often just stereotyping, but it's the effort to describe this new way of technology behaviour. But there is still little empirical evidence for this description.

2.2. New communication structures

As seen above, the work requirements will change, work in multi-disciplinary or multi-professional teams will get normal. Networks are determining our society structures (Castells, 1996). One effect of globalisation is that working processes are more and more organized in networks, most of them all over the world. This means, that communication is changing, networks are getting important.

Net workers stay informed within new media in new forms: technologies like twitter and jaiku let us stay in contact with our network very easily and very currently. Blogs provide a basis for topical discussions. By the installation of different channels and the combination with mobile technology and blogging systems, it's possible to share information fast, for different target audiences and mobile.

Visual communication with emoticons is getting more and more important, because on the one side most of our communication will be written communication at different input devices. But it seems that there is one communication channel missing, the non-verbal communication. Emoticons are a great chance to integrate non-verbal communication into our writings. On the other side emoticons are fast: with one emoticon you can say a lot, for example “☺”. Our mobility needs a fast communication channel to stay informed (Azuma & Maurer, 2007), and emoticons are very easy and quick way to communicate with others.

2.3. New form of content

The last issue that must be pointed out is the kind of information. Till now a typical learning content has been a well-written document with detailed information. Sometimes the help of multimedia expanded it. With other words pedagogues, teachers and programmers created a modern kind of learning content. In fact, the often so-called New Media let the old book appears in new style.

In future teachers will be confronted not only with a new type of learner, with new devices and new communication structures, but also with a new type of content – called microcontent (Leinonen, 2007). Microcontent are very small pieces of information placed on the World Wide Web. Mostly this information chunks make no sense by standing alone. Microcontent needs context or communication behaviour to take place. Research work in this area as well as in the field of nanocast, microblogging or the use of QR-Codes² in learning is very rare, so it is very hard to estimate the potential and effect of these new kinds of information distribution in future.

3. Future of technology based learning

Considering all arguments it must be pointed out that education in future will change anyway. The question is how and in which way? The enormous speed of technological developments will lead to increasing applications. Due to the fact that the “net generation” is much more familiar with programming the World Wide Web, new data, tools and even programs will grow exponentially.

Bearing in mind that mobile devices including internet connection are at hand by everyone we like to think about what typical lessons of the future will look like? The next two subchapters show which technologies promises a big change of our world of tomorrow and what this means for our educational settings.

² <http://www.jaxo.com/home>

3.1. Future technologies and application

Of course it is impossible to make a precise prediction, remembering about 10 years ago nearly nobody used a mobile phone. Today in Central Europe we have at least one per person. The increasing speed of new technologies and web based applications is amazing. According to Moore's Law (about 1970) hardware is increasing exponentially by doubling every two years. Nevertheless we are expecting some major trends, which will influence our learning environments:

- *Mergence of devices*: In the near future the performance and ability of mobile devices will increase arbitrarily. With other words the key functions of a mobile phone are expanded to make photos, instant messaging, browsing and maybe also job efforts. It is imaginable that our complete work place is just online and we are using clients to connect to this place. For example YouOS is one of the first online Operating Systems³. Reading news, watching TV or listening to podcasts with a mobile device will be as usual as doing a phone call today.
- *Widgets and Mashups*: The next generation of internet use is to provide so called Widgets. A Widget is a small third party item, which can easily be embedded into a webpage or on a mobile device. So no further programming is necessary to show for example RSS Readers, statistics or other small applications on our own homepages. Remixing different pieces of online content and providing it on another internet-site is called a Mashup. Reusing, resorting, remixing are the catchwords of the future web. Existing information will be expanded by someone and adapted to his/her personal needs. So the World Wide Web is becoming much more powerful we hardly can imagine, because two components are combined: human creativity and computer batch processing.
- *Surface computing*: Currently the company Apple released the iPhone, the combination of a mobile phone and an iPod. The most interesting feature of this device is the touch screen – Digital Physics is the name of this new way of interaction with a device. Apple's software is tuned to respond to our hand gestures in a way that makes an impression of interaction with the physical object. For example scrolling is represented by striving one finger on the screen from up to down⁴. A similar project called Microsoft Surface⁵ will be launched by Microsoft. A simple table with a multi-touch multi-user, touch-and-gesture-activated screen for supporting working with digital materials. A further project is Diamond Touch⁶ from MERL. However there is one fundamental change observable: The way how we interact with computers and digital devices. Just by using our fingers and hands but without any input devices, we move digital contents, work and share material.

But what do this mean for education in the 21st century?

3.2. Future education

After pointing out the great improvements from a technical point of view, we have to concentrate on the learner and teacher views.

For example let's think about a typical geographical lecture. The teacher enforces the students to open their books and point at the country or town on an oversized, huge map hanging on a

³ <http://youous.com>

⁴ http://www.readwriteweb.com/archives/the_physics_of_iphone.php

⁵ <http://www.microsoft.com/surface/>

⁶ <http://www.merl.com/projects/DiamondTouch/>

pillar. We are sure that this situation is not a thing of the past; it still describes a typical lesson in elementary schools today.

But in the near future the situation can change dramatically, because first there will be no books anymore. The mobile device of students connects to the internet within seconds and delivers any information; any so called hard fact. Access to information from different sources, from different cultures and languages extend the possibility of teaching in a manifold way. Imagine the teacher only says “Today we are talking (learning) about the country xyz”.

The first child is looking about the population, another one tells about the cities and famous buildings. The next one shouts that there is picture and a video about important cultural aspects of the country. “Oh, the famous actor is born here” the next contribution appeared. A further child is chatting with an inhabitant and asking what is the most famous sightseeing or landmark in his/her town. Someone has already found some historical backgrounds of this country. However, the list of questions and their answers seems to be endless.

Nevertheless there are some very important characteristics:

- *Information chunks and Mashups*: Digital natives are searching for quick information and zapping between a high numbers of websites. Communities are playing a very important role in their daily life. It will not be very surprising when working with small pieces of content will be common. By presenting them to a group the result is much more effective. Different information from different sources and different people combined lead to a big Mashup of information in the classroom. This data has to be integrated to a big knowledge network, like for example a classroom wiki, so that everyone has access to the information of the others. So methods of learning and working together like teamwork, tandems, etc. will play a more important role for educational practice as today.
- *Individualism*: By searching, reading and interpreting information students will do this via their personal environments, with their personal devices and with their personal agents, filter systems and maybe also with their personal programs. This leads to a personalization, which helps to enforce the individualism in a very powerful way.
- *Informal learning*: Learning by listening and reading something without intention will become more and more important. By searching relevant information children read tons of other chunks. They see and listen to the results of their colleagues and recognize the different standpoints and arguments.
- *Problem based learning*: The teacher defines the topic; afterwards he/she confronts the learners with realistic, complex and authentic problems. Searching, reading, interpreting and discussion will lead to a more appropriate learning situation and help the learners to gain a more cross-linked view. Considering also motivational and emotional aspects this can lead to a more in-depth learning.
- *New role of teachers*: In future teachers will have a very new important role; they have to help to survive within the mass of information. In the beginning learners are not able to distinguish which chunk is highly relevant for understanding and which is only a small detail. The main role of a teaching person is to help sorting and structuring learning material and to reflect it. Critical thinking will become a competence, which is getting more and more important. Teachers must have “a wide variety of life experiences and attributes, most centred on the ability to facilitate or connect, and an understanding of social technologies and deep collaboration. [...] There will be many different opportunities for working with kids and communities in a teaching role other than the traditional idea of what a teacher is“ (Richardson, 2007).

But these changes require new competencies among teachers and learners. Learning to learn and to validate information from different sources will increasingly become a great challenge for learners and educators in future.

But what does these implications means for traditional e-learning courses? Since about 1995 when the first web-based-training courses were available, e-learning has become popular. A large number of didactical scenarios and technical tools have been developed (Collis, 1998), but many projects showed lacks concerning interactivity (Preece et al, 2002). Enhancing self-regulated learning (Boekaerts, 1999) or active participation of students seems to be impossible. However, from this standpoint all these new technologies will help to improve the current situation. The question is still, if this leads to the end for the classic e-learning in the meaning of the turn of the million.

4. Will e-learning die?

The premises presented in chapter three will influence the learning process. What are the implications for traditional learning institutions, such as school and universities to handle with this new educational scenario? With these changes new ways of learning and interacting with media grow up. Informal learning will getting more and more important, formal learning settings and informal learning will accrete. Computer, digital devices and the internet are ubiquitous so that the ‘e’ can be neglected. The question «will e-learning die?» can be answered under two different facets: first on a semantic aspect and second on a structural aspect.

4.1. The End of the ‘e’ on a semantic aspect

E-learning as a concept has had his time. In the early 90’s of the last century it was necessary to define and describe the integration of computer technology in the learning process, because it was new. There were no experiences with this learning form before. Experiences had to be made and success factors had to be founded out by teaching, implementation and research.

But time is changing. In our point of view, in a few years, no one will use the term e-learning anymore. Already today there are a lot of existing terms to describe different learning forms for learning with computer or technology based learning: distributed, blended, mobile, distance, informal, and on and on.

But does this imply a new learning theory or a new e-learning wave? Media and technology are a usual part of our life; therefore we don’t need a special “e” for the subject we call learning. As Taylor (2007) said: “There’s no need to differentiate now between methods of content delivery. The battle is over, and e-learning has won. It’s a regular part of the learning mix”.

The main focus behind these entire concept is the term «learning». We have to think about the best terms and conditions of learning, with or without media and technology. How can we arrange in-depth learning processes? How can we educate the kids of today? We don’t need to separate between learning and e-learning because it’s getting usual and ubiquitous. Learning takes place everywhere. The main focus should be how to support learning, with or without technology. The quality of pedagogy is first dependent on qualitative teaching; media and technology are only the second factors of success. Furthermore the term e-learning is historically intimately connected with instructional design theory, and this doesn’t fit to constructivistic and connectivistic learning theories (Neuhaus, 2007, p. 5).

4.2. The End of the ‘e’ on a structural level

But not only the target group of learning scenarios, technologies and communications styles are changing as said before. There are tremendous changes in the field of e-learning too as we pointed out in chapter three. It’s also time to drop the ‘e’ from a structural perspective: Traditional e-learning courses often consist of Computer or Web Based Trainings (CBT/WBT) or content on learning management systems (LMS/LCMS), like islands at the internet, where students have to go to (Kerres, 2006); fixed courses with fixed content produced by the teacher. Traditional e-learning courses are designed from e-learning experts for learners. Production and contribution these forms of e-learning was too circumstantial. Furthermore this form of e-learning wasn’t very successful because the social component was missing, so that Blended Learning, a mix between online learning and traditional learning was seen as a concept so far.

But with Web 2.0 and social software there are some things changing. Users are creating their content and learn in other forms than traditional planned courses; learning in networks and communities is very widespread. Long courses however e-learning or Blended Learning have had their time, learning and further education is now changing. Instead of large e-learning courses small units of learning pieces will be integrated not only in educational settings, but also in usual life. Content is aggregating from different services for learning, like wikis, blogs, VoIP, tagging, etc.. Boundaries between e-learning 2.0 and general learning disappear. Web 2.0 changes learning into "ubiquitous computing" (Kerres 2006), learning and working is possible from everywhere, new learning communities will find each other. If you are connected to the Internet all over time, learning can take place everywhere and at every time. Social aspects of learning processes are more and more relevant, people are learning together in communities of practice, social networks or peer to peer.

Even the role of the author is changing, how Seitzinger (2006) pointed out: “... there seems to be a divergence between the learning content producers and the content users. While producers are trying to force everything into closed systems, the users want to use open systems. (...) We can already see a convergence between these new open media tools and constructivist learning: all three require the users to construct their own content.” (Seitzinger, 2006, p. 2). Users are creating their own content in an easy way of doing, bottom-up. Web 2.0 is changing role perception for learners and teachers.

Table 1: Differences between Web 1.0 and 2.0 according Kerres (2006) and Karrer (2007)

	Web 1.0 – instruction	Web 2.0 – construction
Learning environment ...	... is an island at the internet with content and tools	... is a portal to the internet with content and tools
Main components	Courseware, LMS, Authoring tools	Wikis, Social networking and bookmarking tools, Blogs, Add-ins, Mash-ups
Ownership	Top-down, one-way	Bottom-up, learner-driven, peer learning
Delivery	At one time	When you need it
Teacher ...	... is creating all resources at the island	... is creating directories, is aggregating resources
Teacher’s tasks ...	... teaching – explanation – instruction	... observation – coaching – moderation
Learners ...	... is using the given learning materials	... is setting up his/her own personal learning environment
Learner’s tasks ...	... receive – recall – exercise	... decision – action – reflection

This change has effects of the traditional role perception in teaching. Learning and teaching is changing from fixed e-learning courses and ready-mades to constructivist learning environments. Learners are self-directed, are solving real situative problems (Brown, Collins und Duguid 1989)

4.3. Personal learning environment and learning networks

To scope with the problem of the neglected “e”, the integration of formal and informal learning processes, with or without media seems to be the solution. The main part is to construct one’s own learning space, a setting where the own education and learning process can be haunt.

Personal learning environments and networks like communities of practice for formal learning or the blogosphere for informal learning might be an answer. The goal is to create a personal learning environment and to combine the advantage of technology based learning and social learning. But the main term remains learning.

“The idea of a Personal Learning Environment recognises that learning is continuing and seeks to provide tools to support that learning. It also recognises the role of the individual in organising their own learning. Moreover, the pressures for a PLE are based on the idea that learning will take place in different contexts and situations and will not be provided by a single learning provider. Linked to this is an increasing recognition of the importance of informal learning.” (Attwell, 2007, p.1).

Beside Personal Learning Environments learning networks are getting more and more important. The role between teacher and learner blur. Micromentors (Attwell, 2007) that means not a tutor or a teacher but rather peers are involved more and more in the learning process of the individual. As Rudd & Facer (2007, p. 3) said “[...] we need to move away from the institutionalised logic of the school as a factory, to the network logic of the learning community.”

Life long learning will become reality, when the learner is connected anytime to the internet and has access to every kind of information: Informal information like information in communities, blogs etc. or formal information, like courses and information from institutions, i.e. schools or universities. Learning environments will exist over institutional boundaries. Learners can aggregate and integrate these different forms of information to their own personal learning environment. Customization of learning material will take place in real-time and focused on problems, individualistic and customized learning material for learning just in time and all over the lifetime.

5. The Digital World with Digital inhabitants

Currently we are living in a social world that is changing dramatically. Information is digitalized and supports our daily life. We have to learn how to scope with these changes. And it’s a task for everyone, the little schoolboy and schoolgirl and the old woman and her husband. In a society where computers with lots of information will get more and more important, society have to look critical about it and have to build up new competencies.

But what are the implications of this learning scenario for learners and teachers of today? Apart from learning how to use this new technologies (keyword media competences) teachers and learners will have to acquire new and higher ordered competencies as shortly said in chapter three.

Learners first have to learn how to use this new technology. Not once, technologies are changing a lot of time, so they have to learn life long how to use future technologies for learning. But the most important learning task is how to validate new information, how to integrate them to their cognitive space, how to scope with this mass of information.

Information literacy will be an important competence. Searching for information and the evaluation of information requires reflection and of course critical thinking. Information competence comprises “filtering of relevant information and integrating of relevant information in prevalent cognitive structures to transform information into knowledge” (Winter, 2001). They have to learn how to trust information, how to guarantee things like authorship. "The ability that is needed to solve problems within non-routine tasks requires competence in finding, handling and creating relevant knowledge“ (van Weert, 2006, p. 223). *Teachers* have to learn change from their role of knowledge provider to a role of communicator and coach. They don't have to teach hard facts, because they were available at the internet in different forms and sources. They have to help building knowledge by supervising and structuring of learning content. Teaching thinking skills will be a great challenge. Even more lifelong learning will be a requirement for teachers because technologies are changing often and fast. They have to be “up to date” to integrate new developments in technology into their lectures. Recapitulatory, it can be said “according to U-Teacher (2005), a European project on Teacher's professional development in ICT for education, characteristics of a successful teacher are:

- To work effectively in the rapidly changing educational field, teachers should be able to adapt to change, to be flexible, intuitive, innovative and persistent.
- They should also be highly collaborative, demonstrating good interpersonal skills in creating opportunities to communicate and share knowledge, experience and ideas with others.
- Teachers should be problem solvers who are willing to take risks to find solutions to educational issues, and decision-makers who use their experience to motivate students and enhance their learning.
- On the one hand teachers should be enthusiastic, creative, intellectually curious, resourceful and positive, and on the other they should be systematic and well organised, focused, determined and hardworking” (van Weert, 2006, p. 234).

A remarkable point of this last chapter is that until now we wrote anything about technological issues. According to Mark Weiser who has already written in 1991 about his ideas about pervasive computing (Weiser, 1991) we have to bear in mind that mobile devices and internet access will be ubiquitous. Maybe the next step of e-learning is u-learning. However, it must be summarized that the topic is learning and technology is supporting it in manifold ways.

In the end it must be expressed that only critical thinking inhabitants will use and learn with this new technology responsible, sustainable and avoid scenarios like «I, Robot» or Orwells «1984». Technology will influence our daily life as well as our learning behaviour, but in a way we cannot imagine yet. Nowadays nobody is thinking about a pencil for writing and nobody is thinking about using a calculator for doing a calculation and so nobody will think about using a personal internet connected device for getting some information or learning materials. The main difference is that this change will be one of the greatest in the history of the learning mankind. We are very sure that in some years nearly nobody will talk explicit about e-learning – learning and computer are inseparably connected.

Literature

- Ally, M. (2007). Mobile Learning. *The International Review of Research in Open and Distance Learning*, 8 (2). Retrieved from:
<http://www.irrodl.org/index.php/irrodl/article/view/451/918>. [13.08.2007].
- Attwell, Graham (2007). The Personal Learning Environments – the future of eLearning? *eLearning Papers*, 2 (1), Retrieved from:
<http://www.elearningeuropa.info/files/media/media11561.pdf> [13.08.2007].
- Azuma, J., Maurer, H. (2007) From Emoticon to Universal Symbolic Signs: Can Written Language Survive in Hyperspace?, In: Lindner, M., Bruck, P.A. (Ed.), *Micromedia and Corporate Learning*, 3rd International Microlearning Conference, p.106-122.
- Berners-Lee, T (1989).: Information Management: A Proposal. Retrieved from:
<http://www.w3.org/History/1989/proposal.html> [13.08.2007].
- Boekaerts, M. (1999) Self-regulated learning: where we are today. *International Journal of Educational Research*, 31, p. 445–457.
- Brown, J.S.; Collins, A.; Duguid, P. (1989). *Situated Cognition and the culture of learning*. In: *Educational Researcher*, 18 (1), p. 32-42.
- Cambridge, B. (2007). Learning, Knowing, and Reflecting: Literacies for the 21st Century. *International Journal for the Scholarship of Teaching and Learning*, 1 (2), 1-7. Retrieved from: <http://www.georgiasouthern.edu/ijstol> [17.8.2007].
- Castells, M. (2006). *The rise of the network society. The information age: Bd. Vol. 1*. Malden, MA: Blackwell.
- Centre for Educational Research and Innovation. (2007). *Giving Knowledge for Free: THE EMERGENCE OF OPEN EDUCATIONAL RESOURCES*. : OECD. Retrieved from:
<http://213.253.134.43/oecd/pdfs/browseit/9607041E.pdf> [27.6.2007].
- Collis, B. (1998) New didactics for university instruction: why and how? *Computers & Education*, 31 (2), p. 373-393.
- Downes, S.: E-learning 2.0. *ACM eLearn Magazine*, October 2005 (10).
- Green, H. & Hannon, C. (2007). *Their Space: Education for a digital generation*. London: DEMOS. Retrieved from: <http://www.demos.co.uk/files/Their%20space%20-%20web.pdf> [18.7.2007].
- Holzinger, A., Nischelwitzer, A., Meisenberger, M. (2005a): Mobile Phones as a Challenge for m-Learning: Examples for Mobile Interactive Learning Objects (MILOs). In: Tavangarian, D. (Ed.): *3rd IEEE PerCom* p. 307-311.
- Holzinger, A., Nischelwitzer, A., Meisenberger, M. (2005b): Lifelong-Learning Support by M-learning: Example Scenarios. *ACM eLearn Magazine*, 5 (2005).
- Karrer, T. (2007). Understanding E-learning 2.0. In: *Learning Circuits*. Retrieved from
<http://www.learningcircuits.org/2007/0707karrer.html> [13.08.2007].
- Kerres, M. (2006). *Potenziale von Web 2.0 nutzen*. In: Hohenstein, A. & K. Wilbers (Ed.) *Handbuch E-Learning*, München: DWD-Verlag.
- Leinonen, T. (2007): *Building the Culture of (e-)Learning in Microcontent Environments*, In: M. Lindner & P.A. Bruck (Ed.), *Micromedia and Corporate Learning*, 3rd International Microlearning Conference, (p. 24-34).
- Lenhart, A. & Madden, M. (2005). *Teen Content Creators and Consumers*. Washington, DC: Pew Internet & American Life Project. Retrieved from:
http://www.pewinternet.org/pdfs/PIP_Teens_Content_Creation.pdf [31.7.2007].

- Neuhaus, W. (2007). *Web 2.0 und der Kampf der Begriffe*. Berlin, Blog Mediendidaktik - http://www.mediendidaktik.port07.de/docs/neuhaus_2007_04.pdf [13.08.2007].
- OECD (2007). *Giving Knowledge for Free: The Emergence of Open Educational Resources*. <http://www.oecd.org/dataoecd/35/7/38654317.pdf> [15.08.2007].
- Oblinger, D. D. & Oblinger, J. L. (Hrsg.). (2005). *Educating the Net Generation*. Verfügbar unter: <http://www.educause.edu/educatingthenetgen>. [13.08.2007].
- Oblinger, J. L. (2005). Is it age for IT: First Steps Toward Understanding the Net Generation. In D. D. Oblinger & J. L. Oblinger (Hrsg.). *Educating the Net Generation*. (p. 2.1-1.5).
- O'Reilly, T. (2006) Web 2.0: Stuck on a name or hooked on value? *Dr Dobbs Journal*, 31(7), p. 10-10
- Preece J., Sharp, H., Rogers, Y. (2002) *Interaction Design: Beyond Human-Computer Interaction*. New York: Wiley.
- Prensky, M. (2001). Digital natives, Digital Immigrants. *On the Horizon*, 9 (5), p. 1-6.
- Richardson, W. (2007). *The Future of Teaching*. Retrieved from: <http://weblogg-ed.com/2007/the-future-of-teaching/> [13.08.2007].
- Rudd, T. Sutch Dan & Facer, K. (2007). *Towards new learning networks*. : Futurelab.
- Sharples, M. (2007). *Big Issues in Mobile Learning*. Report of a workshop by the Kaleidoscope Network of Excellence, Mobile Learning Initiative, University of Nottingham, 2007.
- Seitzinger, J. (2006). *Be constructive: Blogs, Podcasts, and Wiki as Constructivist Learning Tools* (eLearning Guild) Learning Solution e-magazine.
- Taylor, D. H. (2007). *It's Time to Drop E-learning*. Retrieved from: <http://www.trainingzone.co.uk/cgi-bin/item.cgi?id=170224> [13.08.2007].
- van Weert, T. (2006). Education of the twenty-first century: New professionalism in lifelong learning, knowledge development and knowledge sharing. *Education and Information Technologies*, 11 (3-4), 217-237.
- Winter, U. (2001, 04. Oktober). *Kampf gegen die Informationsüberflutung: Neue Wege zur Herausbildung von Informationskompetenz bei Mitarbeitern und Bibliotheksnutzern*. Retrieved from: <http://www.db-thueringen.de/servlets/DerivateServlet/Derivate-994/winter.html> [24.7.2005].
- Weiser, M. (1991): The computer for the twenty-first century. *Scientific American*, 265 (3) p. 94-104.
- Ziefle, M. (2002): The influence of user expertise and phone complexity on performance, ease of use and learn ability of different mobile phones. *Behaviour & Information Technology*, 21(5) p. 303-311.