INFO-1070
Primljeno/Received: 2008-11-21

UDK: 159.953:681.3
Izvorni znanstveni rad / Original Scientific Paper

TECHNOLOGY ENHANCED LEARNING BETWEEN TECHNOLOGY AND HUMANISM

UČENJE POTPOMOGNUTO TEHNOLOGIJOM IZMEĐU TEHNOLOGIJE I HUMANIZMA

Marko Ivanišin

Faculty of Electrical Engineering and Computer Science; University of Maribor, Maribor, Slovenia
Fakultet za elektrotehniku, računarstvo i informatiku, Sveučilište u Mariboru, Maribor, Slovenija

A b s t r a c t

In this article we tried to show how technical perspectives on technology enhanced learning (TEL) integrate into learning theories. Our intention was to widen technical horizons by showing on theoretical implications that existing horizons have. We discussed two in our opinion most present understandings of technology in learning, the dictum of "invisible software" and the exclusiveness of task-oriented approach of technology, and tried to make clear in which theoretical tradition they can be ordered. By that and by showing on theoretical approaches that represent other perspectives, especially the humanist one, we hope to have opened the technical perspective for new and different approaches to TEL. As a result we opened a discussion on two questions we believe are today crucial in TEL: who takes responsibility for learning in personal learning environments (PLE) and what role the content (respectively domain-specific knowledge) has in the "era of task-conscious learning proponents". Our conclusions were that, firstly, learning responsibility in TEL and PLE is carried by learners only indirectly as it is the technology that allows personalization and by that carries direct responsibility for learning. And secondly we believe that for TEL the learning model has to stress the content part of learning. We suggested the model of parallel learning that stresses dichotomous and dialectic character of learning theories which often present two alternative approaches (task- and learning-conscious, skills and domain-specific knowledge, technology and content). Like we have argued in this article in our opinion the academic TEL discussion focuses too much on task orientation, therefore our model advocates building learning process upon the learning-conscious domain.

S a ž e t a k

U ovom je radu pokušano prikazati kako se tehničke perspektive tehnnološki potpomognutog učenja integriraju u teorije o učenju. Namjera je bila proširiti tehničke horizonte, prikazujući na teoretskim implikacijama postojeće horizonte. Razmotrena su dva najčešće spominjana shvaćanja o tehnologiji u učenju, dogmu o "nevidljivom software-u" i ekskluzivnost pristupa usmjerenog riješavanju zadatka, te je nastojano razriješiti koji teoretski pristup može biti primjenjen. Prikazujući i ostale teoretske pristupe koji reprezentiraju i ostale prerspektive, posebno humanističku, nadam se da je otvorena nova tehnička perspektiva prema učenju potpomognut tehnologijom. Kao rezultat pokrenuta je diskusija, koju smatramo najvažnijom kod proučavanja učenja potpomognuto tehnologijom: tko preuzima odgovornost za učenje u osobnom okruženju za učenje i koju ulogu sadržaj (specifično znanje) ima u vremenu "učenja usmjerenog prema određenom zadatku". Zaključak je bio da, kao prvo, odgovornost za učenje kod učenja potpomognutog tehnologijom kod onih koji uče je indirektna, jer tehnologija omogućuje personalizaciju i kao takva nosi direktnu odgovornost za učenje. I kao drugo, vjerujemo da kod učenja potpomognutog tehnologijom treba naglasiti sadržajni dio učenja. Predlažemo model paralelnog učenja koji naglašava dihotomni i dijalektički karakter teorija o učenju koji često predstavlja dva alternativna pristupa (svjesnost zadatka i procesa učenja, vještine i specifično znanje, tehnologiju i sadržaj). Kao što je naglašeno u članku, akademska diskusija o učenju potpomognutim tehnologijom se previše fokusira na sam zadatak učenja, dok ovaj model zagovara proces učenja koji se temelji na svjesnosti o učenju.

Introduction: two dictums of technical perspective on technology enhanced learning and limitations of this article

Using Internet and new technologies for learning opens a big variety of perspectives that the technology enhanced learning (TEL) can be observed from. In opposite to "traditional learning" (involving classroom, blackboard, teacher and learners) that was mainly if not exclusively reflected by humanist disciplines like pedagogy, the implementation of technologies made learning a playground for technical disciplines (e.g. informatics, automation)

and their (ways of) observations. Moreover it is technical disciplines that coin terms and phenomena commonly accepted and used in current academic debates on learning (e.g. web-based-learning, LMS/LCMS, PLE/e-learning 2.0) whereas humanities are chasing after with rare innovative theoretical reflections (e.g. connectivism).

The technical perspective on human-machine interaction, a part of which is in technical sciences also TEL, can be extracted from the Editorial to the special issue of Springer's Journal Universal Access in the Information Society on "User-centered interaction paradigms". Although the issue was (supposed to be) on user-centered interaction it is hard to ignore editor's accentuation of technology, its potentials and efficiency in articles to follow. Since it is or should be clear that the humanist perspective is quite if not completely different from the technical standpoint we will here focus on one of the assumptions of TEL (and more general of human-machine interaction) that seems to hold stand in technical *and* humanist disciplines respectively it has not been reflected at all in humanist literature. The assumption is well expressed in the an academic journal editorial and reads "the augmented reality equipment should be integrated into the user's natural environment in a seamless way" /**1**/. We will come to some expressions used in this quote in a minute let us first focus on the *seamless way* of integration of equipment into user's environment. Not only here but also in scholar articles on quality of TEL the dictum of the "invisibility" of the technical tool supporting the learning process is one of central quality criteria. /**2//3**/ More concrete this first dictum we will reflect on here means that the software should be adapted to the learner's skills and needs to the level that the learner does not have to "spend" his/her time and cognitive capacity for learning how to use the software but should be enabled to focus only on learning the contents. The learner should not "feel" that there is a tool between him/her and the content and should instead have the feeling that he is learning like in a lecture at school or from the book at home. Namely, following the technical argument, it is the contents that learner wants to learn not the software/medium. This perspective respects software usability as the dominant criteria of e-learning quality and is sound with our more general observation in the beginning that technology dominates the TEL discourse.

The second dictum points in other direction which will become clear after our discussion on the first dictum. There are some theoretical discussions done by scholars in technical disciplines stressing that learning to learn, a humanists' thought, is the central model of TEL and that learning domain-specific knowledge is the accompanying result. Moreover they presuppose that "learning environment, i.e. a network of people, artefacts, and tools (consciously or unconsciously) involved in learning activities, is part of *learning outcomes* and not instructional condition" /**4**/. The thoughts on learning to learn are clearly to subscribe to humanist theories to which we will refer here, but is it like this also with the presumption that learning environment is a learning goal and not a learning condition?

Although in this article we focus on theory of only two dimensions of TEL, the technology and the knowledge obtained from the learning process, it needs to be said that TEL in many ways on pragmatic and/or practical level revolutionizes learning paradigms we will be talking about. By allowing physical distance between learner and teacher it generates (via Internet, CD-Rom etc.) formal learning in situations that else would not be possible and moreover with simulations in virtual classrooms (or even in virtual spaces/lives) it expands classical learning situations (in classroom, laboratory etc.) to learning processes and knowledge acquisition experiences that would else not be possible (e.g. medical operations, environmental impacts etc.). These developments although crucial for theorizing on TEL go beyond the scope of this article, which tries to answer the question *what* are technology and learning when they are connected to TEL and not *how* they are (or can be) connected. In the same rationale this article leaves out other practical developments of technology for learning (e.g. personalization and personal learning environments) to stay focused on the dimensions named above. Moreover we can account these developments to process oriented (unconscious) learning as through innovative (technical) approaches that bring "machine" and "man" closer together the learner is less and less aware of the learning situation and more and more of what the technical tool can provide for him to experience the (virtual) reality.

To discuss the two dictums and answer questions posed above we will now look at theory on learning and epistemology. We will start by using the expression from editorial that spoke about user's *natural* environment.

Theory on learning

Epistemological paradigms and learning

There are basically two more or less opposing epistemological paradigms that learning theories are built on. When we are talking of *natural* order (and mean that *things are like they are*) as opposed to cultural (that *is not any more the same as it was in the state of natural*) we are thinking inside the paradigm

of objectivism. The other paradigm advocates that natural order exists by itself (as subject or Kantian *ding-an-sich*) but not when somebody picks it up to reflect it or report on it (as object or *ding-fuer-sich*). As a matter of fact natural is continuously disappearing from our environment (and we do not address here the environmental pollution) because even natural sciences are recognizing that what they observe is product of their observation and not the nature itself.

The difference between objectivism and constructivism derives mainly from the answer to the question What is truth? In the perspective of objectivism truth is reproduction of reality, as there is one reality there is one (objective) truth. The paradigm of the objective truth awards legitimacy to all further exclusive phenomena, assigned to learning these phenomena could be knowledge, teacher, and learning. There is specific (professional, not lay) knowledge that is meant to be learnt, the teacher has the role of transferring the knowledge to the learner, and to learn means to acquire, understand, memorize, and reproduce the knowledge presented by the teacher. What matters as the result of learning is whether the assessed knowledge of the learner (output) is coherent with the knowledge presented by the teacher (input). Opposed to that constructivists are not interested into what is the truth but in what are and why and how occur various and different interpretations of it. Therefore the implication of everything absolute and exclusive is redundant. Instead constructivism advocates observational (and learning) methods that change "old" (always existent) meanings and values and promote new relations and dependencies between "old" phenomena. In some ways in addition and in other ways in opposite to objectivism constructivism therefore praises (also) lay knowledge, informal learning and allows the learner to switch into the role of the teachers by presenting his/her (learner's) views of contents concerned.

In the table below there is an indexed comparison of what implications both paradigms have on various elements of learning.

Table 1: Implications of objectivism and constructivism on learning (compare to /**5**/)

Elements	Objectivism	Constructivism
one reality	→ one truth	→ multiple interpretations
learning goal	knowledge transfer from teacher to learner	exploration and production of individual knowledge concepts
learning process	linear (by lecture chapters)	hyper textual (by learners interests)
orientation	teacher-centred	learner-centred
role of teacher	master of knowledge	moderator of information and learning process
role of learner	passive audience	active researcher
interaction	linear teacher to student, occasional feedback	spiral teacher-student and student-student
materials used	lecture notes (.doc, .ppt)	links to various sources of information

Learning theories and technology enhanced learning

Although some authors list epistemological paradigms and learning theories in a different manner to us most sense makes following indexing. There are four major learning theory groups: behaviorist, cognitive, humanist and social/situational theories (for overview see Table 2). Objectivism sets more or less the ground for the first two groups and constructivism for the later two. To refer to the first of the two dictums in the introduction we will first focus on some basic premises of cognitive learning theories and link them to the technical perspective of e-learning as we believe that this connection is most plausible. Nonetheless the "metaphor of the mind [is used] as computer: information comes in, is being processed, and leads to certain outcomes" /**6**/. Further we will focus on humanist approach to learning and try to argue why we believe that the technical perspective does not promote learning (in e-learning) but is concerned with frictionless knowledge transfer. Humanistic approach to learning will also be the

theory that will help us to reflect on the second introductory dictum.

Both, the technical perspective of TEL and the cognitive learning theory focus on the question how to most efficiently transfer knowledge from teacher to learner /**8**/. Leaving out the constructivist question how knowledge emerges at all, it advocates a learning process that is totally controlled by the teacher. The success formula "well prepared is well taught and well taught is efficiently learned" means that if learning is well organized (which it is in formal education) and the learning content is well structured (which applies to all levels of knowledge from vertical structure of academic disciplines down to clear structure of a topic into chapters) than best learning results are guaranteed. In the technical perspective the role of the teacher is taken by the learning software (LMSs, LCMSs, etc.) which should only enhance but cause no barriers when input (teacher's knowledge) has to be transformed into (best possible input copy) output (learner's knowledge). This can be achieved only if it is "user friendly" to the extent that the user/learner does not have to use his/her time and cognitive capacities to figure out how to use the electronic version of the learning content but can concentrate on the content itself /**9//10**/.

Learning is often divided in conscious and unconscious learning or in learning as a product and learning as a process. Formal education and situations that learners themselves identified as contributing to their knowledge are referred to as *conscious learning or learning as a product*, and situations that cause our behavior or state of mind change because of the experience we gained from the situation but we are not aware that this process took place are referred to as *unconscious learning or learning as a process*. There is an addition to that made by A. Rogers who renamed both phenomena to *learning-conscious* and *task-conscious learning* arguing that in the so called unconscious learning we are still conscious of the task to perform (but not that we went through a learning process to perform it). /**11**/ The idea of dichotomy of learning was strongest promoted by Carl Rogers who broke with the cognitive learning tradition and claimed that learning challenges also the intuitive and emotional (not only cognitive and logical) skills. He introduced the idea of holistic learning and established humanist approach. But the more relevant part for our discussion are other elements that C. Rogers identified as being present in learning:

- learning is always self-initiated; even when the initiative comes from outside (e.g. formal

Table 2: Overview of learning theory groups /**7**/

Aspect	Behaviorist	Cognitivist	Humanist	Social and situational
Learning theorists	Thorndike, Pavlov, Watson, Guthrie, Hull, Tolman, Skinner	Koffka, Kohler, Lewin, Piaget, Ausubel, Bruner, Gagne	Maslow, Rogers	Bandura, Lave and Wenger, Salomon
View of the learning process	Change in behaviour	Internal mental process (including insight, information processing, memory, perception	A personal act to fulfil potential.	Interaction /observation in social contexts. Movement from the periphery to the centre of a community of practice
Locus of learning	Stimuli in external environment	Internal cognitive structuring	Affective and cognitive needs	Learning is in relationship between people and environment.
Purpose in education	Produce behavioural change in desired direction	Develop capacity and skills to learn better	Become self-actualized, autonomous	Full participation in communities of practice and utilization of resources
Educator's role	Arranges environment to elicit desired response	Structures content of learning activity	Facilitates development of the whole person	Works to establish communities of practice in which conversation and participation can occur.
Manifestations in adult learning	Behavioural objectives Competency -based education Skill development and training	Cognitive development Intelligence, learning and memory as function of age Learning how to learn	Andragogy Self-directed learning	Socialization Social participation Associationalism Conversation

education) the personal conditions necessary for learning (interest, tolerance etc.) come from inside the person.
- learning affects the person as a whole (holistic learning), it changes its behavior, attitudes and maybe even the personality.
- the essence of learning is the meaning that it has for the learner (not the meaning it has for the teacher) so learning can only be evaluated by the learner (not by tests structured by teachers).

With basic knowledge on cognitive and humanist approach to learning we can reconsider whether the quoted presumption that learning environment is a goal not a condition can be subscribed to humanist theory or does it continue cognitive tradition. As one can read from Table 2 for constructivists and herewith for humanists the learning goal is "exploration and production of individual knowledge concepts". Does this include setting up "a network of people, arte-facts, and tools (consciously or unconsciously) involved in learning activities" from the quote? It certainly does. But the constructivist learning goal is broader and includes more. At this point we would have to go beyond the analyzed quote which further reads: "Adaptation strategies go beyond navigational adaptation through content artefacts along a predefined path: for example, some learners may prefer to email an expert instead of reading an online paper. Adaptation has to take place along individualized activities performed in these environments. Inherently, these learning environments are always networks" /**12**/. However authors do not give any further reference to better understand their thoughts, so we must conclude that what they mean by learning goal is setting up a network of artefacts, people, and preferred tools for learning.

To conclude, from the technical perspective we have two seemingly contrasting approaches to the role of technical tool in TEL. On the one hand the approach of "invisible" software and on the other hand an approach that makes, by building up a network, the process of learning to the learning content. If we apply the later to TEL we can say that it is about learning how to pick and use technical tools to set up an individualized learning environment of artefacts and people. As such it is nothing else but learning the technical tool since learning the content (artefacts) does not appear to be addressed as (one of) learning goal(s). This approach is in our opinion too centered on the learning process (and technical tool) that it could be subscribed to the humanist learning theory. Furthermore it does not address reflection of the learning process so it is basically concerned only with the question how to use technical tools (and not with the question How do I learn?).

New discussions on technology enhanced learning: responsible parallel learning

Learning responsibility

In the center of humanist learning theories is the learner just like the individual (not the system) is in the centre of constructivist paradigm. As described above it is the learner who initiates learning (or at least allows the externally initiated learning to reach him/her), it is him/her who decides over the learning process, so it is also him/her who takes responsibility for what he/she learned.

We believe that the question of responsibility in learning is a crucial one. A discussion on this topic is widely missing in scholar perspectives on TEL. It sounds like a paradox having papers on personal learning environments (PLE) substituting or upgrading traditional and formal education structures (of responsibility) but the question of who and how is going to monitor learners' achievements is left out of the agenda. With PLE namely the teacher in the role of the learners' supervisor is disappearing /**13**/. Although already in 1975 Knowles introduced the concept of self-directed learning which was accompanied by self-responsibility of the learner that increases self-esteem and produces an inquiring mind on everything one does, later empirical evidence showed that teachers taking responsibility for learning results is the most common and most efficient model (in secondary schools of USA) of learning responsibility distribution /**14**/. So who takes responsibility in the era of PLE? We will use some non-academic quotes here, since the academic debate on this topic has not blossomed yet. Some professional trainers still prefer to push the responsibility to the collective/organization/system /**15**/, while others believe that it has always been the responsibility of the teacher to ensure achievement of learning objectives which for PLE means to ensure "the community has the support and guidance required to achieve the learning objectives" /**16**/. We will come to the question of learning objectives in TEL and PLE later, let us first clear the responsibility question.

We for our part believe that the learning responsibility in TEL is primarily in the hands of the learner but to a part also in the hands of technology provider. Respectively using technology to learn allows learner to be responsible for his/her learning activities to a much wider extent that he/she was able to do it in the classical learning situation (including teacher). Therefore we furthermore believe that technology gives external

conditions to learners and learning environment to fulfill the constructivist paradigm's and humanist learning theory's idea of self-responsibility. Without technology (and with the teacher) this idea can be fulfilled only internally and depends on learner's decision to take responsibility for learning (or in opposite to "blame it on the teacher"). Here we are coming back to our initial claim that technology (technical tools and/or learning software) has to be revealed to the learner instead of being invisible. It has to be reveled out of two reasons: Firstly we agree with the quote above that technology is there for the learner to make choices that construct his/her reality respectively that he/she by choosing to email an expert instead of reading an online article creates his/her PLE. For doing that the learner must understand how the technology works, he/she must invest time and cognitive skills in exploring it. Only by doing that (explorative learning) the learner makes full usage of the technology which becomes part of the learning content and is not only the administrative tool (like argued by the proponents of the technical invisibility). But moreover and secondly the technology must be also reflected. Than the learner will understand how he/she learns and will be able to improve the learning only if he/she reflects on it. Reflecting on the learning process in TEL means reflecting on the technology. So the reflection of technology must be either part of the learning contents or the technology itself forces learners to reflection of usage.

Parallel learning and learning practice

Here we will develop a holistic learning concept for TEL. We are calling it parallel learning to stress the two components that are in our opinion central in learning concerned. The one component has already been stressed a lot in this article and in scholar papers referenced in it. It is the component of using technical tools to learn. Like argued above, using the technical tool can be seen as the process of learning to learn (if we allowed reflection on it). It serves to create PLE or to administer the learning process in e-learning, it puts control over learning in hands of the learner. It develops learner's skills and abilities and we agree that these are equally if not even more important as domain-specific knowledge. However extending domain-specific knowledge remains main learning objective and the technical tool changes just the approach to it but does/should not replace this objective.

Therefore the second component is the learning content (domain-specific knowledge). In learning theory and its approaches it is integrated into pedagogical strategy and didactical methods (as learning objective). Since content is widely missing its recognition in technical perspective of TEL, we are stressing it here. If content is put aside and learning concentrates just on using technical tools than we are dealing with a too general form of learning. A form of learning that includes all our actions and has already been referred to as task-conscious learning. Like said, many scholar papers written from technological perspective consider (deliberately or not) such learning when they are reporting on (e-learning) software usability.

In fact, task-conscious learning is another expression for our everyday life, it includes everything we do, because all our actions are bound to objects respectively tasks or intentions. If we read a blog we can do it out of more and various intentions, let us compare two of them here. If we are reading it out of boredom, just to do something etc., we are improving our ability (learning) to read (since we did not decide to draw or play a videogame). If we are reading it because we are interested into what it says we are improving our knowledge (learning) on the blog's topic. In reality in both cases we improve both, reading skills as well as knowledge on the topic, whereas improving knowledge on the topic is a typical learning objective of learning-conscious learning (formal education).

From theory and more concrete from the last example it is clear that learning-conscious learning includes also task-conscious learning. We are stressing that because we believe that the learning-conscious model should play a more important role in scholar papers on TEL and that technology should not only be advocated to provide task-conscious learning. In fact, being aware of both models, one can easily implement the learning-conscious and the task-conscious is automatically included. Namely learning-conscious model means that learners are aware they are in a learning situation and in task conscious they are not aware that they are (always) learning. So by putting learners in a learning situation and define tasks that learners would otherwise not consider to be part of (formal) learning, we make task-conscious learning to learning-conscious learning. Here is a concrete example of such task: "Find an internet site that reports on TEL or on some aspects of it and follow the link that you find most interesting on the site. From the second site follow again the most interesting link and so forth until you have opened 5 sites. Report in the end on what you have learned on TEL." In this way learners will understand that internet browsing (and looking for information) is part of learning and not only a way to fight boredom (that can be defined as a task).

To sum up, parallel learning stresses the dichotomies that appear in learning theory. We

believe that they must be implemented into learning practice. Moreover we suggest to take the learning-conscious model (representing formal education, content, and domain-specific knowledge) as a base that the task-conscious model (informal education, skills, technology implementation) can be integrated in.

Conclusion

Humanistic theory and current discussions on learning put the learner in the centre and try to interpret learning from his/her perspective. Next to many theoretical discussions however there is little empirical research made on the subject. One of the few surveys made on TEL from the learners' perspective was done by Ehlers in 2004. He interviewed 56 and later polled 2000 users of e-learning to identify e-learning quality criteria that matter for learners. He structured results in 30 "dimensions of quality in e-learning" (having 153 "factors of subjective quality" beneath and 7 "fields of quality" above) and two of these dimensions supported the idea that users are anxious to learn the technical tool used for e-learning as well as the content of e-course (other dimensions referred to tutor support, cooperation and communication, costs-value relationship of the course, course structure, didactics, and information transparency). The named dimensions are originally described as "The user is interested in the course not only because of the course topic but also because of interest in online learning and the usage of the internet." and "This dimension contains criteria that express that the course should enable users to gain learning literacy and become more skilled in their life long learning competencies." /**17**/

We believe that this empirical results support discussions we made in this article. If learners are anxious to learn how to use the software that shapes their learning environment the software must be built in a way to allow learners to explore and understand it. If the software is invisible and perfectly fitted to activities the learner has to perform during learning process than it gives no opportunity to be explored but it is only a predetermined path/ instruction to be uncritically followed. Another advocacy we make to prevent TEL from being too technically oriented both in theory and practice is by introducing a learning model that stresses domain-specific knowledge to be the leading orientation of course design. With parallel learning we intended to put knowledge back in the hands of the learner. In the new learning theory of connectivism it was torn from him/her and put into the domain of networks and technology /**18**/. However this discussion will need further theorizing in the future.

References

/1/ Stary, C. (2006): Special UIAS issue on "User-centered interaction paradigms for universal access in the information society". *Universal Access to Information Society 4/2006*. p. 175

/2/ Ardito, C., Costabile M.F., Marsico, M., Lanzilotti, R., Levialdi, S., Rosselli, T., Rossano, V. (2006): An Approach to Usability Evaluation of E-Learning Applications. *Universal Access in the Information Society 4/2006*. pp. 270 - 283

/3/ Lanzilotti, R., Ardito, C., Costabile, M.F. (2006): eLSE Methodology: a Systemic Approach to the e-Learning Systems Evaluation. *Educational Technology & Society 4/2006*. pp. 42-53

/4/ Wild, F., Moerditscher, F., Sigurdarson, S. (2008): Designing for Change: Mash-up Personal Learning Environments. *eLearning Papers 9/2008*. Accessed at www.elearningpapers.eu on July 25th 2008. p. 2.

/5/ Khalifa, M. and R. Lam (2002): Web-Based Learning: Effects on Learning Process and Outcome. *IEEE Transactions on Education*, Vol. 45, No. 4. p. 351

/6/ Learning Theories Knowledgebase (2008): Index of Learning Theories and Models at Learning-Theories. Accessed at *http://www.learning-theories.com/cognitivism.html* on July 18th, 2008. p. 1.

/7/ Smith, M. K., (1999): Learning Theory. The encyclopedia of informal education. Accessed at *http://www.infed.org/biblio/b-learn.html* on July 15th. p. 5. Cited from Merriam, S. and Caffarella (1998) *Learning in Adulthood. A comprehensive guide*, San Francisco: Jossey-Bass.

/8/ Fox, Stephen (1997): Situated Learning Theory Versus Traditional Cognitive Learning Theory: Why Management Education Should Not Ignore Management Learning. *System Practice*, Vol. 10, No. 6, pp. 227 – 228.

/9/ Ardito et al., op. cit. /2/, p. 272

/10/ Lanzilotti et al., op.cit. /3/, p. 43

/11/ Smith, M. K., op.cit. /7/, p. 1 and pp. 3-4. Cited from Rogers, A (2003): *What is the difference? A new critique of adult learning and teaching*. Leicester

/12/ Wild et al., op. cit. /4/, p. 2.

/13/ Schaffert, S. and Hilzensauer, W. (2008): On the way towards Personal Learning Environments: Seven crucial aspects. *eLearning Papers 9/2008*. Accessed at www.elearningpapers.eu on July 25th 2008. p. 9.

/14/ Lee, V. E., Smith, J. B. (1996): Collective Responsibility for Learning and Its Effects on Gains in Achievement for Early Secondary School Students. *American Journal of Education* Vol. 104, No. 2, p. 103.

/15/ NN (2008): Responsible Learning. The Learning Revolution. Accessed at *http://thelearningrevolution.blogspot.com/2008/03/responsible-learning.html* on August 4th 2008 p. 1.

/16/ Leyden, M. (2008): Professional Responsibility? From the Tram – Mick thinks about social media and stuff. Accessed at *http://micktl.wordpress.com/2008/03/11/professional-responsibility/* on August 4th 2008. p. 1.

/17/ Ehlers, U. (2004): Quality of E-Learning from a Learners Perspective. *European Journal of Open Distance and E-Learning*. Accessed athttp://www.eurodl.org/materials/contrib/2004/Online_Master_COPs.html on May 5 2008. p. 5.

/18/ Siemens, G. (2005). Connectivism: A Learning Theory for the Digital Age. *International Journal of Instructional Technology & Distance Learning*, Vol. 2 No. 1. Accessed at http://www.itdl.org/journal/jan_05/Jan_05.pdf#page=7 on May 5 2008.