What is eLearning: a pragmatic mess of paradigms or evolution in learning?

IRENA MILETIC
Department of Psychology
Faculty of Arts and Sciences Rijeka,
Omladinska 14, 51000 Rijeka,
CROATIA
irenam@ffri.hr   http://www.ffri.hr/

IVAN POGARCIC
Business Department
Polytechnic of Rijeka
Vukovarska 58, 51000 Rijeka
CROATIA
pogarcic@veleri.hr   http://www.veleri.hr/

MAJA GLIGORA MARKOVIC
Business Department
Polytechnic of Rijeka
Vukovarska 58, 51000 Rijeka
CROATIA
mgligoram@veleri.hr   http://www.veleri.hr/

Abstract: - Speed of developing information-communication technology (ICT) and its broader application in education have led to reconsideration of education as system and as process. Influence that ICT has over education is multiple regardless to its formal or informal form. From the point of integration of education as combination of learning and teaching it is necessary to re-examine approach – recognized paradigms – their modification or replacement with adequate forms, appropriate to concrete situations within educational contexts, time and space. Both processes: learning and teaching have verified paradigms. However, nor the learning nor the teaching paradigms are not independent of realization technology of education as whole. Influence of ICT over educational elements: student, teacher and content are obvious and significant. Also, ICT significantly influences the educational aims, their definition and mode of realization. On the other hand, all activities in development of various ICT products have also developed their own paradigms. E-learning as educational mode strongly backed up by ICT necessarily combines paradigms of education and developing ICT products. Paper re-examines mentioned paradigms, evaluate their importance and sufficiency, possibility and necessity of their combining or replacing with the new ones. Paper tries to define weaknesses in educational process backed up by ICT, starting form preparation of education, through its realization up to mode and possibility of evaluating its quality.

Key-Words: - eLearning, learning paradigms, teaching paradigms, ICT, object oriented paradigms

1 Introduction
Paradigm as a concept can be interpreted in several different ways, but mostly it is being used for explaining the causes, examples or the approach to certain phenomena. Philosophy defines a paradigm as: A fundamental theory from which all concepts and terminology is derived. Here the fundamental theory is ‘object orientation’. [1] The idea of a paradigm forming the basis of a scientific field formed the cornerstone of his philosophy of science (Fig 1.). As for the object oriented paradigms, we do not have to accept a categorization outlined in Figure 1, but still, each modification of the current tower will reflect solely in its “facade” regardless to the structure of individual floors. Philosophy, in particular ‘epistemology’, helps us to understand what (object oriented) knowledge is, and how we can acquire (object oriented) knowledge. It is obvious tower outlines all basic paradigms of the object oriented approach, so there is no need for the ICT note, perceptible in the upper flours. Software
engineering does not necessarily require a computer realization but it does make it possible. Tower’s peak – programming, shouldn’t be comprehended literally. Properly programming of any activity presumes a creation of programme as to realize the process activities of a system.

To accept paradigm means to observe, analyze and explain certain phenomena by virtue of the relationships and facts valid within the same paradigm. More specific, if we accept object oriented paradigms, each problem and its solution should be formulated as terms valid within the paradigms. Paper deals with scientifically acceptable paradigm within education and modelling of the information science systems, respectively the concrete applicative solutions in conformity to needs of the specific systems. The conducted research also puts emphasis on two facts: accepting the paradigms in the abovementioned frames and perceiving them as a consequence of developing the scientific approach. The respective literature claims that object oriented approach is a revolution which requires a completely new way of thinking. This is true to a certain extent, since change of attitudes, opinions and paradigms perceived as an approach, is in prior a consequence of the evolutionally instead of revolutionary development. From this aspect, paper considers a thesis that eLearning is actually learning on a new level of evolution, while synergy with the ICT can be regarded as a foundation in defining the mutual characteristics as oppose to paradigms. Figure 2, i.e. implicitly indicates individualization in approach and a possibility of combining the paradigms as to realize the final goal – integrity in paradigms’ implementation.

2 eLearning and paradigm

E-learning represents an intersection of two worlds – world of the information science and communication technology and the world of education. This can be of great value when applied as a part of well planned and organized educational environment, however, eLearning certainly isn’t “a magic ball” that will replace and suppress current pedagogic theories, educational methods and technologies and norms[2], but instead should be regarded as their corresponding supplementation.[3] Traditional methodical approach to learning is apparently cut in two levels: methodical approach to implementation of technology and methodical approach to preparation of a concrete learning content. These levels are interdependent but not subordinated to each other.

E-learning is a new paradigm of learning supported by different devices based on electronic technology in conformity to a paradigm of individualized learning and teaching oriented to analysis of content, goal, media to be applied, modelling of learning contents and media of the eLearning environment. This learning is structured in way to enable acquiring the knowledge and skills not solely for students’ sake in the formal process of learning and teaching, but instead for all categories of participants of the so-called process of Lifelong Learning and Teaching.

In comparison to the traditional teaching in class which puts emphasis to teacher and his control over the class, learning content and process of learning and teaching, e-Learning put emphasis on student who gets a possibility of interactive learning at own
speed, within simple, flexible and distributed teaching environments. [4] All participants who are engaged in creation of the educational multimedia material should, besides tools, also understand the principles of modelling, as to ensure its quality in conformity with its educational purpose and technological foundation. [5]

3 eLearning and OO Paradigms
E-learning is based upon Learning Management Systems (LMS) and Learning Content Management systems (LCMS). These are Web oriented systems to support the process of teaching and learning, as for students to acquire knowledge and skills. The Learning Management Systems have been supplemented with the Learning Content Management system or the Reusable Learning Objects (RLO). The point is to apply a model of object oriented thinking in the world of learning. The Learning Objects (LO) can be anyone (“the knowledge granules”) used for developing and acquiring knowledge or re-usage of the media independent information as construction block of the eLearning contents.[6] Learning objects are more flexible to use if they are organized and classified according to meta-data and saved in data repositories such as the ones of the LCMS systems. E-learning is basically developed in conformity to object oriented paradigms:[7]

- Abstraction – providing the learning objects or programme’s fragments with scale of information – from basic to more concrete;
- Encapsulation – teacher doesn’t have to understand the structure of learning objects and has no need for insight in programme code since emphasis is put on availability and applicability of learning object’s function;
- Inheritance – a possibility of accepting the learning objects and their free adaptations and improvements within e-Learning’s frames;
- Polymorphism – a possibility of elaborating different forms of learning objects in a unique definition.

To insist on a complete application of these paradigms means to speed the process of applying the complete on-line mode of teaching. Developing banks (repositories) with standardized learning objects leads to providing a reliable mode of developing teaching process that will enable “teaching team” to express its creativity and to orient its constructive potentials to real cause and goal of teaching – the most qualitative education of pupils (or students or attendants or simply put an student).[8]

Generally speaking, a learning object is defined as any digital or un-digital object that can be used in learning, teaching and education. LO can be defined as the smallest unit of digital learning content that represents a meaningful unit and can be observed independently. Its size can vary. This is a unit comprised of information and completely independent of the other LO. These units can be divided and reused in different learning contents (the share & reuse concept is backed up). Level of dividing digital learning materials to LO depends of the author who can apply different levels of granularity. Each picture, animations, text block etc. can represent one LO. However, simple fine granulation can define LO as lection, chapter or event of the complete digital learning material for one course.[2] Their features are as follows:

- Reusability – the content is independent of the learning context and can be used in numerous situations;
- Durability – a constant usage of learning components without their repeatedly development or new coding when technology changes;
- Accessibility – approach to learning components from one distant location and their distribution to other locations;
- Interoperability – learning components developed at one but used in another location, regardless to platform and respective set of programme tools.

Several imperfections have been spotted in the current massive approach to online learning in comparison to learning and teaching.[10] The learning objects are usually applied as “content’s fragments”, “data repository” or “qualitatively produced learning” as if the online learning is just teacher’s bigger megaphone. Numerous individuals and institutions analyze learning objects as to enable learning “anywhere and anytime” by virtue of computer-automated assembly of learning objects adjusted to the specific student’s needs. However, an isolated approach instead of interaction is not in conformity with propositions put forward by the modern theoreticians of learning – the importance of cooperation, collaborative learning, community of students, negotiations conducted in the society and professions. The respectable approaches to usage of learning object referred as “education by saving” by Freire (according to Wiley, 2006), do not provide students with possibilities of experiencing different comprehensions and asking the meaningful questions.
Despite a line of problems connected to traditional comprehension of learning objects’ implementation, there are numerous possibilities for applying the learning objects as efficient tools that facilitate learning. Internet is saturated with examples of learning supported by the reusable digital learning resources. Modern approach to learning objects is often confronted with the recent analysis of learning, regardless to its qualitative adjustment to the same analyses conducted in the eighties or sooner, including the researches of authors who dealt with behavioural or cognitive educational paradigms.

4 Learning paradigms

Main goal of any educational system is to improve learning so teachers have to understand learning principles and learning modes before they begin to develop learning materials. This is especially important in online learning where teacher and student are separated. Development of efficient online materials should have foundations in verified and applicable theories of learning. ICT, as media used in learning and transferring information, is not however a crucial factor that influences quality of learning. Therefore, it is necessary that each application of technology in learning is simultaneously supplemented with suitable methodical approach.

Fig.3: Formal Learning TheoryParadigm (source) www.personal.psu.edu/wlm103/edpsy/paradigms.html, 15-10-2008).

When developing learning materials, it is recommendable to use combination of different approaches to learning and teaching, as to get through to all prospective users/students and to satisfy their personal needs and learning styles (Figure 3). The chosen strategies of learning should motivate students, facilitate cognitive processing, help to create a complete personality, take into considerations the individual differences, encourage meaningful learning and interaction, provide feedbacks, facilitate learning and ensure backup.[11] At the time we are dealing with various trends in thinking and approaching to learning. Development of learning materials should never consider just one of these trends, but instead it should combine different approaches to learning.

The early systems of computerized learning were based on behavioural approach to learning that presumes learning as change of behaviour caused by environmental incentives, impossible to observe and measure as learning indicator. The process of thinking that occurs in students’ heads is totally being neglected. In order to activate cognitive structures, students should be provided with conceptual maps, information about prerequisites and scheduled learning outcomes so they could define their own expectations and judge whether they have reached the outcomes or not. They should also be given feedbacks and learning materials that would motivate them to learn (from easier data to more complicated, from familiar to the unknown, from knowledge to its application).

However, some teachers have claimed not every type of learning can be recognized so it is more than just a change in behaviour. The result was shift from behavioural to cognitive approach. Those in favour of cognitive approach perceive learning as an internal process that includes memory, motivation and thinking. They believe thinking has an important role in learning. Learning is considered as an internal process so that quantity of learned depends of possibility of cognitive analysis of students, the efforts put in the learning process, depth of the analysis and current knowledge of students. The deeper the analysis is, the acquired new information creates greater number of connections in memory. The most frequent contemporary psychological paradigms of learning that support human knowledge are found in Atkins’ and Shifrin’s model of cognitive psychology that analyses learning from the point of data processing and student who uses different sorts of memory in his teaching. Information are obtained through sensors and preserved in sensor storage before they are being processed in working memory, and finally stored to the long-term memory. If the information is not instantly transferred to the working memory, it could get loss. Short-term memory has limited capacity with average of 7 elements (±2). Since working memory also has a limited capacity, information should be qualitatively organized and divided into fragments of suitable size as to facilitate
Recently a shift has been made towards the constructive approach to learning and teaching. This trend was initiated as a reaction to teaching recommended by teachers who have dominated in educational process over the last 40 years – especially in education of adults and higher education.[13] Those in favour of constructive approach claim that students interpret information and world in conformity to their personal reality, so they learn by noting, processing and interpreting information later transformed in personal knowledge. Students are in the centre of learning while teacher acts as counsellor and assistant. The process of learning includes a transactional relationship between teacher, student and content. During the process of transformation, students communicate with technology (student-interface), content (student-content), other students and teachers (student-student, student-teacher).

In creating and developing e-Learning material, principles of all three approaches should be included: behavioural, cognitive and constructive. (Fig. 3)

5 Teaching paradigms

Information and communication technology has become a fragment of educational system as backup for teacher who carries out traditional teaching or as tool of replacing such teaching with one of the numerous new methods and modes of realizing the teaching process as process of learning and teaching. New educational paradigm is oriented towards student (Learner-centred paradigm) so the centre of teaching model has been moved toward student(Fig. 4).

Student is “placed” in centre while environment encompasses learning resources in terms of time, place and style of learning. Teacher has been replaced with team respectively required assistants in teaching realization.

Pratt and associates have conducted years-long research in five different countries where they examined work of hundreds of teachers who educate the adults. Thanks to a wide range of disciplines, contexts and cultures, the author and associates have come to a conclusion there are numerous styles of good teaching of which just few rely on constructive principles of teaching. However, a unique approach to learning and teaching hasn’t been found.

Researchers have defined five different teaching perspectives, all with a potential of “good teaching”. Each perspective represents a combination of attitudes, intentions and actions. However, they all do have some similarities.

- Transmission perspective – teacher has to effectively and efficiently transfer certain quantity of knowledge and way of thinking similar to the one found in text he uses.
- Apprenticeship perspective – teachers should define internal structure of skilful teaching, whether in auditoriums or working places.
- Development perspective of education – has a foundation in constructive principle as students apply already acquired knowledge in order to filter and explain new information.
- Nurturing perspective – presumes long-lasting, difficult and constant effort in achieving the results led by heart instead of head.
- Social reform perspective – these teachers not only do try to interpret world but also to change it in way that suits their ideals.

Data collected thanks to more than 2,000 teachers who filled the questionnaires with list of perspectives (TPI - Teaching Perspectives Inventory, Pratt and Collins, 2000) implied more than 90% of teachers use only one or two described perspectives as their dominant attitude towards teaching while other perspectives are used only marginally. This shouldn’t surprise us if we take into consideration that perspectives do differ in their attitudes to knowledge, learning and teaching. Furthermore, Pratt made a conclusion that perspectives are not good or bad, but are philosophical orientations regarding the knowledge, learning, teaching, roles and responsibilities of teaching profession.
6 Conclusion

Online learning can be regarded as using the Internet with purpose of approaching the materials, communicating with content, teacher or other students, and providing a backup during the learning process that would all result in acquiring knowledge, creating a personal sense and development due to learning. Main goal is to create a good multimedia content that encourages active cognitive processes and leads to meaningful learning, as to creatively solve the problems. In this respect, all participants who work in development of educational multimedia material should, besides tools, also comprehend the basic principles of developing learning material thus making it qualitative in educational and technological sense. Behavioural, cognitive and constructive theories have made different contributions to developing online materials. When moving closer to constructivism, students are given an opportunity to personalize information presented in online materials. The essence of using digital multiply-usable educational units is in implementing the object-oriented models of thinking within the educational world. Purpose of learning, the social, historical, cultural and institutional context of teaching are all essential factors that must be taken into consideration when developing the successful learning. Simple chaining or sequential connecting of de-contextualized educational objects do not create meaningful learning context.

Teachers combine several teaching styles. Namely, researches that analyze teaching perspectives do not define a unique attitude towards learning or teaching that would dominate in the concept of the so-called “good teaching”. Perhaps, we could quote Kuhn: "Failing to find a solution under the paradigm, indicates a lack of understanding of the paradigm, and not a flaw in the paradigm!"[1]

7 Da capo al fine

“Da Capo al fine” refers to musical term that suggests repeating the theme from the beginning to mark “fine”. If we compare the combination of object-oriented paradigms with music, paradigms of learning and paradigms of teaching can be observed as a beautiful fugue, which purpose is to express the most interesting and the most beautiful fragments of music perceived as learning. The structure of fugue can seem disordered but it does have a purpose and meaning, as one definition of fugue explains it as a combination of wind and elegance (sic!). In the respect, teaching and student to whom it is intended are put in an environment which offers and requires higher engagements of members. Therefore, question addressed in title is not dilemma but instead a reality that implies eLearning as future dominant form of learning developed through evolution while the allege mess of paradigms becomes a necessity in the same evolution. The combination of paradigms consequently becomes indisputable.

References: