

THE E-LEARNING STRUCTURE - CONTEXT METHODOLOGY

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Abstract

*This article investigates the concept of structure – context methodology (SCM) used to elicit the process of forming the key competence. The work discusses SCM as the base component of **electronic textbooks development**. The study is supported by practical applications, whose characterizations allow us to understand the role of structure-context methodology for new e-Learning technology. A brief theoretical and conceptual approach is presented and major contribution and difficulties are discussed. New questions and future trends about the functional contexts methodology are suggested.*

Keywords: *theory of learning, electronic textbooks, structure - context methodology*
ACM classification: K.3.1

1. Introduction

In the globalised world, constructivism is a philosophy of learning views competence development as a process in which knowledge cannot be taught, but must be generated by the learner. In such a process both teacher and learner need to be active and flexible and demonstrate e-Learning competence. From one point of view the learner is a unique individual with unique needs and unique background. M. Merrill note that *“knowledge is constructed from experience, learning is a personal interpretation of the world, learning is an active process in which meaning is developed on the basis of experience, conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning, learning should be situated in realistic settings; testing should be integrated with the task and not a separate activity”*.

1.1. Learning process in the globalised educational system

In the globalised educational system the didactical process has been done in some difficult conditions. First of all, is an expansion of information: 5000 pages text/hour and a limit humans' capacity to assimilate 0.1 new pages per day. Secondly, the Web 2.0 technologies change the speed of knowledge transmission at the global scale. Thirdly, the didactical process became and more learning process. Then, in the learning process have had included native digitals that *“think and process information fundamentally differently from their predecessors”* [2]. The

learning process is done in student - centered educational environment, which place life long learning in the core of the learning environment [3]. But, practically, in the traditional learning process the student must learn a lot and reproduce a lot of material in short time. To do this activity, he/her repeats twice before test examination, increasing the capacity of short-time memory, but forming a *knowledge buffer* [Atkinson, 1980]. According to the dates providing by Nicandrov, 1970 the capacity of human memory is 13 - 15bit / sec. In the short – time memory the information has been keeping 24 – 28 hours and then only 40 % from information with the speed 0, 05 bit/sec are replaced in long - time memory. On the other hand, the reproduction is the lowest level of cognitive branch of competence (taking into account the Bloom' taxonomy).

1.2 *The role of the electronic textbooks in the e-Learning process*

The e-Learning process can be done traditionally or at distance. The e-Learning content can be delivered online or offline, using electronic or nor electronic format, and the user can be connected or stay alone. One of the important roles in the e-Learning content delivery is assumed to be for the electronic textbooks. Polat (2004) defined electronic textbooks as a central component of a system of instructional tools; Саркисов (2002) *a tool for instruction and learning*; Зайцева and Попко (2006) *a complex of informational, methodological and programs tools used for learning one domain with items for self – assessment and assessment of knowledge through providing a feedback*.

The role of electronic textbooks is to increase the efficiency of blended learning. In such opinion the leaner use e-Learning context to gain new knowledge, and concomitantly to develop his /her abilities or key competence in an individual manner. But, if we look at examples there are a lot of electronic textbooks. For example, anyone can use Internet electronic textbooks to study Microsoft Word, Microsoft Excel etc. The problem is that all proposed tools have similar structure (theoretical content and some quizzes) and similar representation forms, including text, pictures, audio / video / animation, pedagogical agents. The learning design of electronic textbooks is based on different technologies, for example: *curriculum sequencing, adaptive presentation, intelligent analyze of student solutions, interactive problem solving support, adaptive navigation support, example based problem solving and interactive collaboration support*, as was mentioned by Brusilovsky (2005).

All proposed educational technologies for electronic textbooks development apply results of Artificial Intelligence for analyzing the items. The learning process is seemed to be “without” the electronic textbooks: learning process apart and e-textbooks. Traditionally, students use the e-manual for finding answer of proposed questions; to found some knowledge; but not to form a suitable cognitive structure. If we will consider the globalisated educational system as an open and dynamic system, we can take into consideration the *process of forming self –regulated competence*. First we will considerer that globalisated educational system has *the propriety of self-regulation*. In such context, the learning process will be described as a *synergetic process*. In this case, taking into account the idea of constructivism philosophy, we will consider that external influences of the cognitive structure will keep the structure of knowledge competence, but will change the structure of the electronic content through modification the type and the structure of algorithms.

These changes open a new perspective for electronic textbooks design changing the role of instructional context to structure – context methodology.

2. Structure - context methodologies

The constructivism philosophy of learning requires *new models of learning*. The efficiency of the new didactical models has been based on the priority of structuring the content by teacher and on personalization the content by learner. This approach can be seemed as result of hermeneutics' influence in the philosophy of education. The electronic content with functional structure can be using to form a suitable structure of competence. The process of developing the functional structure is based on structure – context methodology. *By structure – context methodology, we mean the methodology in which the teacher helps students to build their own scheme of comprehension*. The arguments in favor of the proposed methodology came from the following points of view:

1. *Themes can serve as organized structure if there are relevant to context necessary to be learn*, as was noted by Andre (1997), Mayer (1975), Clark and Blake (1997);
2. *The recourses of knowledge must be strongly interconnected*, as was noted by Spiro, Feltovitch and Coulson (1990);
3. *The instructional material must integrate new material with the students' knowledge through comparing and analyzing the old and new ideas*, as was mentioned by Ausubel (1978).

The structure – context methodology describe using a metasystem view of globalised learning process. In such context *the educational efficiency of the learning process are based on philosophical, psychological, pedagogical, cybernetic and managerial principles*.

The structure – context functional methodology has included the core concept “crystal” – one main module that forms the comprehension in terminology. This module has been included the main concepts of domain and the methods of learning. All domains have the specific methods of comprehension and abstractisation. But, we can understand chemistry, only if will make connection between the real word processes, phenomena (learning objects!); mathematics – between connection of real things and operations and so on.

The first conclusion is that *data used for study can be connected to real word learning objects*. Secondly, to maintain the motivation, *the student must understand why this information is important* for him. For example, in the first module the student is asking to write 2 - 3 pages text on the theme that is important for him to personalize the task.

Our experience has been shown that *process of personalisated themes and tasks are very important for all students*. After this moment, chapter by chapter the student will return to this document and will add new text, tables, graphics, or multimedia resource.

On the other hand, the structure – context methodology permits to develop all branches of competence: cognitive, affective and psychometric. For this result, the main concept needs to be carefully identified and included in the name of the first module. Then the main concept will be used in the future content (modules, chapters, themes, etc.). In this module the student will understand main definition

and will learn specific methods for learning. The most suitable seems to be *constructivism development of concept mapping and writing conclusions*.

2.1. *E-Learning process as dynamic and flexible process*

The teacher helps students to construct realities, but can do it if the student poses the self – regulation competence. Self – regulated competence are vital, not only to guide one's own learning during formal schooling, but also to educate oneself and update one's knowledge after leaving school. For this case, *electronic textbook will create a powerful learning environment, in which students are allowed and inspired in design of own experience*. In our research the learning environment are called *electronic textbook in e-portfolio*. The proposed technology combines the theoretical instructional context with individual and/or collaborative building the e-portfolio.

The practical realization of the proposed technology has combined the functional context of teacher manual with practical building of the student textbook. Such idea has permitted to develop an interactive model consisting of 2 parts: *the theoretical part and the practical application*. The theory part is developed by the teacher and can be completed /changed periodically. The practical part is completed individually/collaboratively by the students. In this case was used a variety assessments methods, for example collaborative classrooms, peer assessment, project method etc.

Self - regulated competence maintains motivation through concentration of the practical part on only one idea. This concept must be important for student. In the second module the student has studied the extenuation of main concepts added most important questions for him. In the third module the student will compare the old and new ideas.

The technology uses different online and offline forms of delivery the information. Individual methods are completed by collective methods of instruction (for example, *collaborative classroom*) and assessment (*peer and group assessment*). The role of the third modules is to *interiorize the knowledge*, as was mentioned by Galperin (2000).

The constructivist idea based on the "learning for life" principle was applied in structure –context methodology. So, the students at the end of each chapter demonstrate their comprehension of proposed information using concept mapping.

3. Conclusion

The structure – context methodology intends to offer a means of developing a self - regulated learning experience in a powerful learning environment. This idea holds that a promising approach is to emphasize the metasystemics approach of pedagogy in context of globalization. The pedagogy is view as part of metasystems, meta-directed by philosophy of education. The constructivism philosophy of learning accentuates the importance of having a different approach of instructional process based on *learning by doing*. Structuring the context based on this model give a functional and dynamic structure for competence development. SCM offers many promises ideas of developing the electronic textbooks.

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