Eduknowledge - The Future of E-learning ?

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Abstract

What is eduknowledge? A relatively new concept in the learning domain, eduknowledge could be defined as an object like educational tailored knowledge. Eduknowledge could be also defined as a process of developing and adapting specific knowledge for educational purposes. As the new method is based on individual interaction between the training system and the trainee, the subject of training could individually improve his/hers training paths and rise the efficiency of personal training contributing to the increase in the whole training process. After understanding the basics in his specific activity the trainee interacts with various scenarios, in order to use the acquired knowledge and develop his abilities in virtual environments re-enacting the real ones. The paper describes the basics of the development of eduknowledge supporting e-learning systems with a very rich content.

Keywords: eduknowledge, personalised learning, goal oriented learning

INTRODUCTION

The paper presents some aspects regarding specific educational structures, called eduknowledge. Task oriented, objective oriented knowledge structured in order to perform educational purposes, eduknowledge could be the teaching instrument for the XXI century, mainly regarding learning of specific good practices in industry.

A joint research team from ASE Bucharest, INCDPM "Alexandru Darabont" and Hyperion University developed since 2001 a research regarding the development of specific eduknowledge (mostly with applications in the safety domain).

An efficient educational process is based upon knowledge and not information. Boisot (Boisot 1998) differentiates between data, information and knowledge. He defines them as follows:

- Data- a property of things (discrimination between physical states);
- Information- the subset of the data that resides in things and activates an agent-being filtered from the data by the agent's perceptual or conceptual apparatus;
- Knowledge- a property of agents predisposing them to act in particular circumstances;

So, knowledge is connected directly with action. Knowledge evolves dynamically, being changed in the action process. Continous learning is based upon the dynamically progress of knowledge.

Eduknowledge is mainly goal oriented, education tailored knowledge. Eduknowledge could be also seen as a framework to structure knowledge for educational purposes.

The figure 1 shows a general schemata of the eduknowledge framework.

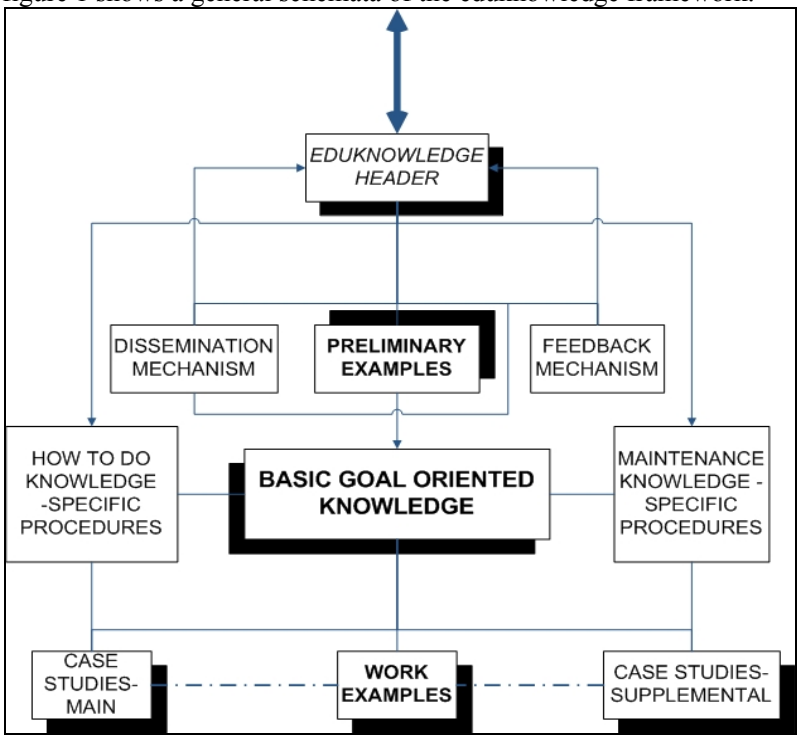

Figure 1 The eduknowledge framework

From the figure could be individualised the main eduknowledge components:

- The eduknowledge header- which gives details regarding the specific eduknowledge chunk and also acts as an user-friendly interface ;
- The preliminary examples- which are introducing students in the specific domain of activity;
- The basic chunk of knowledge that gives the ways to perform the specific task for which the eduknowledge was built (for example, a specific eduknowledge is oriented towards the design and development of expert systems- this basic chunk of knowledge is a step-by-step procedure for development of an expert system from scratch);
- How to do (HTD) knowledge- which shows how to perform specific tasks related to the main task (for example, an efficient expert system uses data from databases- as the eduknowledge is centered around efficiently building expert systems one of HTD is centered around the development of databases that could be used in conjunction with the expert system)
- Maintenance (M) knowledge- which has the role to help in solving specific problems that could appear during the task performance (for example, in

building an expert system the inference mechanism is not closing on the production rules that are leading to the solution- maintenance knowledge gives the solutions for tracking and debugging the inference process)

- Examples and case studies- are used in order to give the student the possibility to see in practice the applications of the knowledge
- Dissemination mechanism- the tutorial mechanism used to train the student;
- Feedback mechanism- the mechanism used to take the feedback from the student and use it to adapt accordingly the tutorial process

The eduknowledge cycle of development is presented in the figure 2.

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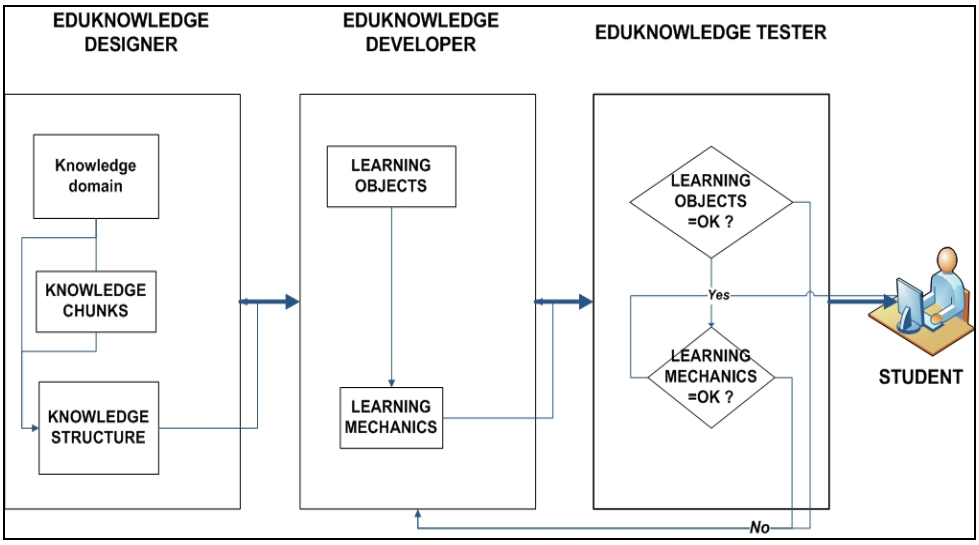

Figure 2 Eduknowledge cycle of development

EDUKNOWLEDGE DESIGN

One of the most important characteristics of eduknowledge is the importance of the design phase. The design phase follows mainly to establish an efficient delivery strategy in order to achieve the proposed objectives.
The team for the design phase must include minimal:
- knowledge engineers;
- educational (instructional) designers;
- delivery designers [Landoni 2003];

The design team must perform the following main steps in order to optimally design the eduknowledge:

- development of an optimal model of the task performance (regarding the task that will be the eduknowledge's goal);
- identification of the knowledge pool;
- identification of the specific knowledge chunks mapped on the logical steps for task performing;

- design the eduknowledge frame;
- design the eduknowledge performance mechanisms;
- design the eduknowledge performance indicators;
- design of the eduknowledge delivery structure;
- development of the eduknowledge prototype [Landoni 1997]:
- testing the eduknowledge prototype;

The design phase is based upon conceptual models, structured in two distinct structures:

a) The model structure of education

b) The model structure of actors

-the teacher [Yokohama 2006];

-the student;

-the learning environment;

The connexion between models is presented in figure 3

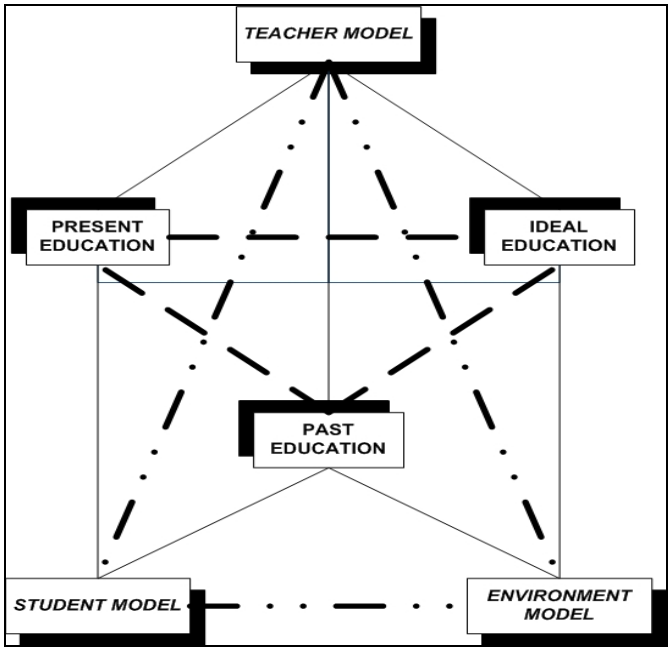

Figure 3 Connexion between the model structure of education and the model structure of the actors involved in the education process.

A cooperative design list (COPDESIGN) is derived from the two structures. This list helps the designer in optimising the eduknowledge structure. The expression of past and present states is given by colors:

- Blue- represents the desired (ideal) state or the state of an optimal education attribute;
- Green- represents the state of an neutral education attribute- for example, in the past education process the environment was neutral.

- Red- represents the state of an improper education attribute. For example, in the past educational process regarding expert system the students were not actively involved in the development of expert prototypes.

EDUKNOWLEDGE DEVELOPMENT

Eduknowledge development process is the process of building an effective tutorial expert, tailored to teach optimally a specific task (for example, the development of expert systems using expert shells).

We have tested the most significant development instruments existent on the market and we found that the most effective development package would be a combination between an authoring tool and an expert shell.

The authoring tool (used eventually together with a framework tool) helps to structure knowledge for educational purposes. Specific knowledge structures – like partial or final tests- could be also developed with the authoring tool.

The expert shell encapsulates the authoring structure (preferably in the form of knowledge objects) into an expert mechanism, used in order to perform goal oriented.

Figure 4 shows the combination.

The development team performs the main eduknowledge development. Like the design team they must contain minimum: an education expert- with the aim to structure properly the educational component and an AI expert- with the aim to build the tutorial expert system (Kovacs 2005);

From our research the development of eduknowledge as tutorial expert system has a number of advantages like:

- The use of educational knowledge as a tool in order to (learn how to) perform a task;
- The preservation of activity oriented, goal oriented trend of eduknowledge;
- The open, modular, object oriented structure;
- The efficient storage and retrieval of knowledge (Kovacs 2005);

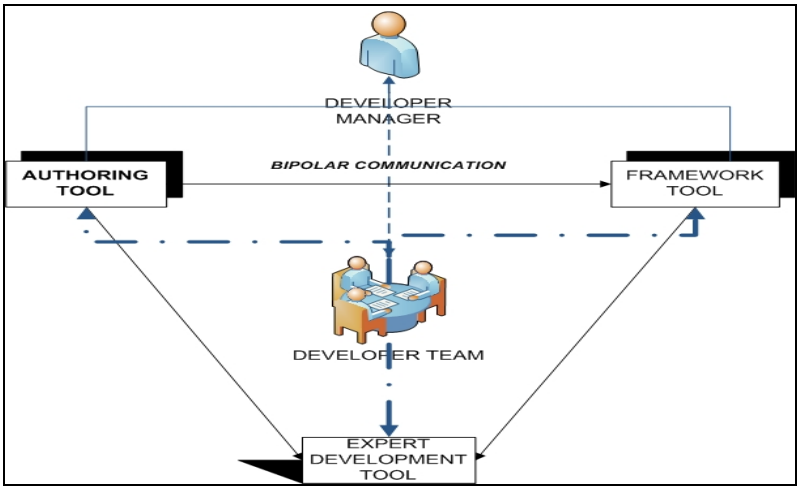

Figure 4 Eduknowledge development process

CONCLUSIONS

Eduknowledge is an extremely powerfull educational tool, especially for the training of industrial activities which must be performed optimally in order to assure the necessary productivity and to avoid risks.

Eduknowledge is not just the development of rich educational content but also the structure of such content in order to perform efficiently and optimally.

Our research started in 2001 with the design and development of specific eduknowledge prototypes. Some of these prototypes were tested inside ASE University and some where tested inside Hyperion University with fruitful results.

Having the necessary tools the development of specific eduknowledge is a time and resource consuming process. However, once developed, the efficiency of eduknowledge learning could surpass by 100% the efficiency of classical learning.

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