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Full Reference

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Title

A new learning environment (LE) model based on knowledge management (km) and its use in university teaching

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Abstract

This proposal offers a LE model based on KM that allows the student, by accessing different types of knowledge, to learn. The proposed pattern (see Diagram 1 Architecture) will consist of: a) Entity student: it represents the student. It maintains the student's information, their work, binnacle notebook and learning preferences. b) Entity professor: it represents and maintains the information of the teacher, including their own vision of the knowledge to present. c) KM Module: it contains the knowledge repository. There it is the institutional memory with "heuristic" knowledge. Examples are the best practices, learned lessons, frequent and not frequent questions and the yellow pages. "Heuristic" knowledge is comparable with: tacit [1], heuristic [2], community [3] and strategic [4]. Also, the module contains: - "descriptive" knowledge: it is the knowledge with which a situation is described, a concept or an idea. Similar terms are: systematic [5], explicit ([1], [3]), descriptive [6], declarative ([2], [4]) and to know why [7]; - "procedural" knowledge: it is the knowledge required to take an action, procedure or process ahead. Almost equivalent terms are: pragmatic [5], explicit [1], operative [2], procedural [4] and to know how [7]; and - "anecdotic" knowledge: it refers to anecdotes, histories and stories linked to a knowledge [6]. d) Supervisor process: carries out the intelligent tutorship. Diagram 1 Architecture

The model is intended to be applicable to i) any domain of knowledge of intellectual content, ii) to contain generic teaching strategies that adapt according to the student's behavior and iii) to foment the different learning types. ([5], [8], [9], [10], [11]). In the bibliographical research we carried out, no LE was detected up to date with the characteristics of the proposed one (among others: [11], [12], [13], [14], [15], [16]). Detected problems are that many times there seems to be an overload of information which is not centered on the student. None manages knowledge explicitly (except for [11]). In comparison with the architecture of IEEE P1481.1/d9 [17] the fundamental new contributions are the KM module and the incorporation of the entity professor. The model was implemented in Java. The developed environment, PLE:ASE ("Programming LE: an Approach to Software for Education") was applied and evaluated in a basic course of Object Oriented Programming for 1st. year students of System Engineering at Universidad ORT Uruguay. Hypothetically, the environment helps to: a) Understanding teaching: detecting the understanding of a problem situation; b) Search for new ways to solve problems: to identify a problem situation, conceptualize it, use it as a model and advance towards its solution; c) transfer knowledge: the student can solve a given test taking elements of other tests by applying analogies, inferences, deductions, etc. The three possible cases are shown in Table 1: Table 1 Possible cases

Two tests were presented to each student, both with 3 problems. The first test was taken at the beginning of the course, the other at its end. Both tests were graded using ordinal scales. The marks difference was calculated for each student and problem. As shown in Table 2 Experimentation results, numbers were: Table 2 Experimentation results

Through these data we may conclude that: a) No benefit was detected as to problem understanding in groups II and III. Moreover, it is a better choice not to use anything (group I). b) The students of group III show a remarkable improvement in the number of ways for solving a problem. They can find, apply and show more ways. An improvement (though poorer) is found in group II as compared to group I. c) Group III students improve their ability to transfer knowledge and none gets worse.

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Notes

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