Surpassing Online Learning Obstacles

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INTRODUCTION

In the last decade, the use of Internet and wide-band access have supported the spread of distance learning through the Web, which we will call Online Teaching. Schools and universities have been rethinking their teaching practices and educational policies in establishing online teaching programs. Online Teaching becomes not only a new pedagogical model or an educational technology, but also a new social model and technology, gathering each time more students at decreasing costs.

Nevertheless, Online Teaching is far from achieving its maximum potential. Personal, methodological, technological, and institutional restrictions are usually associated with important limitations. As an example, teachers may not attend many students without affecting the quality of the online learning process. Clearly, this may impose serious restrictions to a major growth of the number of students attended and/or the quality of the learning process.

This work presents a computational tool, called AUXILIAR, designed to aid the teacher in managing the classes, to monitor courses, and to conduct and redirect the students learning process in online courses. The system shall decrease the teachers' time and effort in managing the classes and the students learning process, measuring the students learning levels to assure the teaching quality. The system AUXILIAR is composed of two modules. The first one contains an edition, diagramming, and publication tool for online courses, called CONSTRUCTOR. The second one, called REASONING, manages the path followed by each student when exploring the courses contents. It is also responsible to automatically detect and redirect the student, depending on his/her deficiencies, detected by the followed path and by formative evaluations. To achieve this, it uses a Case-Based System, which stores, adapts and reuses previous experiences to new situations.

BACKGROUND

Among the studies that relate obstacles to the effective use and spread of technology in online courses, we could include Pajo and Wallace (2001) that pointed as the main restrictions: 1) the time required to learn how to use the technology; 2) the time required to develop and to implement web-based courses; and 3) the time required to use the Online Teaching environment, and to monitor the course, e.g. giving feedback to the students.

As a similar perspective, James and Beattie (1996) indicated the main obstacles to be: 1) the time required for the management of the class and the students; 2) the time required to produce good quality teaching materials; and 3) the comparative reward in teaching at distance when compared to traditional teaching.

Similar results are also present in (Daugherty & Funke, 1998; Metcalf, 1997; Hare & McCartan, 1996; Piva Jr et al, 2002), among others.

The minimization of such obstacles when using computational tools becomes of major concern. Moreover, methodological strategies that could be integrated into computational tools focusing on a more efficient management of the teaching-learning process, thereby minimizing the needed effort of the teacher/mediator without worsening the learning levels, would also be highly desirable.

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THE TEACHING MODEL

In AUXILIAR, concepts may be exposed through different instructional materials and have their own evaluation method. A simplified model of contents organization is shown in Figure 1. It presents synthetically how the system inferences kernel conducts the evaluation process for each studied concept. As shown, each concept is composed of three basic parts: the Pedagogical Proposal; the Pedagogical Contents and Media; and Questions for Apprenticeship Checking.

All concepts are stored in Knowledge Bases, making their maintenance and retrieval easier. The retrieval process, based on the student profile, uses a Case-Based System. This facilitates the symmetric migration among concepts in a given apprenticeship problem (Nakamiti, 2000; Piva Jr., 2006).

The teacher provides what he/she considers the most adequate evaluation criteria for each concept, which will be used to automatically generate the evaluation. To better understand how it works, we present below a brief description of the system modules.

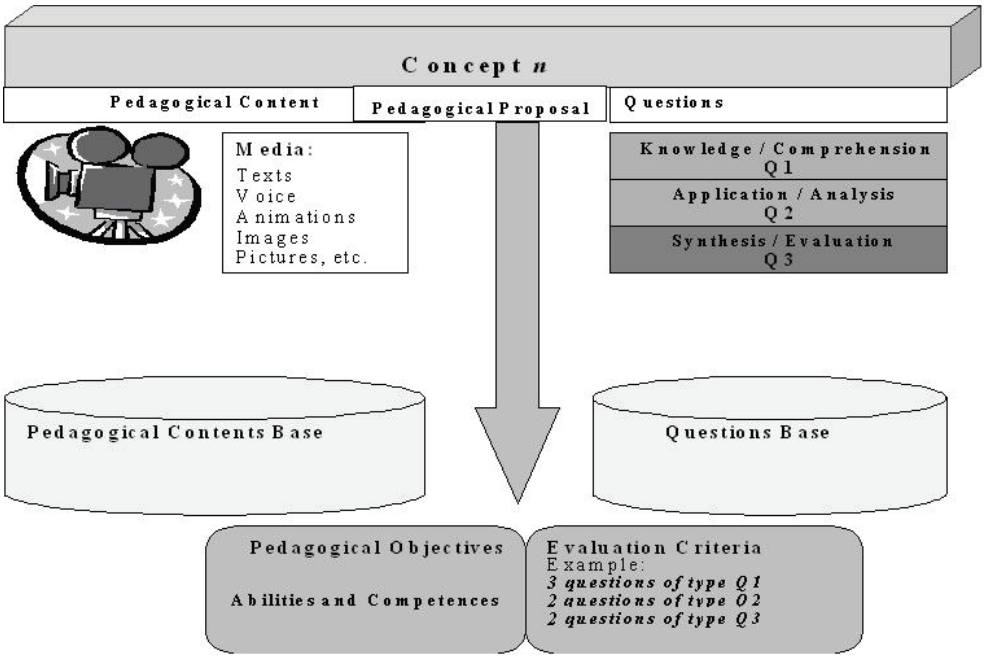
THE CONSTRUCTOR MODULE

The CONSTRUCTOR Module helps to better organize the course contents, leading to more interactivity between the student and the system. It avoids static contents in favor to dynamic contents, as suggested by Khalifa and Lam (2002).

One of the principles that conducted the development of this module was the semiotic language, which is implicit in the online teaching process. There are several definitions of the term semiotic. In the AUXILIAR system, we used the one proposed by Charles Sanders Peirce (1839-1914), which is a very comprehensive one. For Peirce, semiotic is a formal doctrine of the signs, and a sign is something that represents something to someone, under specific aspects or capacities. Since knowing and knowledge are inseparable, semiotic tries to explain how humans construct meaning from their interactions with the signs available in the world. Moreover, man learns through their interaction with the world (i.e. with the signs) (Nöth, 1998).

This way, concepts from various modes of signs – images, sounds, gestures, intonations and other non-verbal manifestations – have fundamental importance in online teaching, because they are also constructors of superior and cultural mental functions. According to Pierre Lévy (1993), "the interface contributes to define the way of the information capturing offered to the communication actors. It opens, closes, and guides the signification domains, of the possible uses of the media".

Figure 1. Pedagogical contents and questions for each concept



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