

# Adaptive Learning Environments with Knowledge Representation and Social Interaction

Joaquim Silva <sup>1</sup>, Francisco Restivo <sup>2</sup>

joaquim.silva@fe.up.pt, fjr@fe.up.pt

<sup>1,2</sup> *Engineering Faculty of Porto University, Rua Dr. Roberto Frias, s/n, 4200-465, Porto, Portugal*

**Abstract:** Web 2.0 technologies bring a shift in learning environments where different collaborative spaces are emerging. Unfortunately the abrupt spin-of web technologies don't have an immediate echo on the learning paradigm. Learning itself must modify, adapt and incorporate these technologies push-ups. Therefore this research project appears in order to grasp the emergent web based learning environments and thus project learning into a higher level, bringing the learner closer to the teacher. The idea is to complement the classroom activities with a web collaborative learning tool, which should bring some new added value to make it a competitive advantage idea. In fact, by combining learning material organized in topics, user personalization on each topic entrance and with the possibility of enabling users to interact among themselves through discussions, we hope to deliver a collaborative learning environment, where students and teachers will actively interact in a social network of knowledge.

**Key-words:** E-learning; Instructional Design; Web-based environments.

## 1. PhD research topic

The topic is related with web based learning environments and interfaces. In particular testing out knowledge communities, with social networks and tagging structuring content, into an elearning web system. This instructional design model has a web site available at <http://www.L-tree.org>, where this blended learning approach is described in more detail. In the future it will be later validated on K16 students, testing its usefulness and effectiveness.

## 2. Current PhD status

In the first eighteen months of this research the method involved was: the analysis of education modern models (Behaviorist, Cognitivist, Prescriptive Models), postmodern phenomenological models (Constructivism, Connectivism); technology strands (semantic web, ontologies, web 2.0) and the delivery of a state of art paper with the design model specification. All the research can be track through the researcher's web site, (<http://paginas.fe.up.pt/~pro05009/>). Now and for the next

eighteen months, besides the previous methods, there are the efforts of developing the learning system which structures knowledge with visual representation and navigation. Several approaches have been taken into equation, namely the usage of some available tools, but it is preferable to develop a simple platform using AJAX with PHP on Mysql, just to test it out in specific scenarios. Due to professional and personnel motives the tool will be tested on K16 students and teachers; however this is not a limiting usage. The hypothesis is by combining trees of knowledge with semantic social networks; it will contribute to a true collaborative learning environment, where students and teachers will actively interact towards wisdom.

### **3. The Research Questions behind this hypothesis**

There are three prominent research questions around the hypothesis. Two questions are related to people computer's usage in collaborative learning environments, while constructing knowledge. They are: How web systems might improve the computer's usability in learning processes? And how do students interact with the learning community to develop knowledge? The third question is, related to the learning platform, how can a system that organizes structures and navigates through web content, reinforces and motivates the collaborative learning?

### **4. Expected outcomes**

The product to be developed should be twofold. It will use trees of knowledge directly related to knowledge (structured, visualized, distributed, stored, and shared). It will apply a connectivism approach, which asserts the learning of knowledge in a distributive manner, based on a network of connections formed from experience and interactions in a knowing community. Users may interact with the learning material and make connections within a community who has the same topics of interest. This approach will be validated in a class of high school students.

### **5. Publications**

Silva, J., Restivo, F. (2006). Building a distributed system for dynamic information search, organization and classification for educational purposes. CoMIC'06, Porto-Portugal.

Silva, J. and Restivo, F. (2006). Web-based Knowledge Portal for Educational Purposes . XML Aplicações e Tecnologias Associadas, Portalegre-Portugal.

Silva, J. and Restivo, F. (2006). Combining Ontologies, Social Networks and Argumentation into a Dynamic Learning Portal ICL 2006, Villach-Austria.