Designing Social Personalized Adaptive E-Learning

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ABSTRACT

Here we introduce Topolor, a *social personalized adaptive e-learning system* aiming to improve social interaction in the learning process as well as applying classical adaptation based on user modeling. Here, we focus on the system architecture and preliminary evaluation that showed high system usability.

Categories and Subject Descriptors

K.3.1 [**Computers and Education**]: Computer Uses in Education – *Collaborative learning.*

General Terms

Design, Human Factors.

Keywords

Social Learning, Adaptive E-Learning, Evaluation, Architecture.

1. INTRODUCTION

Topolor is a social personalized adaptive e-learning system that has been used as an online learning environment for MSc level students in the Department of Computer Science, at the University of Warwick. It was designed based on the hypothesis that *extensive social features, personalized recommendations and Facebook-like appearance of a system, would make the environment more familiar to the learners, positively affecting usability, as well as learning*. This paper describes the system architecture and the primary evaluation of the system usability.

2. SYSTEM ARCHITECTURE

Topolor (Figure 1) adopts a classical layered architecture (inspired by the Dexter model [1]), extended with a *social flavor*: a *storage layer*, a persistence infrastructure for physical entities; and a *runtime layer*, parsing adaptation strategies to present adaptive and/or adaptable learning materials, providing Web 2.0 tools for social interaction, and monitoring learners' behavior. The main contribution is the combination of the Affiliate Model, Group Model and User Behavior Tracker Models, supporting adaptation and social interactions.

Concept Model. This is a knowledge cell with the minimum granularity that contains metadata and concrete learning content. The metadata describes the basic information such as title and difficulty. The learning content can be stored as PDF or HTML.

Course Model. This is a self-contain online course, which contains several Concept Models organized in a tree structure.

Affiliate Model. This original wrapper model is affiliated to a Course Model or a Concept Model. It can be instantiated to be tag, like, share, comment, question, note and to-do, defining an infrastructure of simple interaction between learners.

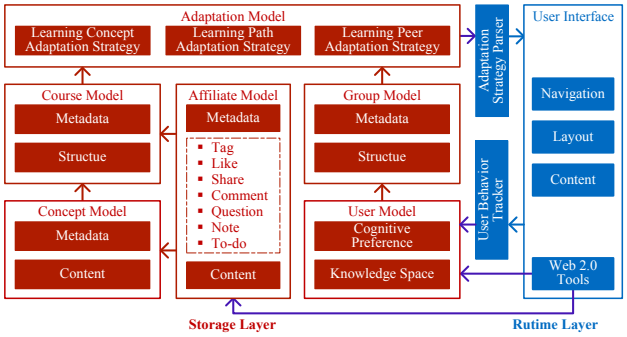

Figure 1. The System Architecture of Topolor

User Model. This builds a learner's preference and knowledge space, applying well-established mechanisms of overlay models.

Group Model. This assembles a small set of learners who have the same learning goals, in order to strengthen their relationships and encourage social interaction.

Adaptation Model. This contains the adaptation strategies that determine if and how to present entities such as courses, concepts and learning peers to the learners.

Adaptation Strategy Parser. This combines and analyzes the adaptation strategies to provide the adaptive and adaptable user interface to learners. In particular, it determines if and how to present learning concepts, learning paths and expert peers.

User Behavior Tracker. Explicitly modeled, it non-intrusively monitors the learners' activities, analyzing their learning progress, and updating the user models in the *storage layer* according to the gained behavioral information of the learners.

User Interface. This mainly consists of navigation menu, layout controller and presentation content. Its core components are the Web 2.0 tools that enable learners to create social annotation on learning contents as well as communicate with each other.

3. EVALUATION AND CONCLUSION

Topolor was evaluated with the help of 21 4th year computer science students at the University of Warwick. We used the SUS [2] to obtain a global view of subjective assessments of usability. The SUS Score of Topolor is 75.75 (σ=12.36, median=76.25). Hence we claim that the usability of Topolor meets our initial expectation. A hands-on demonstration is planned to be shown next to the poster at the conference.

4. REFERENCES

[1] Halasz, F., et al. 1994. The Dexter hypertext reference model. *Communications of the ACM*, 37, 2, 30-39.

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