

Topolor: A Social Personalized Adaptive E-Learning System

Lei Shi, Dana Al Qudah, Alaa Qaffas, and Alexandra I. Cristea

Department of Computer Science, University of Warwick
CV4 7AL, Coventry, United Kingdom
{lei.shi,d.al-qudah,aqaffas,acristea}@dcs.warwick.ac.uk

Abstract. This paper briefly introduces Topolor, a social personalized adaptive e-learning system, which aims at improving fine-grained social interaction in the learning process in addition to applying classical adaptation based on user modeling. Here, we present the main features of Topolor and its preliminary evaluation that showed high system usability from a student's perspective. The intention is to demonstrate Topolor hands-on at the conference.

1 Introduction

Topolor is a social adaptive personalized e-learning system built on Yii Framework¹ and Bootstrap², and hosted on Github³ for open source sharing and version control. It 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 Facebook⁴-like appearance of a system, would make the environment more familiar to the learners, so will subsequently increase the system usability*. This paper describes the system architecture and the primary evaluation on the system usability.

2 Main Features

As shown in Figure 1 a, Topolor has a Facebook-like appearance, i.e., the profile avatar and learner information, the fixed-position top menu and the left side bar for navigation, and the information flow wall for social interaction, etc. Topolor (Figure 1 b) supports learning content adaptation, learning path adaptation and peer adaptation, and provides a social e-learning environment, i.e., learners can comment on a topic, ask/answer a question about a topic, create and share notes related a topic, etc. This is a much broader range of adaptation than in regular adaptive hypermedia systems [1].

¹ <http://yiiframework.com>

² <http://twitter.github.com/bootstrap>

³ <https://github.com/aslanshek/topolor>

⁴ <https://www.facebook.com>

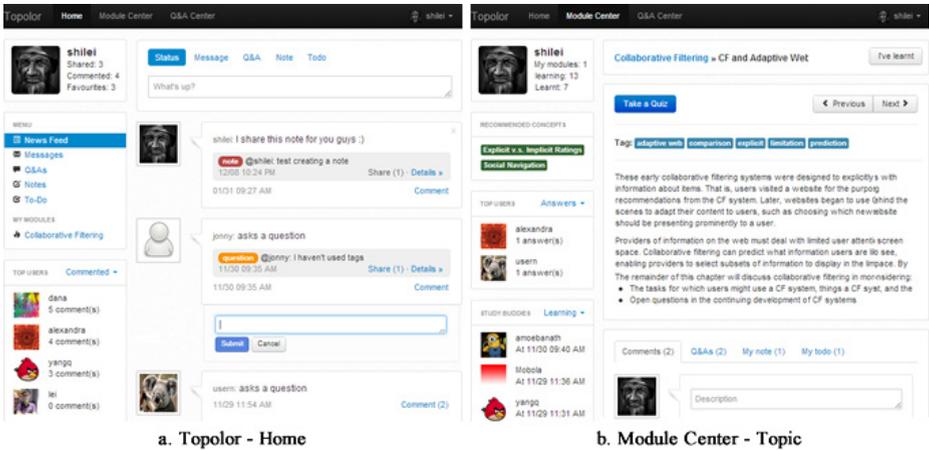


Fig. 1. The Screenshot of Topolor

2.1 Learning Content Adaptation

Topolor provides various levels of granularity of learning content adaptation, such as the whole modules versus individual topics within a module, based on: a) the connection and distance among modules/topics, b) the number of same tags shared; c) the knowledge levels of related topics, d) the incorrectly answered questions related to learning topics, and so on.

2.2 Learning Path Adaptation

The learning path adaptation is based on the structure of online courses (e.g., the depth-first traversal in a tree structured module), so a learner can, for example, click on 'Previous' to review prerequisite topics. The learning path is dynamically changed when, e.g., the submitted quiz contains the precast maximum number of incorrectly answered questions related to a specific topic.

2.3 Learning Peer Recommendations

Different scenes of peer recommendations are provided, e.g., when a learner is in a module dashboard page, learning a topic, asking/answering questions or taking a quiz. The learning peer recommendation is based on learning history, previous performance and so on. For instance, for a topic page, peers are recommended based on their quiz score for that topic, ordered in a recommendation ranking list.

2.4 Social Interaction

Topolor provides a set of Web 2.0 tools that learners are familiar with. For instance, the system index (Topolor – Home, as shown in Figure 1 a) contains an information

flow wall presenting social interaction events; navigation bar provides a messaging tool for synchronous and asynchronous communication. Learners can also comment on, share and 'favorite' a topic, a question, a status, a note and so on.

2.5 Adaptivity and Adaptability

Adaptivity is the ability to recommend automatically via pre-defined adaptation strategies, while adaptability is the ability to perform changes based on learner's direct intervention. Topolor provides both as main adaptation approaches.

3 Evaluation

Topolor was evaluated with the help of 21 students studying 'Dynamic Web-based Systems', a 4th year module at the department of Computer Science, University of Warwick. Before accessing the online course, a 'to-do list' was handed out to the students, to make sure they have a reminder of all actions at their disposal. The order of doing the actions, and if to repeat any actions was up to them. The system usability was tested using SUS [2]. SUS questions were answered on the Likert scale to provide a global view of subjective assessments of usability. The SUS assessment has a reliability value of 0.85 [3], and good systems should get a SUS score between 70-80 points. The SUS Score of Topolor is 75.75 ($\sigma=12.36$, median=76.25). Hence we claim that the usability of Topolor meets our initial expectation.

4 Summary and Future Work

In this paper, we have briefly introduced Topolor, a social adaptive personalized e-learning system, and showed results on usability from its preliminary evaluation. We plan to demo Topolor to researchers and practitioners and both showcase new adaptation features, as well as gather feedback on further development. Our results showed high system usability from a student's perspective. Additionally, during the online course session, a logging mechanism kept track of students' actions. Therefore for the future work, we intend to conduct an investigative study on learning behavior patterns by using data mining methods and visualization tools to analyze the extracted learning behavior data from the logging system, aiming at better understanding the learning process and thereby improve its adaptation and personalization mechanisms.

References

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