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Abstract—here we present a case study that analyses the social interaction features in Topolor, an adaptive personalized social e-learning system. This paper focuses on the evaluation of the perceived usefulness and usability. The results show a considerably high satisfaction of the students. We discuss the evaluation results and outline the plan for improvement.

Keywords—social learning; e-learning; social interaction; evaluation; adaptive educational hypermedia

I. INTRODUCTION

Topolor [1] is an e-learning system with adaptation and social interaction features. It has been used as an online learning environment for teaching postgraduate modules at the Department of Computer Science, 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 learners, positively affecting usability, as well as learning. To isolate research variables, this paper focuses exclusively on studying the usefulness and ease of use of the social interaction features in Topolor.

II. THE TOPOLOR SYSTEM

Topolor was built on Yii1, a PHP framework, and Bootstrap2, a user interface framework. It is hosted on Github3 for version control and open resource sharing. The first version of Topolor4 has been opened to public with the expectation that a larger cohort of learners could use it, so that in the near future, we could collect more feedback, usage data and suggestions for further study and implementation.

Topolor mainly consists of 3 sub-systems, i.e., Topolor-Home, Module Centre and Q&A Centre. Each of them contains adaptive and social interaction features that help enhance learning experience. Topolor-Home provides a chronological list of the learning statuses posted by students. It also provides interaction tools that encourage informal communication and collaboration, such as commenting on, sharing and favoring of posted statuses; Module Centre maintains online modules, and provides recommendations of learning materials, learning peers and interaction tools that encourage personalized social e-learning. Q&A Centre provides questions and answers related to learning topics, and provides recommendations of questions, learning topics, expert peer and social interaction tools for practices and discussions, and collaborations.

III. SOCIAL INTERACTION FEATURES IN TOPOLOR

This paper focuses on the three social interaction tools (shown in Fig. 1 and Table I): Status Tool is used to share learning statuses. Learners can favor and comment on each other’s statuses; Messaging Tool is used to send private messages to others; Q&A tool is used to ask and answer questions. Learners can also use Q&A tool for discussions.

Figure 1. Social interaction toolset

IV. EVALUATION OF SOCIAL INTERACTION FEATURES

The experimental case study was conducted with the help of 21 students from the Department of Computer Science at the University of Warwick, who were registered for a 4th year MSc level module “Dynamic Web-Based Systems”, and a lecturer led this module. The students were asked to learn from the system a lesson on “Collaborative Filtering” during a 2-hour learning session. 18 social interaction features used by the students were identified, listed in Table I.

TABLE I. SOCIAL INTERACTION FEATURES USED BY THE STUDENTS

<table>
<thead>
<tr>
<th>Status</th>
<th>a. post a status; b. edit a status; c. delete a status; d. comment on a status; e. favorite a status; f. share a status; g. send a message; h. reply to a message;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message</td>
<td>i. ask a question; j. edit a question; k. delete a question; l. answer a question; m. edit an answer; n. delete an answer; o. share a question; p. favorite a question; q. add a tag to a question; r. edit tags of a question.</td>
</tr>
<tr>
<td>Q&amp;A</td>
<td></td>
</tr>
</tbody>
</table>

After the learning session, the students were asked to fill in an optional questionnaire to measure the usefulness and ease of use of the social interaction features. The students had to select one of the five responses for usefulness and ease of use, respectively. Usefulness: 1) very useless; 2) very useful; 3) useful; 4) very useful; 5) very useful.
useless; 3) neither useless nor useful; 4) useful; and 5) very useful. Ease of Use: 1) very hard to use; 2) hard to use; 3) neither hard nor easy to use; 4) easy to use; and 5) very easy to use. 10 out of 21 students responded to the questionnaire. The 36 5-Likert-scale questions formed a reliable scale (Cronbach’s alpha = 0.934 for usefulness; Cronbach’s alpha = 0.948 for ease of use) [2]. The results are shown in Fig. 2.

The results illustrate that answering a question was rated as the most useful feature (mean = 4.6) as well as the easiest feature to use (mean = 4.7), which is further supported by the qualitative feedbacks, e.g., the way of asking and answering questions was explicitly mentioned as favorable. Asking a question was rated very high on the usefulness (mean = 4.5) and also ease of use (mean = 4.5). However, the usefulness of editing the tags of a question was rated as the 2nd lowest (mean=3.8), and the usefulness of adding tags to a question was rated as the 4th lowest (mean=4.1). We assume that when a student asked a question in a given learning content area, the relation between the question and the learning content would have been automatically established, so that tagging the question would not have brought additional benefits. Posting questions beyond the learning content area would be necessary to further comment on this feature.

VI. CONCLUSION

Topolor was designed to provide a wider range of social interaction features than other adaptive e-learning systems. It has been evaluated from different perspectives [3]. This paper focuses on the evaluation of social interaction features with the help of 21 MSc students. A questionnaire with 36 5-Likert-scale questions was used for evaluating each social interaction feature’s usefulness and ease of use. The results of the experimental case study reveal positive attitudes to all the evaluated social interaction features, but we still intend to further improve the system based on the above analyses and discussions. The design of the next version of Topolor has been initiated. Future experiments will focus on the evaluation of the new and improved features.

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