Using online presence data for recommending human resources in the OP4L project

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Abstract.
Web-based Personal Learning Environments (PLEs) have been widely recognized as a mean for supporting and assisting online learning practices. A PLE is a set of services customized by the student. Among these services, resource (either digital or human) recommendation is a crucial one. The paper briefly reviews existing approaches for recommending resources in PLE. Then it describes a novel approach that relies on students' social presence data and is implemented in the OP4L prototype. OP4L makes use of ontologies to formally represent and make use of the students' social presence data. Then the paper reports on qualitative studies that were aimed at getting students' feedback about the social-presence-aware services offered by the OP4L prototype.

Keywords. Web-based learning, social presence, online presence, ontology based resource recommendation.

1   Introduction

Personal Learning Environments (PLEs) have been widely adopted in the TEL research community as a mean for facilitating learning practices. From the technical perspective, a PLE is a customizable set of services aimed at enhancing the learning experience and learning outcomes. Among these services, resource (either digital or human) recommendation services are crucial, given the number and the diversity of available resources on the Web. Various approaches to the recommendation of resources have been proposed [1-3]. They all rely on a learner profile and include a more or less rich description of the learning context, often based on ontologies.

The recent increase in the use of social software tools by learners lead to the inclusion of novel forms of social presence into PLEs. These include online status updates, online visibility, availability for online communication and the like. Semantic Web technologies, ontologies in particular, allow for taking these forms of social presence into account when generating recommendations for students.

This paper reports on qualitative studies that were conducted with students using a PLE prototype developed in the scope of the OP4L (Online Presence For Learning) project [4]. First, we briefly summarize the results from some previous studies that explored PLEs, social presence and recommendation of resources in the context of online learning. Then, we present the OP4L framework with a focus on its social presence features. Finally, we describe how we organized data collection to get an initial feedback from students and discuss the obtained results.

2   Background

In her "vision" paper [5], Vassileva defines three main roles to be performed by PLEs: *(1) support the learner in finding the right content (right for the context, particular learner, specific purpose of the learner and pedagogically), (2) support learner to connect with the right people (…) and (3) motivate/incentivize people to learn.*

To achieve these goals, researchers and developers build on experiences gained from several domains. The discovery and retrieval of learning resources is one of them and has been widely investigated, beginning with the work on metadata interoperability, then going on with the use of ontologies to better match the learners' needs and context. As social web applications, such as resources tagging, became available, solutions mixing both ontology and tagging-based approaches were proposed. Meanwhile the recommender systems community developed powerful algorithms for the e-commerce sector and PLE developers tried to adapt them to e-learning purposes [1-3].

Social presence has been identified as a crucial success factor in e-learning for many years [6]. At the beginning social presence was mostly implemented through online forums and Instant Messaging tools that allowed establishing and maintaining social presence in online learning settings. The wide adoption of social web applications resulted in the inclusion of online social networks and connections established in these networks into online learning environments. Though in theory students can interact with their entire social network, in practice they do not get any indicator about who is really available in the given moment and who is really competent for helping in the current task. Although recommending knowledgeable people for performing a given task is not new, it has been mostly investigated in company settings such as reported, for instance, in [7]. OP4L project proposes solutions for these last two challenges as described below.

3   OP4L framework

3.1   Background and objectives

OP4L is a European SEE-ERANET project which aims at exploring the use of web tools and services for supporting social presence in online learning environments and thus contributing to an improved learning experience [4]. In this paper, we use OP4L to name both the project and the developed prototype.

OP4L defines online presence as a temporary description of a user's presence in the online world. It can be considered as an image that a person projects about

him/herself into the online world. In this project we explored online presence in the context of the DEPTHS PLE [8]. DEPTHS (DEsign Patterns Teaching Help System) is designed for a Design Pattern course in Software Engineering – Computer Science – master level. It makes use of ontologies as a common base for the integration of different systems and services in a common environment for collaborative learning of software design patterns. In addition, the ontologies served as the foundation for the development of the DEPTHS' recommendation services. The first service is a context-aware recommendation of resources on software design patterns from online repositories, learning artifacts produced and shared by peers, software projects, discussion threads, chats, etc.; the second service is a context-aware recommendation of other students, experts and/or teachers to offer help in the given situation.

Within the OP4L project, DEPTHS' services have been extended to include the notion of online presence. The novel online-presence-aware educational services make use of users' online presence data when providing learners with recommendation on whom to ask for help or collaborative work. These data are periodically "pushed" towards the PLE by specific software modules developed for that purpose. Within the online presence data, a key indicator is the "online status" as declared by the user. For instance, a peer whose online status indicates that he/she is busy in the given moment will not be recommended; on the other hand, the system would recommend a face-to-face study session with a peer who has just checked in the same building and whose status indicates that he/she can be freely contacted.

A complete technical description of the OP4L models can be found in [9],

3.2 Main features of OP4L prototype

OP4L services are accessible through a dedicated Moodle platform and become available after a student selects a course to study and a learning activity. Specifically, the system indicates who is competent and available online for help or collaboration and how to contact potential helper(s)/collaborator(s), either on the Moodle platform itself, or via Facebook or Twitter. The platform also recommends appropriate content related to the topic of the course. For enhancing collaboration, students are also given a brainstorming tool where ideas can be annotated and rated. Finally, students can upload their work on the platform and benefit from a system of peer evaluation. They can assess other proposals only when they have uploaded their own solution.

4 First feedbacks from students

Two studies were run between January and May 2012 with the first versions of the OP4L prototype: The first one with Human Sciences students in Nancy (France), the second one with Computer Science students in Skopje (Republic of Macedonia).

4.1 Experiment at Université de Lorraine (Nancy, France)

Our objective was to get an early feedback about OP4L services from students to analyze how end-users use, like/dislike, and benefit from the newly provided features.

The study was conducted with 15 students in February 2012. The participants came from several master courses on different subjects. This diversity was important for the project as we needed to get feedback about recommendation services from students studying different subjects in several countries. The students' profiles were: Bachelor in Communication (8), Master in Laws and European right (3), Master in Chemistry (1), Master in Digital Design (2) and Bachelor in Medical Sciences (1).

The data collection was organized in three steps. A first questionnaire was passed with the aim of getting descriptive data about students' understanding and current use of Web-based social networking services. Then the OP4L's online presence services were demonstrated; the students were free to analyze more deeply the services. Finally, a second questionnaire was passed to get the students' feedback about the features of online presence services. To learn more about their expectations from such services, they were also asked to describe a scenario including the kind of services they would dream about. They were also invited to provide free suggestions.

Preliminary conclusion. The hypothesis was that providing students with online presence recommendation services in a LMS could significantly help them in performing their learning tasks. Students immediately show an interest in contacting peer students for the kind of project they have to complete for their master degree. Some comments: "This tool can be useful to help us identifying the appropriate additional contents, to collaborate on specific topics and to get advices on the already done work. There is a true social aspect (peer-to-peer) which could really help us." "This tool could give the possibility to ask questions and to collaborate with other students who have the capability and the availability to answer to questions. To have all contacts and friends in the platform will bring a gain of time". "To create and display detailed users' profiles including curricula, centers of interest and whom they helped and in which domains. This gives us a possibility to have a better knowledge of the people who could be contacted for help".

The analysis of the students' current use of communication technologies shows that they are not daily users of the university's Moodle environment. However, they join each other preferably through social networks. Given that context, their appreciation of the prototype ("The overall ergonomic design is quite good, clear and well organized. It is really user friendly.") is quite encouraging as they immediately understand the benefits that such a tool could bring to them in the tasks they have to achieve. Moreover we collected their appreciations (ranking) about several dimensions of online presence, knowing who is online and who is available are the most appreciated. They also mention several times a gain of time in achieving their tasks.

4.2 Evaluation at Ss. Cyril and Methodius University, Skopje (Macedonia),

The objective of this evaluation study was to provide evidence that the OP4L framework can be successfully used by students for collaborative problem solving activities. The study scenario was project-based learning with collaborative learning support where a teacher defines a specific problem to be solved in a workshop-like manner. To perform collaborative learning activities, students had to use OP4L services:

peers recommendation (suggestions of other students, teachers or experts as possible collaborators) and recommended reading (suggestions for relevant learning content to be consulted and/or used when working on the problem's solution). The evaluation study was performed at the Faculty of Computer Science and Engineering, between February and May 2012. Two groups of students participated in the study: 1) 22 master students enrolled in the Design Patterns course; these students were obliged to do two of their five course homeworks using the system; and 2) 14 undergraduate students (2nd and 3rd year) enrolled in the Human-Computer Interaction course; these students had either limited or no knowledge of software design patterns.

The study scenario was the same for both groups; the difference between the groups was in the tasks they were required to perform. At the beginning all students filled in a motivation questionnaire (MSLQ). Then, the students performed two tasks related to Design Patterns and for each task they had to do the following: propose and submit an idea for the task solution; discuss and grade ideas proposed by the colleagues; propose a solution in the form of an UML model; and assess his/her own solution and solutions of others. At the end, each student filled in a questionnaire related to the study tasks. This questionnaire was concerned with: the habits of using Facebook, the experience in using the OP4L learning environment, collaborative learning and the use of Facebook in collaborative learning.

Students were positive about the following system' services: 1) possibility to discuss with peers: 65.5% stated that discussion with peers helped them to rethink their proposal for the solution; and 2) recommending reading: 65.5% reported that reference materials helped them to rethink their proposal for the solution.

However, the results also showed that the students are not keen to use Facebook, its chat and applications for learning. Only 8 (22.2%) of them reported that they used OP4L's Facebook connection, whereas 18 (50%) students explicitly stated that they did not use the OP4L's Facebook connection. Students answers related to the use of Facebook can be grouped as follows: seven students did not have a Facebook account; those who had Facebook account, usually use the Facebook for fun or for "private matters"; some students did not use OP4L's Facebook connection because they had access to the solutions of others, so for them it was enough to solve the problem; and one student reported that the complete use of the system was too difficult and that was the reason why he/she did not try OP4L's Facebook connection.

Preliminary conclusion. Considering the answers in the questionnaire we can conclude that some of developed services for OP4L are positively assessed by students. Generally, the students as the most positive assessed the services recommending reading and "offline" discussion with peers (providing ideas for solution, and commenting and assessing the ideas and the solutions).

The use of Facebook, its chat and applications did not increase after period of working with the system. It was an unexpected result since the students tend to use the Facebook chat to communicate with the teaching staff on the course-related matters. This evaluation showed that the majority used their Facebook accounts as they had used before the study, which mainly includes fun and social communication.

5   Conclusion and further work.

We have presented online-presence-aware recommendation services as implemented in the DEPTH PLE, as well as the first assessment of these services with students. The presented studies only aimed at providing a qualitative analysis of the services and the PLE in general. Quantitative evaluations of these services are currently under way by other project partners.

   Next steps include improving the software solution to deploy it in more universities and to provide teachers with ways to add new lessons and new courses. Indeed, the recommendation of resources for a given task relies on the availability of task domain descriptions through ontologies. Providing the corresponding ontologies for a new domain as well as describing resources (digital and human) is a time-consuming task. So, there is a need for an intermediate solution. The students' ratings of different dimensions of online presence and the services effectively used could help us to choose the appropriate services to implement. Then further evaluation in larger learning settings (longer period in the academic year, lower dependency to exam ratings, etc.) should take place.

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