Computer Support for Participatory Designing – A Pilot Study

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ABSTRACT

The present study analyzed whether and how students working in the collaborative learning environment (Future Learning Environment, FLE2) were able to share their design process with the intended user of the product. Six teams of first-year university-level textile students (N=24) participated in design course, in which they solved an authentic design task -- designing bags of EuroCSCL conference. The methods of social network analysis were applied to study interaction between all participants. A qualitative content analysis was carried out by analyzing the interaction between statements posted to the FLE2 database by two of the design teams. The results indicated that in the case of more successful group, the expert user took a role of co-designer by participating in the design process through evaluating ideas produced by students.

Keywords

Collaborative designing, knowledge-building environments, participatory design

INTRODUCTION

Collaboration is essential aspect of professionals' practical activity in the field of modern design. The idea of giving an "expert user" an important role in designing relies on the notion of participatory designing. Participatory design emphasizes the importance of acquiring relevant information from the end user of the product and ensuring that the product manifest the end user's viewpoint. The present study aimed to investigate aspects of teacher and expert users role in a participatory design process, specifically: 1) to explore how teacher and expert users worked in the virtual design environment to jointly advance students' design process; 2) to investigate the participatory design and the expert users' contribution to the design teams' collaborative design process.

The present study relies on the Future Learning Environment FLE2 (Leinonen, Mielonen, Seitamaa-Hakkarainen, Muukkonen, & Hakkarainen, 1999; http://FLE2.uiah.fi). The data were collected from a 13-week collaborative design course, and students were using FLE2 -environment during design process. In the study the participants were 24 first-year – university students and the students worked in six design teams. The design task was a very authentic and complex -- design task: the students were asked to design and produce functionally and aesthetically delightful conference bags to the EuroCSCL conference. Each of the teams had its' own "expert user" (i.e., an avid conference goer), and they participated in the design process by providing information about conference bags and conferences in general in the FLE2- environment. In order to analyze the participants' role in the social interaction of networked designing the social network analysis (Scott, 1991) was used to study participants' social position in the collaborative design process. The participants' positions in the networked discussions were analyzed using Freeman's degree as a centrality measure. The second level of analysis i.e., qualitative content analysis was conducted to teacher's and expert users' participation in design process. This detailed analysis was, limited to the database produced by two of the design teams, teacher and expert users. We selected team 1 and 2 because expert users appeared to participate rather actively in these teams. The knowledge-building messages posted to the database were segmented into propositions representing one main idea (Chi 1997). The classification schema consists of several categories but we are limiting our results analysis only one category. The reliability of classification; the coefficient for rater agreement was .88, which was considered satisfactory.

RESULTS

The entire database consisted of 211 Knowledge Building messages. The students posted 149 messages, on average 6.2 messages per student (minimum was 0, maximum 26 messages) to FLE2's database during the course. The teacher posted 35 messages, and the expert users posted 27 messages. Team members' activities and expert users' participation varied considerably from one team to another. The analysis indicated that the participants' social network had a relatively centralized structure (92% in the case of sent, and 82% in the case of received messages). The teacher's extremely high betweenness value indicates that she was mediating information between the teams and expert users. The students did not actively comment on design process across the teams. Team 4 appeared to be the most productive in posting KB messages, and the number of their sent and received messages was higher than those of other teams. Team 3 did not participate in virtual designing as actively as the other teams. Teams 1 and 2 appeared to have most active expert users, whereas in Team

6's expert user did not participate (for technical reasons) in the ongoing discussion. The analysis indicated that the students' network of interaction was not very dense; specifically, 0.22 (SD =0.86) for symmetrized data (direction of commenting ignored). Detailed analyses indicated that the teacher distributed her coaching efforts equally across design teams.

We analyzed more closely two design teams, with respect to interaction between the teacher and the users. Teams 1 and 2 posted 72 knowledge-building messages, consisting 293 design statements. There appeared to be significant differences between the teams' designing concerning how student used information and acquired knowledge as well as feedback from the expert users (df=7; χ^2= 46.3; p< .001). While all teams were provided information of expert users' conference experience, only Team 2 explicitly requested experts to comment on their design. The teacher's and expert user's contribution to Team 2's design process appeared to focus on helping to evaluate students' ideas. Moreover, Team 2 students also asked for more feedback (f=14; 8%) from their fellow members than did Team 1 (f=4; 3%). Both teams received an approximately equal amount of statements representing expert users' experience during their designing and both expert users were active and supported students' designing by providing their own experiences with conference bags. Team 1 acquired, however, much more information from the users outside the present network environment by interviewing some other conference goers (f=24; 20%). In the case of Team 2, the expert users gave feedback about the students' ideas twice as often (f=31; 18%) as in the case of Team 1 (f=9; 8%). Team 1 produced design ideas, but they did not ask for any direct feedback for their ideas, from the teacher or the users.

DISCUSSION

In general, it appears to us that participatory designing (i.e., including the expert user as a designer's partner) is indeed possible to arrange in the FLE-environment. Our previous studies have indicated that there are two important aspects of designing that virtual design environments may scaffold: defining the design context and acquiring new information. In the case of Team 2's design process, the expert user directly provided his or her own experiences and feedback for the participants about their solutions. Students of Team 1 also acquired outsider users' experiences but did not rely on interaction with the expert user while testing their design ideas. In Team 2's design process, the teacher and user became more involved in the students' designing since they were actively invited to the discussion of the relative merits of solutions. The user and teacher became more co-designers with the students even if they did not directly provide new solutions or sketches. An essential aim of the present study was to facilitate direct student-expert partnership, i.e., provide the students with access to authentic expert users' knowledge so that the student designers might apply it. In the present case, however, the activity of the user also varied: Either the student did not ask the active user's contribution, or the volunteer expert user did not have enough time to participate in the virtual design process. It might be important to improve the participants' awareness of what is going on within a networked learning environment (e.g., setting up a notification system that transmits information about students' activities to the expert users), so that very busy experts could follow what students are doing and provide timely feedback for students.

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