Considering Technical, Social & Organizational Contexts in Systems to Support Teacher Learning

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ABSTRACT

This paper presents the results of a field trial of the Living Curriculum (an on-line professional development resource for teachers) examining use, utility and usability. Results show limited use of the system, but high utility for the teachers that did use it. Usability results suggest some design improvements but by and large show that teachers were readily able to use the system. Limited use is attributed to a failure to account for the context of use. Future research in this area should attend realistically to the technical and social constraints of schools.

Keywords

social context, performance support, teacher learning, on-line learning, design research

INTRODUCTION

This paper presents the results of a field trial of the Living Curriculum (LC); a case-based performance support system designed to help teachers learn to teach project-based science (Krajcik, Blumenfeld, Fredricks & Soloway, 1998) curricula by coupling video cases to curriculum over the Internet. The goal is for teachers to learn from those video cases as they teach the projects. This study examines the *use*, *utility* and *usability* of the LC. Do teachers use the system? Do they find it useful when they do? Finally, from an HCI perspective, is the system usable? In the interest of space we refer you to our CSCL '99 paper (Shrader & Gomez, 1999) for a description of the system.

METHODS & RESULTS

The participants in our study were all Chicago Public School teachers with at least 10 years experience who were planning to teach a project-based science unit called ReNUE between January and April of 2000. Participants were assigned to 2 groups (4 teachers per group). The "Scheduled User Group" committed to use the LC on two week intervals with an interviewer present. The "Independent User Group" had access to the LC but made no commitment to a schedule of use. We conducted pre and post-interviews with all participants. We also observed and videotaped the Scheduled User sessions and maintained a server log of all LC interactions. Results of the study are reported in the two categories: Quantitative analysis of use patterns and qualitative analysis of the scheduled user sessions.

Use Patterns: A total of 6 sessions were logged by the *Independent Users*; 4 by User 1 and 2 by User 2. Most of that use was motivated by the interaction with a professional development facilitator (not associated with this study) who recommended specific LC content to help a teacher experiencing difficulty teaching part of the project. All of the *Scheduled Users* logged sessions as planned but only User 4 logged independent sessions. It is interesting to note that our data are confounded by the fact that all of the participants were also registered in a graduate course supporting their implementation of ReNUE. All 4 of User 4's independent sessions occurred after the class ended. We also know that at least 2 teachers outside of our study used the LC; for one the LC was her sole PD resource.

Analysis of Scheduled User Sessions: To explore the utility and usability of the LC we now examine the video and interview data from the scheduled user sessions. All the videos from the scheduled user sessions were reviewed and coded by the interviewers. Those coded videotapes were then subjected to interaction analysis at team research meetings (Jordan & Henderson, 1995). The main results are outlined below.

- Teachers' time and computing skills: Our scheduled user data suggest that *teachers' time* was a significant barriers to use. Users frequently expressed an intent to use the LC independently between sessions, but rarely did. All of the teachers sampled had adequate basic *computing skills* and could locate and navigate the LC. However they needed help configuring their browsers by installing the Quicktime plug-in.
- Design and Usability: All scheduled users consistently complained about the *size and the quality* of LC videos. In some cases the video was streaming too slowly. In other cases the 160x120 pixel video was too small. The LC *organizes video cases* by indexing several videos to each project lesson plan and uses a schematic diagram of titles to point users to the individual videos. Users did not understand that organization.

- Utility of the LC: Our scheduled users all used the system to browse the curriculum pages until they found an activity of interest and then linked to the video for that activity. In both the scheduled user sessions and the post interviews teachers reported that the LC was useful in three ways: to plan their lessons, to review lessons that they had already taught, and to get help with difficult lessons (e.g., modeling).

DISCUSSION & CONCLUSION

We undertook this study to examine the use, utility and usability of the LC. Our *use* results were disappointing. Data suggest that use is constrained by teachers' access to connected computers, time, and technology skills. Despite these limitations we found that the teachers who did use the LC found *utility* in that use. They used it to plan their teaching, to build confidence in their teaching, and to address instructional problems in their classrooms. Finally with respect to *usability* we found room for design improvements but in general found that teachers easily learned to navigate the LC. We are encouraged by our utility and usability results. Of course those results only matter if we can address the barriers to use. For that reason we focus the remainder of our discussion on the question of use. We begin our discussion by addressing access and technical support from a social context perspective and then consider the larger context of use.

Access to computers and the Internet as well as limited technical proficiency are not surprising findings. Both are knowable conditions of the user population. The distribution of computing skill among the teaching population roughly mirrors that of the working population at large. The teachers in our study could use a computer to read mail, browse the web or produce documents. Difficulties arose when they were asked to install plug-ins. Access has two dimensions. In simple terms teachers do not have access to enough Internet connected computers. More importantly, they do not have access to adequate technical support. With adequate support the browser software would have been updated and the plug-in problem would not have arisen. But understanding the problem does not let us off the hook. Our job is to design for our clients' environment. Use of the LC suffers because we depend on an idealized computing infrastructure that does not exist. Our future success will depend upon our ability to execute a design that will be usable in school environments.

While the volume of use during this study was clearly disappointing we take encouragement from two results. First, when teachers did use the LC they found it useful. More importantly there were two contexts that fostered use. Teachers used the LC during scheduled use sessions with an interviewer. They also used it at the recommendation of PD facilitators to address specific problems. These two uses have one thing in common: social context. We are reminded of Vermeer's (in process) work on the social/organizational environment in which knowledge management systems are used. Vermeer argues that use of knowledge management systems depends on careful consideration to the design of use contexts. The goal cannot simply be to design systems that identify, represent and share practice but to design explicit organizational contexts within which the resulting system will be used. Through the design of our study we happened upon two social contexts that promote use (interviews and PD interactions). Future research in this area must take the social and organizational context of use seriously both as it relates to the design of the tools themselves (e.g., making them usable within the infrastructure of schools) and as it relates to the way the tool fits into the school context. A longer version of this paper with a more detailed analysis appears in the electronic version of these conference proceedings.

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