Designing Tools, Designing Learning Opportunities: Issues in Developing a CSCL System for the Technical Communication Classroom

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Abstract: This poster demonstrates a prototype of a CSCL system aimed at supporting oral presentation skills required in technical communication classrooms based on group practices. The system, Classroom2000, includes Web delivery of student oral presentations and slides. We point out challenges to adopting a user- design approach (Carr, 1997) and involving students in formative research needed to for develop CSCL technologies.

We investigate the effectiveness of the prototype as well as the prototyping process as it relates to learning outcomes. First, we look at the classroom2000's support of reflection, peer evaluation, and interaction skills required in the students' production and delivery of team-based oral presentations. Next, we consider the process of developing the prototype of the system within an activity theory framework that highlights the interdependence and tensions between constituents of the design. (Engestrom, 1997). Our early results is based on ethnographic research , including participant observation, product analysis, and open-ended questionnaires. These are discussed in light of the potentials and problems in undertaking a participatory design process for CSCL systems in, and with, the classroom.

Keywords: language arts, participatory design, activity theory

Background

We present research on the design of a system aimed at supporting technical communication skills of Management and Engineering students engaged in collaborative learning activities. The system includes: audio/video recording of student presentation of a Power-Point report; automatic conversion of the PowerPoint slides into HTML and GIF files; generation of HTML files that synchronize and stream the audio/video and slide files; serving the files on a remote server to be accessed by students and teachers both on-campus and off-site. Two overlapping perspectives in the development of CSCL situate our study: the notion of process-oriented assessment of CSCL (Solomon, 1995) and the potential for developing CSCL technologies within a user-design, rapid prototyping process (Carr, 1997). We use ethnography within an activity theory (Engestrom, 1997) framework in order to represent and discuss issues surrounding the effectiveness of both the tool and its development process.

The research was motivated by the possibilities of re-engineering and re-purposing existing technology to support technical communication instruction offered by the Writing Centre of the Faculty of Education at McGill University. As originally developed by Georgia Tech, Classroom2000 is intended to support on-line delivery of campus lectures. Students are able to access classes missed or revue lecture material after class or off-campus using the Web. The Department of Electrical and Computer Engineering at McGill further refined Classroom2000's user interface "ZenPad" and recording facility that allows capturing, storing, and on-line retrieval of lectures which included PowerPoint slides. We then decided to explore how Classroom2000 could be further adapted for use by the students in technical communication classrooms.

While tailored to the specific Faculties requiring technical communication instruction, the technical communication curriculum is based on a theoretical view of the writing process as being iterative (Flower, 1981) and on instructional design principles emphasizing critical thinking, collaboration in the writing/ editing/re-write process, and opportunity for team, problem based learning. The cap-stone project is the team based oral presentation which assesses the students knowledge of team interaction, technical rhetorical structure, and effective speaking. Students are evaluated on their own presentations and process logs, as well as their fulfilling team based responsibilities and the quality (depth, scope, and manner) of constructive criticism offered to their team- and class-mates. This curriculum is therefore aligned with team and process-oriented writing pedagogies described in Neuwirth and Wojahn (1996). It is within this pedagogical framework that we thought that the features of Classroom2000 would be a valuable support of the fundamental instructional principles in technical communication: the practice/review cycle; peer evaluation; and reflective learning.

Implementation

The system was implemented in a newly designed course for first year business management students as a large class (45 students) alternative to the usual 25 students or less. As well, for the first time, the class was being co-taught by two senior lecturers in the Writing Centre. The students were divided into eight teams of five students. The students had individual and group assignments, inc., technical report, oral presentation using PowerPoint, group process logs, reviewing drafts, jointly developing the presentation format.The students were instructed how to use ZenPad and given the background and purpose of the research. Because of scheduling and administrative problems, the introduction of the tool was delayed until the final weeks of the term, and the oral presentations were held over a three week period.

Method

Following a user- design orientation (Carr, 1997) the primary researcher and computer engineer identified the two potentially interested instructors in order to involve them in the planning, development, implementation and review of the design.

The implemented system was evaluated on the fundamental learning principles in technical communication instruction: understanding the practice/review cycle ; critical , peer evaluation; and reflective learning. Data were derived from observation, student open-ended questionnaire, instructor evaluation of the students, guided interviews with instructors. We investigated which features of the tool were used by both students and teachers, why these features were used, and the impact of the tool as used on the students' performance in their oral delivery of PowerPoint presentations. We focused on: student assessments of the technology, their own and their group's oral performance, their self and peer evaluation skills; the instructors' evaluations of the technology, it's use, and their students' performance and critical thinking skills.

Results

Most students used Classroom2000 to revue their own presentations rather than their classmates. Because of the delay, the students who may have benefited the most from the tool's support of peer evaluation were obviously the late presenters. Indeed, these students more often believed that the tool supported their peer evaluation skills when compared to the students who presented earlier. Also, while most of the students felt that their oral presentation and group interaction skills improved through peer and self evaluation, the instructors found little evidence of this in the students' oral and group performance, or in their critical thinking skills. Generally, most students felt that they were designing 'to' and not 'with' the tool. Both instructors also saw the potential of Classroom2000's video recording and on-line accessibility in contributing to the student's development of evaluation and reflection. Like the students, they criticized the effort it took to "make the system work", but were willing to try again.

Discussion

We identified three distinct but related arenas of collaboration: the students engaged in collaborative communication tasks; the students and the instructors adjusting teaching and learning at the implementation level; and the instructors and the researcher/technologist adjusting technology to instructional goals at the design level. Assessment of learning in CSCL writing classrooms is problematic (Neuwirth and Wojahn, 1996). From an activity theory perspective, this may be partly due to the tension between conflicting objects, as in long term and short term objects between the participants, and the extent to which long term objects and learning outcomes are accurately measured in relatively short term projects. Also, the students objects focus on the mastery of the tool while the instructors sought students' mastery of the content. Moreover, while participatory design practices continue to generate much interest, we consider the difference in status and motivation between stakeholders who are representative of a group (i.e., the students), and stakeholders whose involvement is more based on their own merit or position. We believe that for students to be involved in a formative, user-design process,we need question what they may learn from their participation at the design, as well as at the implementation level.

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