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ABSTRACT

This study took place within a teacher education program at a large Midwestern university with vast field observation placements around the state and the world. The purpose was to discover whether preservice teacher electronic conferencing on the World Wide Web about early field experiences can have an impact on the learning of educational psychology and general apprenticeship within the teacher education program. The power of asynchronous conferencing was combined with case-based reasoning and peer and mentor collaboration to electronically apprentice student learning. Research questions in five areas were examined: (1) dialogue; (2) requests for help/learning assistance; (3) scaffolding and apprenticeship; (4) attitudes; and (5) teaching philosophy. During 1996-1997, 146 undergraduate educational psychology students were randomly assigned to two different electronic conferencing groups; one group was heavily scaffolded (i.e., students received more task structuring, instructor guidance and feedback, moderator queries, and cooperative teacher recommendations) and the other was not (i.e., students received feedback from their peers, and when they requested it, help from the instructor). While students found the conferencing tool, Conferencing on the Web (COW) to be easy to use, many looked at this as an additional task burden of the class, not as an opportunity to interact with peers. (Contains 19 references.) (AEF)

A Case-Based Electronic Learning Environment for Preservice Teacher Education

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This study took place within a teacher education program at a large Midwestern university with vast field observation placements around the state and world. In the first field experience of this program, preservice teachers study for 20 hours with nearby public school teachers. Here, students experience varying degrees of isolation from their instructors, cooperating teachers, and peers. Not surprisingly, many students are lonely and unsure of their responsibilities, while cooperating teachers only have a vague idea of what is expected of the visiting student. Fortunately, as Singletary and Anderson (1995) point out, there are a number of emerging computer conferencing technologies to support beginning and inexperienced teachers with specialized training and consultation.

The purpose of this study, therefore, was to discover whether preservice teacher electronic conferencing on the World Wide Web (WWW) about early field experiences can have an impact on their learning of educational psychology and general apprenticeship within the teacher education program. In building on an earlier comparison study of synchronous and asynchronous conferencing, favoring the latter, this follow-up second experiment was conducted in the spring of 1997 using student-generated cases and an asynchronous web-based conferencing tool called Conferencing on the Web (COW). In a nutshell, this study combines the power of asynchronous conferencing with case-based reasoning and peer and mentor collaboration to electronically apprentice student learning.

Technology Meets Learning Theory

Cases have been used in law, medicine, and business to ground student learning into the context of these disciplines (Riesbeck, 1996). According to Williams (1992), the case method has been used to anchor classroom activities in complex situations wherein students can reflect on the utility of knowledge while understanding the conditions of use. However, she also points out that cases can vary in their authenticity, complexity, engagement, and underlying format. In terms of format, cases can be presented as simple narratives, cases with embedded flaws, cases with expert commentaries, and cases with alternative or counter cases (Silverman, Welty, & Lyon, 1992).

According to Copeland (1989), technology-mediated laboratory experiences might enhance the level of preservice teacher reflection and clinical reasoning about such cases. The time independence of asynchronous web-based conferencing tools, for instance, now offers students opportunities to evaluate, summarize, and communicate critical information about a case situation or problem. Recent developments on the WWW have made available cheap, fast, and broad opportunities for preservice teacher case reflection as well as potential access to expert teachers and mentors. Using the web, college instructors, therefore, might apprentice preservice teacher learning by modeling expert-like answers, providing feedback on student misconceptions, and offering key instructional help and task structuring. Electronic cases might also allow preservice teachers to jointly construct new knowledge with distant peers under the tutelage real-world practitioners (Riesbeck, 1996).

As Singletary and Anderson (1995) state, there are a number of emerging computer conferencing technologies to support beginning and inexperienced teachers with specialized training and consultation. Web-based conferencing (WBC) allows users to read, browse, and add to multiple discussions by using a web browser anywhere in the world. Hence, one does not need access to networks or systems at a particular university to participate in an electronic discussion. All that is needed is access to the WWW and conference clearance from the conference moderator. Another benefit of WBC is that discussions occur asynchronously, permitting the user to read, browse, or add to them at his or her convenience.

Most research on the use of collaborative educational technologies in higher education fails to provide extensive theoretical grounding (Koschmann, 1994). Moreover, faculty and public school teachers sorely lack important information about the effects of various tools and how to embed them in their classes. As a result, some researchers turned to sociocultural theory (Vygotsky, 1986) to evaluate and understand electronic learning environments. Though sociocultural theory continues to evolve (Wertsch, 1985), few studies focus on how sociocultural variables impact adult learning and problem solving (Forman & McPhail, 1993). One sociocultural concern in electronic learning environments is what forms of learning assistance (e.g., modeling, questioning, task structuring, feedback, and scaffolding, see Collins, Brown, & Newman, 1989; Teles, 1993) are evident in electronic computer conferences. Another variable of interest relates to how meaning is negotiated and common knowledge acquired (Rogoff, 1990). A third crucial sociocultural issue is how experts or practitioners cognitively apprentice novice learners in developing skill through authentic learning experiences or exposure to cultural practices (Lave, 1991).

Research Questions

The following research questions were examined:

Dialogue

What topics spur discussion? How does peer responsiveness affect the depth of dialogue? How is intersubjectivity displayed?

Requests for help/Learning assistance

How do students ask for and receive help? What types of advice and learning assistance (i.e., questioning, feedback) do peers, cooperating teachers, and instructors provide in this web-based conference?

Scaffolding and apprenticeship

What might be the indicators or signals of effective mentoring on the web? How might apprenticeship and emerging expertise be captured electronically?

Attitudes

What are the students' attitudes toward using computer conferencing within their early field experience? Will they prefer heavy or weak scaffolded discussion?

Teaching philosophy

Will using conferencing tools foster new expectations of teaching and learning?

Research Methods

Subjects and Intervention

During the academic year of 1996-1997, 146 undergraduate educational psychology students were randomly assigned to two different electronic conferencing groups, one group was heavily scaffolded and the other was not. When in a strong scaffolding conference, students received more task structuring, instructor guidance and feedback, moderator queries, and cooperative teacher recommendations. When in a weak scaffolding conference, students received feedback from their peers, and, when they requested it, help from the instructor. Each student was asked to generate two problematic teaching cases based on his or her observations in the field, as well as provide plausible case resolutions based on readings and lectures. Students were also asked to give feedback to at least four peers on their cases and summarize the electronic discussion generated by his or her respective case as well as at least one peer's case. After three weeks the students who received heavy scaffolding were assigned to another conference where they received weak scaffolding. Along the same lines, the students who received weak scaffolding during the first three weeks, were assigned to a conference where they received strong scaffolding. Such counterbalanced research design was important to control for the effects of system familiarity and utility.

Conferencing Technology

The WBC tool used here is called Conferencing on the Web (COW). COW is organized into three basic levels. At the base level is the conference level. While this is typically a single class, the four conferences reported later on in this paper each consisted of students from five different sections of undergraduate educational psychology. Conferences can be public (i.e., needing only a COW account) or private (i.e., needing permission of the conference moderator or "fair witness" to view). At the second level of COW, each conference is organized into topics (e.g., lecture-based questions or issues). Topics are typically listed at the bottom of the conference main page. At the third level of COW are conversations between students and instructors in response to the material presented in class. Most electronic conferencing actually occurs at the conversation level wherein new messages are posted below older messages. Anyone permitted to join a COW conference can start conversations or reply to conversations here.

Data and Instruments

All of COW case discussions and conferencing activities were saved and archived for in-depth analysis. Aggregate conference posting data was printed out after the conferences ended. In addition, a sample of 60 case discussion threads were analyzed for dialogue content, case quality, and forms of mentoring. Exemplary instances of individual commenting were noted. Finally, after the conferences ended, three of the five course sections took a five minute survey about their attitudes toward the conferencing activity.

Quantitative Analysis

As indicated, the WBC system automatically provided extensive empirical data regarding system usage. This information included: (1) the number of people who

accessed the system and who actively contributed; (2) the overall number of messages and length of message posted to COW; (3) the number and length of responses in the HS and WS conditions; and (4) the average length of a case, case threads, and case summaries.

Qualitative Analysis

Qualitative data were combined with the above quantitative data to build a chain of evidence about the collaborative formats and interaction patterns that facilitate student learning and reflection on the web. Student electronic transcript conversations were coded for discourse type, case components, case summary components, question type, and the forms of learning assistance and mentoring (Tharp & Gallimore, 1988). After the semester ended, a stratified random sample of 35 HS and 25 WS cases or electronic discussion topic threads representing a wide range of discussion and response depth were chosen for content analysis (e.g., Bonk, Hansen, Grabner, Lazar, & Mirabelli, in press; Henri, 1992). Two of the sixty threads were found to be repetitions or extensions of other cases and were removed from the analysis.

Besides recording the components of a typical case and case summary, the content analysis scheme chosen recorded the following forms of electronic discourse: (1) social acknowledgments; (2) unsupported claims and opinions; (3) justified comments; (4) questions and dialogue extension prompts raised; and (5) mentor scaffolding. From these data, we attempted to determine the types of conferencing structures and instructional scaffolding that promoted more extensive dialogue and debate. The key variables of interest here were the depth of dialogue, references to classroom resources, instances of intersubjectivity, and general peer responsiveness.

Discussion of Results

There were a myriad of interesting findings in this study of asynchronous web-based conferencing. First of all, with 1,549 (229 cases and 1,320 replies to them) student case-based postings, it can be argued that students were heavily involved in electronic writing during this six week period. Writing was a way for students to clarify their thinking about field observations and the text material. The electronic traffic registered indicated that the system functioned as planned; while all case conversations were logged and stored for later analysis, the user friendly COW system did not interfere with student case discussions. In over 1,500 postings, students were sharing stories and were apprenticed into teacher education by expert mentors and peers. COW training was so easy, in fact, that immediately after their training students were observed writing new cases as well as firing off responses to the cases of their peers. Since the computer laboratory could accommodate 25-30 students for training, there were times the COW conferencing took on a synchronous flavor.

Other positive results included the fact that groups involved in teacher education (i.e., students, instructors, and cooperating teachers) were communicating with each other through an electronic conferencing tool that was fresh and exciting. In this electronic conferencing system, students were sharing problems and events, asking for help, offering advice, and sharing related stories and events in their lives. To consistently receive five or six responses to a teaching related problem or dilemma one observes in the field is remarkable. In effect, students were conversing about their real problems that they may soon have to face and receive timely and candid feedback. The electronic conference was also a place for extensive social acknowledgment and support. Hence, despite survey data to the contrary, the initial goal of the teacher education program was met with some success—students were not so isolated from their peers and teachers when observing in the field.

Though case quality scores were not related to the depth of electronic discussion, students were reflecting on their field observations in an electronic "shared space" (Schrage, 1990). Instead of case quality or length, case description and topic appears to draw students and mentors into an electronic discussion. Naturally, currently "hot" topics were major draws for such case-based dialogue. Another enticement was that students were not afraid to request help in solving or addressing their dilemmas. Even with all these requests, mentors seldom replied to student questions and concerns with direct instruction. In effect, teachers electronically scaffolded or apprenticed learning without giving away answers. In summary, then, most cases encouraged responses by having interesting contexts and problems, student solicitations for help, and general receptivity to feedback.

Despite these positive findings, there were a myriad of concerns as well. First of all, a twenty percent reduction in the number of mentor and student postings during the second three week period may indicate a drop in interest in sharing field experience information with one's peers and teachers. Perhaps the novelty of COW may have wore off. This decline in participation may also reflect a decrease in time for such activities late in the semester. At the same time, the latter three week cases and discussion threads were longer than the first three weeks, indicating that, while the shear volume of postings decreased over time, students became more thoughtful and elaborate in their responding.

Another interesting finding across all conferences and conditions, was that case threads averaged between five to seven postings. Such a consistent average could reflect the number of users in these conferences, the time allotted, message scrolling frustrations, or a feeling that a half dozen responses was sufficient. More research may be needed here to sort this out.

It was also difficult to explain why students generated more cases when in the HS condition, while creating cases

of significantly higher quality in the WS condition. Perhaps students in HS took advantage of mentor feedback and submitted a myriad of problems for which they expected advice, while the WS condition fostered a more laid back atmosphere and complete case submissions. More analyses are clearly needed here.

A less surprising finding, though also disappointing, was that few student electronic responses to these cases were grounded or justified in course material. While students documented 229 real-life cases of the classroom teacher and introduced a wealth of intriguing topics for discussion, they, for the most part, failed to generate and evaluate cases that were grounded in educational psychology theory and concepts. And while students were observed opening their textbook more during the second three week conference, such direct course linkages were, nevertheless, scarce. Not only were direct links to text and class resources extremely limited, few student responses were controversial in nature. Too many simplistic and naive ideas and remarks were responded to with an "I agree" from a peer. Though students tended to ignore some of the case structure, one possible recommendation for fostering critical thought is to force students to back up each point made with a concept and page reference from their textbook. In effect, students need to be more explicit about their connections. Equally important, there is also a need to foster more disagreements and counterassertions such as through role assignment (e.g., watchdog, pessimist, debater, warrior, idea squelcher, and devil's advocate) or electronic debates.

There were also a few problems involving both preservice and inservice teachers in the same study. Despite conference moderator assurances to the contrary, some students were extremely concerned that their comments would be accessed by the teachers they were observing. In fact, since students were observing in most local schools, we were limited in the cooperating teachers we could include in this project. Expert teacher feedback, therefore, became difficult to arrange for and more limited than originally intended.

While students found COW to be an easy conferencing tool to use, many of them looked at this as an additional task burden of their class, not as an opportunity to interact with their peers. The mechanical nature of the case creation assignment limited opportunities for spontaneous learning and risk taking. While off-task behaviors were virtually nil and students were unaware of the volume of written text they were producing (as in the original study), they did not seem to be having fun writing. Students, wanting grades and points, were task, not mastery, driven. As a result, there was no real sense of learning community felt here. Perhaps the three week time period for each set of conferences was too restrictive. Often times mentors would provide feedback and scaffolding at the end of the three week period and students would not realize that there were additional comments to read. Not surprisingly, many students did not appreciate the mentoring.

Contributing to the lack of an electronic learning community was that many comments from mentors were of an authoritarian or vertical nature, not collegial. Of course, it is a difficult situation for mentors to simultaneously suggest various course connections and real-world examples, while trying not to act as purveyors of knowledge. Moreover, with one to two postings from mentors per case, the term "heavy scaffolding" may be a misnomer. Perhaps, in the future, such "modest" scaffolding might be compared to more extensive scaffolding.

Conclusions

In an earlier study, delayed collaboration and real-time case fostered completely different social interaction and dialogue patterns. Notably, asynchronous cases were more productive in terms of student engagement in the learning process and overall responsiveness. Students in the delayed mode challenged and encouraged each other to think more deeply about educational issues and problems. The real-time focus, on the other hand, was on content generation, not on extended peer interaction and dialogue.

In this follow-up study, students once again appeared task focused. Perhaps student and teacher interviews in the upcoming third study will help us build electronic supports that foster more intrinsic learning opportunities and electronic cognitive apprenticeships, thereby helping advance research in computer-mediated communication from a sociocultural perspective. We concur with Owston (1997, p. 33) who notes that, "No doubt further research and development on the application of the Web to teaching and learning is needed." Based on the initial work here, the WWW may soon become used in a myriad of preservice teaching activities. As a result of this research, we are beginning to understand how preservice teachers remote from the university setting can communicate with their instructors, peers, and cooperating teachers regardless of distance or time.

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