

Formative Evaluation and the Generative Process of Designing an Online Environment

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Transforming a Face-to-Face Course for Online Instruction

The one semester Computer Supported Collaborative Learning (CSCL) course was previously offered in face-to-face classrooms at the University of Texas (UT), Austin, during the fall semesters 1997, 1998, and 1999. The transformation and re-visioning of the CSCL course from a face-to-face course to an entirely online course began in January of 2000. The online version of the CSCL course was first offered in fall of 2000 as a graduate-level elective course through the Department of Curriculum and Instruction at UT, Austin, and as graduate-level elective for the Online Educational Technology M.Ed. program which is physically housed at UT, Brownsville. The online CSCL will be offered in both locations again during fall off 2001.

The goal of the course re-visioning team was for the students to learn both *with* and *about* online collaborative learning. The philosophical and pedagogical stance utilized incorporated aspects of constructivism and included project-based and problem-based learning. The primary focus of the CSCL course was on the development of high performance learning teams. We recognized that moving a face-to-face course online involves more than creating Web pages and uploading materials. We carefully considered strategies to meet the unique support needs of online learning teams. A key design decision was the inclusion alternative forms of encouragement and interaction, via a course support team, to compensate for support that was previously afforded in face-to-face classroom interactions. The course instructor, Dr. Paul Resta, coined the term E-sherpa for the support member role. Sherpas are Tibetan people, skilled in mountain climbing, who live on the high slopes of the Himalayas. The function of a Sherpa on a mountain climbing expedition is to familiarize the expedition with the local terrain and to help members of the expedition carry their load. Likewise, in the CSCL course, the E-sherpas served to help the students navigate the online course terrain. The role of the E-sherpa differs significantly from the traditional and more authoritative roles of an online conference moderator or facilitator. Much like real Sherpas, the E-sherpa is neither the leader of the team nor do they have authority over a learning team. Rather, the E-sherpa's role is simply to help the online team "carry the load", and be successful in accomplishing its learning goals.

Weaving Assessment and Evaluation Strategies

Formative evaluation elements were woven into all components of the course to yield information that would support data-driven course revision decisions. A key evaluation strategy included observation by experts, which included the instructor, the course support team, and the course evaluator. The design team embedded team and product evaluations into each of the course modules to ensure both individual and team accountability among course participants. These evaluations provided formative data related to the

key course goal, which was to build high performance learning teams. Additional formative evaluation information was gathered from analysis of the threaded discussions in Café CSCL, an informal online threaded discussion for course participants. We also analyzed the student's reflection papers which were written by individual students as they completed each course module and student comments during course WebCasts, online broadcasts, which involve communicating with multiple computers at the same time over the Internet by "streaming" live audio and live video. The E-sherpas and the instructor scheduled weekly telephone conferences during the semester to review progress, and to discuss what was going well as well as any emergent problems and their possible solutions. The regularly scheduled online WebCasts allowed the students to discuss and present their collaborative projects and afforded them an opportunity to discuss course-related problems and to highlight their accomplishments. Students enrolled at the University of Texas, Austin, were physically present for the course WebCasts and remote students enrolled through the University of Texas, Brownsville, telephoned in during the online WebCasts, or to participated in simultaneous online chat sessions.

Re-visioning a Face-to-Face Course for Online Instruction: Collaborative Course Design

The instructor formed the core instructional design (ID) course re-visioning team in mid-January of 2000. The core ID team consisted of the instructor, the project coordinator, and several graduate students. The ID team utilized a constructivist and collaborative approach for course transformation. The core ID team met face-to-face twelve times during the five-month period from January through May and audio taped their meetings. The course re-visioning team was cognizant that some materials and methods utilized in the face-to-face course would be applicable to the online version. However, they also acknowledged that a complete transformation of the course was requisite for creating a meaningful and productive online knowledge building community.

The primary goal of the design team was to provide thick authenticity in the course by utilizing a real-world metaphor for the learning context, student roles, project tasks, the organization, and structure of the virtual learning teams. Under the instructor's guidance and supervision the design and development teams worked collaboratively to create an online knowledge building community centered on a hypothetical company, CSCL Technology Inc. The core values of the work environment were based on five aspects: Communication, Community, Curiosity, Learning, and Teamwork. Projects and scenarios in this virtual work environment were based on genuine experiences and problems that course participants might encounter in actual work environments. The development of high performance virtual learning teams requires careful planning and integration of team-building strategies within web-based courses as well as new strategies and resources for supporting the online learning teams. A key ID team objective was the exploration of the use of E-sherpas as a unique support system for online learning teams.

Course Development: Creating an Inviting Learning Environment

The course development team consisted of five members: the instructor, the project coordinator, a Web developer, a database developer, and a graphic designer. The course materials and tools included the course Web pages for presentation of the course content and instructions for assignments, the database for peer and product evaluations, and a computer conferencing tool for communication and collaboration. The instructor developed a draft for each module of the course based on the decisions made by the design team. Next, the development team determined which existing face-to-face materials and concurrent supplemental web materials they could utilize for the online version of the course. New media and instructional materials were then developed. After the media decisions were made, the Web developer created a template Web page for each module assisted by the coordinator, the database developer, and the graphic designer. While the Web developer was creating a template Web page for a module, the instructor created a draft of the content for the next module. After the Web pages were created, the design and development teams reviewed each module. Finally, the Web pages were put on the servers for the course.

Although the instructor and the design team were responsible for creating the draft of the course content, members of the development team also played an active role in revising the content during the production stage.

Design and Delivery of the Assessment Database

The development team began by brainstorming ideas that would enhance the CSCL course by enabling interactive and real-time assessment and evaluation. The capability of the existing courseware and the groupware, did not allow for uncomplicated modification of the systems. The challenge for the development team was to devise a method that would enable seamless integration of the assessment database into the context of existing courseware and groupware systems.

The team developed criteria for selecting a database tool that could track the online assessment activities. The desirable attributes included HTML support, relational capacity, simple administration, security, portability, and cost effectiveness. After evaluating several alternatives, the development team chose File Maker Pro, which is a relational database system. Another capability of this software is CDML (Claris Dynamic Markup Language) that extends the database functionally by interpreting a set of proprietary database specific tags within web pages. As we began to share our intentions of using File Maker Pro at the university, we discovered a network of colleagues using the software for tracking intra-departmental data. Having a network of people using the tool on campus proved invaluable later in our assessment tool development. We were able to get timely answers to question about setup, administration, and web publishing of data. However, no one with whom we consulted had extended his or her databases using CDML.

A graduate development team member who is employed as a professional software developer was given the task of extending the capabilities of the existing courseware and groupware in order to collect assessment data. The problem facing the database developer was how to devise a method that would vector course participants from the context of the systems that supported the content, to the assessment Web pages, which existed on a separate system, and then back to the content. The database designer utilized the assessment rubrics created by the instructional design team, and based on these assessment rubrics he created the data entry pages. The development team worked collaboratively to impart a common look and feel for the course content and the assessment database.

The E-sherpas: A Course Support Team

The vast volume of messages generated by members of virtual learning teams are often impossible for the online course instructor to keep up with on a daily basis. The instructor, therefore, decided to use E-sherpas, non-authoritarian support team members, as a support system for the virtual knowledge-building communities in the CSCL course. The instructor and project coordinator formed the E-sherpa team before the implementation of the course and conducted information sessions to familiarize the E-sherpas with the concepts, and strategies of their role. Several of the E-sherpas had also participated with the instructor in course re-visioning and development. The individuals selected for the E-sherpas role were graduate students who had the following characteristics:

- Prior knowledge of course content
- Prior experience working with online learning teams
- Good communication skills
- Interest in online learning environments

One E-sherpa was assigned to each six or seven member learning team. The E-sherpa role included the following specific behaviors:

- Guide for the requirements of the course

- Assisting with technical problems in the use of software or online collaborative tools
- Clarifying assignments
- Serving as guide for course requirements
- Offering additional references
- Providing feedback on students' work
- Facilitator for students' collaboration
- Helping the team or individual members in the process of building their collaborative team
- Reminding students of scheduled group activities
- Providing positive feedback and acknowledgement for the successes of the online team
- Mediator between the instructor and students
- Monitoring students' progress on assignments and collaborative activities
- Checking students' feelings related to the pacing of the course
- Sharing their course related observations with the instructor
- Making suggestions for clarifying instructions and solutions to technical problems

Online Instruction: Course Evaluation

Thirty-six students originally enrolled in the online CSCL course. These students included twenty enrolled through the University of Texas, Austin, and sixteen, which were enrolled through the University of Texas, Brownsville. Thirty-two students completed the course. Four students dropped the course due to scheduling conflicts and various other personal reasons. An appropriate mix of students from the local campus and students at located at various remote locations was a key consideration in assigning the students to their virtual offices and office suites in the virtual CSCL Technology Company.

Lessons Learned

Analysis of the end of course surveys and other evaluation data indicates that students in the course were generally satisfied with the online course, their own learning, and the teamwork and collaboration in their virtual offices and office suites. The performance of the learning teams and their knowledge building products met or exceeded the expectations of the instructor.

The results of the analysis of the E-sherpa's role suggest that the concept and use of a non-authoritative help person can be an effective and scalable support system for online learning teams. For this support strategy to be successful, however, E-sherpas and course participants must understand the support role. The E-sherpas need continuous training and support as they perform the important and complex tasks that the role demands. We learned that it is imperative that course participants understand the exact functions, roles, and responsibilities of the E-sherpa in relation to their virtual teams. Many of the course participants had nothing in their prior experience from traditional academic settings that enabled them to immediately understand the E-sherpa role. At first, the course participants expected the E-sherpas to direct their learning teams or to do the course work for their team. These and other misconceptions about the E-sherpa role helped us to realize that it may take some time and reiteration for students to fully appreciate and understand the role of the E-sherpa. Future research could seek to further clarify the roles of the E-sherpa and to identify effective ways of training Web-based course support teams.

Analysis of student postings to threaded discussions, student reflections, student comments during WebCasts, and student responses on the voluntary end of course survey, which was conducted after the course grades were submitted, indicates four primary areas of concern. First, students desired more feedback and interaction from and with the course instructor. Second, they were not pleased with one specific course tool that was selected to facilitate a collaborative project. Third, the off campus students felt that they had no "voice" in the WebCasts. The final area of concern reflected the students desire for more timely feedback on the peer and product evaluations, which they submitted via the assessment

database.

Even though the assessment database was functional during the course, it required maintenance and revision during the course. The learners experienced issues commonly associated with computer-based systems such as server downtime, mal-formed pages, and less than intuitive sequencing of pages. We discovered that by facilitating a computer-mediated assessment mechanism, the learners experienced social issues with reviewing and evaluating each other. In the next iteration of the online assessment system, we will explore the use of Extensible Markup Language (XML) to replace CDML. XML will allow us to create special tags and data structures that can be dynamically rendered without the need of a common gateway interface (CGI). In addition, we have plans to automate our gathering and analysis of assessment statistical data. Our generative quality assessment system for course improvement entails the re-visioning of the CSCL course to address these concerns before it is offered again during the fall semester of 2001.

BIOGRAPHICAL SKETCHES

Joanne Williams served thirteen years as secondary school teacher and five years as director of a high school computerized writing lab. She earned a M.A. in Educational Management and Development at New Mexico State University and is a certified teacher and educational administrator in two states. Joanne currently is a doctoral student in the College of Education at the University of Texas, Austin. She is focusing on the evaluation of online learning environments in her dissertation research. Joanne also works full time at University of Texas as an Instructional Designer and Media Coordinator for the Department of Chemistry and Biochemistry.

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