**Provost's Learning Innovations Grant for Faculty**

**Project Title:** Using electronic chat systems to enhance deaf student access to other students, faculty, and disciplinary experts.

**Applicant(s):**

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Project Title: Using electronic chat systems to enhance deaf student access to other students, faculty, and disciplinary experts.

Proposal Summary:

At the request of the PLIG committee, this proposal merges two PLIG proposals that had similarities in original intent. This new collaboration has stimulated further discussion and has led to the following reconfiguration of the initial proposals.

The Problem

It is widely recognized that group discussions in an educational context are challenging and sometimes frustrating for deaf and hard of hearing (deaf/hh) students. This is observable in both homogeneous (all deaf) and heterogeneous or inclusive (mixed deaf & hearing) classrooms where communication must be "managed" by the instructor or the interpreter, by pointing to whomever is speaking/signing. Individuals who depend on speechreading can only look at one face at a time and interpreters can only sign for one person at a time. In both homogeneous and heterogeneous classrooms, the pace of conversation is controlled by the person signing/interpreting who directs communication by pointing to the next "speaker." This does not allow for spontaneous free flowing conversation on the part of either deaf or hearing student.

Group discussions in the classroom and small group collaboration on lab activities and course projects can become burdensome for the student and the instructor without easy access to the sharing of ideas. In addition, classroom communication (and ultimately, productivity) can be difficult when outside experts/guest lecturers, who may not be familiar with deaf/hh communication issues, visit the classroom.

A Promising Solution

Initial informal experimentation with electronic chat systems in both heterogeneous (Golisano) and homogeneous (NTID) classrooms has independently laid the groundwork for collaboration on this project. Jon Schull and his Interface Design students have observed that mainstream electronic chat systems are far from optimal for group discussions, and have prototyped an innovative enhanced chat system that should increase the utility of group chat for hearing as well as deaf/hh students. L.K. Quinsland has found through informal classroom experimentation that the use of electronic classroom discussions, review sessions, and other teaching/learning applications appear to be more fluid and efficient when compared to traditional methods.
Our preliminary experiences suggest that, just as alphanumeric pagers have revolutionized instantaneous real-time telecommunication for deaf people, so could electronic chat revolutionize group discussion for deaf/hh students in both homogeneous and heterogeneous academic settings, including science classes, studio courses in which deaf and hearing student collaborate, and professional internet-facilitated collaborations and mentoring relationships. We now plan to turn these preliminary experiences into reportable results and exploitable technologies.

The Proposal

Having been made aware of our parallel efforts through the PLIG proposal process, our two groups now propose to combine forces and explore promising contexts in which chat systems can make a difference... (see Attached illustration)

- Using our observations in those contexts to design and prototype an enhanced chat system optimized for group communication,
- Conducting laboratory efficacy comparisons of chat and enhanced-chat, and signed conversation in both homogeneous deaf/HH and in heterogeneous groups.
- Field-evaluating and documenting the benefits of what will have been determined to be the most promising chat-system in what will have been determined to be the most promising contexts.

Targeted Learners

This project will include deaf and hard of hearing students at RIT, as well as hearing students with whom they interact. Specifically, the project will involve students in the Golisano College and the College of NTID:

a. NTID-supported deaf and hard of hearing students currently enrolled in inclusive class environments in the Golisano College.

b. Students currently enrolled in AS-designated majors within NTID and deaf students currently matriculated in other colleges of RIT who are fulfilling their degree science requirements (level D) through the NTID Science and Mathematics Department.

c. Students currently enrolled in NTID's associate level Laboratory Science Technology (LST) program, offered through the Department of Industrial and Science Technologies.

d. Students who collaborate in small project groups in connection with studio-style course in the IT department (especially in the course on Interaction Design where some of the design and testing work will be done).

Number of Students Affected

Should these proposed technological and pedagogical solutions prove effective, chat technology has the potential to affect all deaf and hard of hearing students at RIT
(n=\~1,000), and many of the students with whom they interact. Furthermore, the eventual student population impacted should prove to be much larger and include deaf/hh students in mainstreamed environments at other colleges and schools (n=\~17,000), alumni, and students currently participating in co-op experiences.

**Anticipated Impact on Teaching and/or Learning**

It is anticipated that the results of these investigations should have immediate applicability in RIT classrooms and that the results should be of interest to educators, technologists, and technology policy analysts worldwide. Anticipated outcomes include:

**Teaching:**
- New chat systems technology to enhance student interactions.
- New instructional strategies to enhance student learning.
- New techniques for instantly assessing individual student concept development and comprehension.
- New techniques for providing real-time feedback in classroom or study group contexts.

**Learning:**
- Improved collaboration between students with different communication styles and needs.
- New opportunities to interact regularly with professionals on the job when field trips are not feasible or distances too great.
- New opportunities to interact electronically with experts in the field.

Additionally, the research program itself should have significant educational impact on student and faculty participants. Technically trained deaf and hearing students from both NTID Golisano will be collaboratively contributing to the design, implementation and evaluation of technologies with clear and apparent transformative potential. Faculty from both Golisano and NTID will be collaborating at both locations, and contributing unique perspectives and expertise, and increasing ties between the two research communities.

**Impact on Student Success**

Instructors will have new technology and pedagogical guidelines that could easily be implemented in both inclusive and homogeneous classrooms. Students would have improved access to real time communication, improved deaf/hh interactions, improved deaf/hearing collaboration, and an enhanced sense of "belonging" on the part of deaf/hh students. This sense of belonging and feeling more a part of the college experience has been recognized in the "First Year Experience" literature as a factor related to increased retention.
Measuring Impact/Reporting Findings/Faculty Forum

1. Comparative assessments of student performance using conversation efficacy measures will be made of sign-facilitated, chat-facilitated, and enhanced-chat-facilitated group conversations. Additional measures will include student time on task, Small Group Instructional Diagnosis (SGID) techniques and student qualitative feedback using the Student Rating Survey (SRS). Faculty evaluations will include assessments of the hardware, software and logistical considerations.

Rationale for Project

a. This project involves new technology and new classroom applications that require additional time for development that needs to occur outside of current classroom responsibilities.
b. NTID has a long history of experimenting with emerging technologies for the purpose of providing deaf/hh students with tools that enhance communication in a hearing world. The Golisano College and NTID are collaborating on a First in Class Initiative (see e. below)
c. If successful, we expect the technology developed and the classroom techniques elucidated to be easily transferable in both homogeneous and heterogeneous classroom settings.
d. The NTID and Golisano teams bring complementary of expertise to the table in deaf education and computer science/interface design respectively.
e. This project dovetails with a just-approved First In Class Initiative, co-managed by Jon Schull, Cathy Irving, and Peter Lalley, on Deafness and Emerging Technologies, whose mission is, in part, to support exactly this kind of interdisciplinary inter-institution collaboration and to promote the potential of RIT/NTID for research projects such as this one. The Initiative will support Schull’s participation in the project this summer, and should be able to help with dissemination of the results.

Timetable (also see attached diagram)

Spring Quarter (20033): Conduct pilot in NTID & Golisano classrooms.
Develop new enhanced chat system.

Summer Quarter (20034): Conduct controlled experiments using conversation efficacy tests validated in the spring.

Fall Quarter (20041): Complete analysis and recommendations for application and implementation. Prepare presentations for NTID, Golisano, and Institute dissemination of salient outcomes.
QuickTime™ and a TIFF (LZW) decompressor are needed to see this picture.