

Bridging Research and Practice in Math and Science Education for Deaf Students: The Development of a Major Internet Resource

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Harry Lang
National Technical Institute for the Deaf
Gail Kovalik

Can the Internet make a difference in preparing parents, teachers, and other professionals involved in the education of deaf students? What are the most effective components of an asynchronous website for sharing the most recent research-based information to many different target audiences? Can the Internet serve as an effective vehicle for systemic reform—a cornerstone for building relationships among various organizations? These are some of the questions to be addressed systematically through the National Science Foundation grant project (Award No. HRD-0095948) “Clearinghouse On Mathematics, Engineering, Technology and Science” (COMETS).

Based at the National Technical Institute for the Deaf (NTID) at Rochester Institute of Technology (RIT), COMETS will involve extensive evaluation of the World Wide Web over the next several years and the usefulness of the Web as an information dissemination vehicle.

There is an urgent need for well-grounded information about "best practices" in teaching and curriculum development for pre-service teacher preparation programs and for ongoing professional development. This need is exacerbated by the problem of teacher turnover, and the assignment of science and mathematics instruction to teachers not appropriately trained in these disciplines. With increased attention being focused on improving the quality of teaching around the country, there also is a need for resources to support such efforts to be available any time and any place (i.e., on an asynchronous website). With more than 25,000 deaf and hard-of-hearing students in postsecondary programs today, a central clearinghouse of information and resources would be welcomed by educators in the college environment as well. These needs are reflected in hundreds of queries received each year from parents, interpreters, "informal educators" (museum staff, planetarium directors, etc), graduate and undergraduate students, and other professionals in K-12 and postsecondary education, and led us to establish COMETS.

COMETS will include the development of a prototype for "systemic reform" in science, engineering, mathematics, and technology for deaf students. The "system" in “systemic reform” in this project is a complex mosaic of people with a variety of needs. The system also includes people and resources working to achieve a common goal—quality education for deaf students.

COMETS will align professional development and the delivery of instruction. It will involve educators and parents, and deaf students themselves. Both organizations serving deaf students (e.g., the Conference of Educational Administrators of Schools and Programs for the Deaf, Convention of American Instructors of the Deaf, Postsecondary Educational Programs Network, etc.) and those focusing on science, math, engineering, and technology (e.g., National Council of Teachers of

Mathematics, National Science Teachers Association, Association for the Education of Teachers in Science, etc.) will be connected through the systemic reform efforts.

COMETS will have the following primary goals:

- to develop a comprehensive resource to provide asynchronous information through interactive components to eight target audiences (listed below) on the World Wide Web and in print
- to field-test the applicability of the information and the dissemination strategies in both formal and informal professional development activities
- to develop a network for systemic reform through information dissemination in the education of deaf students in science, engineering, mathematics, and technology.

The revolution in computer technologies shows promise for enhancing information dissemination to deaf students and the professionals responsible for their education. In particular, the World Wide Web was very successful in a prior NSF-sponsored grant project, the Access to English and Science Outreach Project, AESOP (see *NTID Research Bulletin*, vol. 2 no. 3, Fall 1997), which was highlighted by the National Science Foundation in the publication *Synergy* (NSF, March 1998). AESOP, co-directed by NTID researchers Harry Lang and John Albertini, provided evidence that many of the needs of professionals serving deaf students in science, mathematics, engineering, and technology areas can be met with quality, interactive resources based on the most recent educational research findings and available on the World Wide Web.

COMETS' Principal Investigator is Harry Lang, a deaf educational researcher, scientist, and teacher who has been on NTID's faculty for more than 30 years. The project staff will present educational research findings and draw implications for teaching, curriculum development, and the provision of support services in science, math, engineering and technology areas. Alan Cutcliffe, from NTID's Instructional Design and Evaluation department, and Cea Dorn, from NTID's Educational Resources department, will be instrumental in designing and programming the World Wide Web site.

Lang's research in this project will focus on evaluating the Internet to determine whether it can be a credible change agent in an information dissemination program for systemic reform. The application of the COMETS Web information will be field tested in formal professional development programs (inservice teacher education in K-12 schools) and in preservice teacher preparation programs in other universities. The results of the comprehensive evaluation will be shared with others through presentations and publications.

The asynchronous website information will include multiple pages of primary information, Frequently Asked Questions/Responses, relevant links to other web resources, bibliography of relevant references, internal search engine for rapid access, email address for suggesting additions, topical menu for in-service workshops, topical menu/syllabus for methods course, and opportunities for on-line evaluation of website information.

The interactive website components will include a hotline for queries, a listserv for network sharing, discussion boards for audiences to discussing issues, an internal search engine for rapid access, and a hotline for assistance in planning formal applications of the website information.

COMETS seeks to answer the question whether a quality website, carefully constructed, can meet the informational needs of professionals and students. Numerous techniques will be systematically piloted and evaluated. Just as with print or other types of resources, the user of a web resource must bring critical evaluative questioning to the content. To design a thorough evaluation scheme for COMETS, various criteria for the evaluation of Internet information resources were reviewed (e.g., Rieh & Belkin, 1998; Engle, 1999, Tillman, 2000; Descey, 1999). The Internet as a resource is a volatile and continually changing environment and it is essential that the evaluation of a major clearinghouse project be flexible and multifaceted. First, samples of each audience will be contacted to review appropriate website sections. Second, there will be an opportunity for any user who finds the website on his/her own to submit evaluation feedback electronically. These dimensions of the COMETS website will be evaluated using Likert scale items and the measure will be concise enough to encourage responses.

In the asynchronous mode, the interactive nature of the website components will allow the Project staff to examine how classroom teachers, interpreters, parents, and other target audiences have used the information to improve instruction and learning. Formative evaluation will include suggestions for improving and/or expanding the information made available. The PI will develop specific on-line measures for these evaluation strategies. The purpose of the evaluation will be to examine the strengths and weaknesses of various components of an asynchronous website for assisting teachers, parents, and other target audiences on a "any time, any place" basis.

The acronym "COMETS" presents an appropriate metaphor. As with the so-named astronomical bodies, this project will leave a trail of material and energy that will be available for a long time to come.

The prototype COMETS web page may be bookmarked at www.rit.edu/~comets.

If you wish to be added to the COMETS network and receive the newsletter, go to www.rit.edu/~comets/pages/welcomepage.html and click on the "Join COMETS" button at the top of the page. The information requested on the Network form will be useful in developing a needs assessment of the field, and in evaluation of the project.

*If you have questions specifically related to the evaluation of the website as introduced in this paper, please contact **Harry Lang** at HGL9008@RIT.EDU.*

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Contact Information:

Harry G. Lang
Professor
Department of Research
National Technical Institute for the Deaf
Rochester Institute of Technology
96 Lomb Memorial Drive
Rochester, NY 14623
716-475-6777 (tty)
hgl9008@rit.edu