

Guest Editorial: *Creating a Mathematics Education Virtual Classroom*

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There is an ongoing effort to create a mathematics education virtual classroom in the Department of Mathematics Education, University of Georgia (UGA). A mathematics education virtual classroom would use the resources of various technologies to connect various mathematics settings universities, colleges, schools, and homes. These connections would use technologies such as the World Wide Web (WWW) on the Internet, desktop collaboration technologies such as CU-SeeMe, satellite transmission, and other technologies. A core strategy is built around the use of Web pages on the Internet to organize and make available materials for mathematics courses, workshops, independent exploration, and teacher demonstration.

Two over-riding goals are:

- To enhance the quality and delivery of educational programs in institutions by creating a mathematics education virtual classroom, accessible on the World Wide Web, in which pre-service and in-service mathematics teachers, can familiarize themselves with mathematics and mathematics teaching methods as well as gain insight into how these methods can be used to address problems in the school mathematics classroom.
- To take advantage of rapid developments in information technology such as multimedia presentation for classroom and self-directed use, to supplement the traditional in-class learning paradigms with unlimited access to a mathematics education virtual classroom. In this virtual classroom, pre-service and in-service teachers will be able to tailor their learning and teaching styles to their own capabilities and pace, and also according to the needs of the community and the expectations of the mathematics teaching profession.

The U.S. has invested considerably to provide computers, connectivity and related equipment for schools. Several school systems have also invested in computers and connectivity in their schools. By the year 2000, all classrooms are expected to be connected via the information superhighway. The graduate program at the Department of Mathematics Education, UGA is on its way to provide the leadership in developing models for the effective use of these technological systems in mathematics classrooms.

The World Wide Web (WWW) is based on unlimited channels of communication, community building, and interactivity that blurs the line between provider and consumer. Desktop collaboration technologies (such as CU-SeeMe technology) and the *World Wide Web* have a lot in common. Both use multimedia systems and employ interactive technology. They provide important features needed to implement virtual mathematics education program in a virtual mathematics education classroom. Used in conjunction with each other can provide one environment for effective distance teaching and learning of mathematics.

Colleges of Education place several students in schools for student teaching and observations. Faculty could stay in their respective offices and supervise student teachers through Desktop collaboration technologies. Not only will this reduce the travel budget of colleges, it will also provide faculty flexibility of when to visit student teachers and travel time could also be used to visit more student teachers in the virtual classrooms using the new technologies. Currently, pre-service teachers are required to do their student teaching within certain geographical regions closer to the University. If advantage is taken of these technologies, pre-service teachers may not be restricted in where they could student teach based on geographical location.

Some methods of teaching mathematics courses have a field based component where pre-service teachers are placed in school classrooms to teach for a week or two. Such pre-service classes could connect life to school classrooms prior and after the school experience. The

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initial connections will encourage discussion about the concepts being studied by school students, their learning style, the type of mathematical instruction used by the classroom teacher, and the way discipline problems are handled. The post connections will provide opportunities for pre-service teachers to reflect on their experiences, discuss their strengths and weaknesses, and discuss the approach they will adopt in future.

The following are examples of what could be offered to pre-service and in-service teachers in the mathematics education virtual classroom:

A set of lessons on the World Wide Web that would link multimedia presentations of classroom practices of mathematics teaching. These lessons would offer links to allow pre-service and in-service teachers to explore problems of teaching mathematics according to their needs and interests.

A series of explorations with technologies such as Geometer's Sketchpad, Algebra Xpresser, spreadsheet-based explorations, and calculator activities. This will offer pre-service teachers opportunity to work on mathematical problems with K-12 students. The sharing of solutions and strategies for solving these problems will provide pre-service teachers first hand knowledge about K-12 students, and K-12 students will be able to assess the strengths and commitments of their future teachers.

Pre-service teacher's abstract questions about teaching will be linked with the "real world" through interactive explorations of multimedia formats of case studies of special problems in teaching mathematics, including examples taken from the interactions between pre-service teachers and K-12 students.

Combining the powers of desktop collaboration technologies and the World Wide Web pre-service teachers would have qualitatively different student teaching experience. The desktop collaboration technology can provide frequent and timely access to supplement the sort of intermittent supervision that faculty provide now. With modem or Internet access, the pre-service teachers can have regular visits and conferences with their supervisors and would be able to seek help whenever needed.

Several research issues are involved here providing mathematics education graduate students new areas to conduct research. Evidence of the effectiveness of the delivery methods and signs of students intrinsic motivation may be areas of investigation. Quality of pre-service teachers and K-12 students' work could be examined and compared with the work of students in previous sessions of the classes that did not use such delivery system. Pre-service and in-service teachers will be encouraged and motivated to produce materials (multimedia, animation, etc.) for possible posting on the World Wide Web. Their intrinsic motivation as they produce materials and term papers, knowing that their work is widely shared could be carefully studied.

To many people, the WWW is some sort of giant, passive library. The concept of the mathematics education virtual classroom, however, underscore the interactive potential of the WWW. When student productions are placed on the Web and there is a design to get an exchange of information, something more than a passive environment is possible.

About the Cover

The cover was designed to emphasize the greater connectedness experienced by the Mathematics Education community through powerful Internet resources. The design was created by University of Georgia Mathematics Education students Gary Brown and Lisa Sheehy. Mr. Brown will finish his Master's degree in August of 1996 and will start teaching mathematics in Marietta, GA in the fall. Ms. Sheehy will start a new job teaching mathematics in Gainesville, GA this fall while continuing to work on her doctorate degree.

