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Curriculum and Instruction in Secondary Mathematics Education (EDSE 437, 438)
This is a dual course offered concurrently and open to 4th year education students majoring in secondary mathematics. These course sections are taken immediately prior to the Field Experience Practicum in schools.

Goals for improving the course

- Provide greater access and instruction for student teachers in the technologies that are required for teaching and learning in secondary education placements
- Develop constructivist practice in technology teaching and learning
- Narrow the gap between theory and practice in mathematics education
- Increase instructors' access, facility and consistent use of mathematics/science education related technologies.

Proposed teaching methods.
Conceptual:

- Visual demonstration involving technology in a classroom setting, directly related to underlying mathematical processes.

Experiential, cooperative, formative:

- To encourage reciprocity and collaboration among students paired and group work will form the basis of explorations using technology.
- A focused task or set of tasks, based on the secondary mathematics curriculum will be presented. Students will investigate the task with the intent of seeking understanding deeper than algorithmic or simple recall cognition.
- Response system technology will offer prompt feedback from the students to facilitate active learning and encourage time on task. Students contribute real-time to a shared workspace that is projected to the whole class.
- Instructors can instantly view screen shots from every student to help inform them of areas requiring further exploration, or possibilities for further challenge.
- Daily journal at the end of each class session.

Information and communications technologies that will be used to enhance learning outcomes and /or increase access.

- Response system using graphing capable calculators
    - TI Navigator --wireless communication between students' graphing calculators and the teacher's PC
        - 8 – 16 hubs; 1-2 central hub stations
        - 32 – 64 Graphing capable calculators
- GC emulator with LCD video data projection
- Overhead viewscreen

- Interactive SmartBoard for whole class demonstrations (especially for interactive applets and animated simulations)
- Calculator-based Lab stations including probes (motion, temperature, voltage, and light).

Proposed evaluation methodology

- Ongoing formative evaluation (using the response system technology) will direct the planning of each successive learning forum.
- Performance-based tasks and project work will extend the ideas beyond the classroom.
- Students will gauge their own progress by completing a self-evaluation bi-weekly.
- Daily log or journal.
- A summative final examination

Previous experience by the course instructor(s) in using innovative, evidence-based teaching methods.

Renée and Bruce have used graphing-based calculators in teaching situations for many years. Renée has more recently been actively involved in establishing a calculator-based response system in her classrooms as well as increasing the use of the SmartBoard, calculator-based laboratories and emulator technologies.

A description of how the project might contribute to improving teaching within the Department and Faculty

The combination of these technologies with student interaction and the collaboration of two or more instructors has the potential of turning large-scale lecture classrooms into experiential, investigative learning communities. Krejins, K, Kirschner, P.A., and Jochems, W. (2002). [1]

[1] Krejins, K, Kirschner, P.A., and Jochems, W. (2002). The Sociability of Computer-Supported Collaborative Learning Environments. *Educational Technology & Society*, 5 (1), 8 - 22.