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MATH 691.01: Research Methods in Mathematics Education

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Math 691 Research Methods in Mathematics Education
Fall Semester, 2000 Wednesday 4:10-7:00; 3 credits (graduate only)
Math Building Rm. 305
Johnny W. Lott

Description: Prerequisite: Consent of Instructor. Resources for learning of reported research, critical reviews of research, quantitative and qualitative processes.

Rationale: Mathematics Education requires research involving institutions, classrooms, and students at all levels, from early childhood to graduate education. A variety of research paradigms are used with different demands on data collection and analysis. This course would complement student needs in statistics, but is not intended to replace any preparation in statistics for the Ph. D. candidates. The exploration of research paradigms is a critical step in a student's selection of appropriate methodology for a research proposal.

Note: Text is available from Lott at a cost of $80.00. It was ordered by the Department through convention rates to save money. Make checks payable to Department of Mathematical Sciences.

Outline: The course will be taught by examining research of the following types:
Weeks 1-2: Traditional research paradigms to include design and analysis of experiments, and quantitative studies. Handout of Campbell and Stanley will be used for the first two weeks.
Weeks 3-4: Problems, Instruments, Methods, Kelly and Lesh—pgs. 9-190 Qualitative versus Quantitative Research; supplemental readings Wang pgs. 103-117.
Weeks 5-6: Teaching Experiments, Kelly and Lesh—pgs. 191-360 Supplemental readings to include systemic research projects
Weeks 7-8: Classroom Based Research, Kelly and Lesh—pgs. 361-512 Supplemental reading include classroom interactions and ethnography
Weeks 9-10: Clinical Methods, Kelly and Lesh—pgs. 513-732 Supplemental readings include clinical interviews
Weeks 11-12: Curriculum Design as Research, Kelly and Lesh—pgs. 733-814 Supplemental readings from SIMMS as an example

Evaluation:
1. Class contributions—discussions in class (10%)  
2. Written assignments—Short paragraphs about research reviewed and submitted by email. (20%)  
3. Research presentations—Made in class to exemplify a design or a research issue (20%)  
4. Mini-research proposal—Required for each on an area of interest. For doctoral students, this may be either a preliminary proposal for a dissertation, or the actual proposal. For others, this is negotiable as to what it covers. (30%)  
5. Take-home final examination—The plan is to give you a research project or article and to have you critique it exemplifying what you have learned in the semester. (20%)
Sources:


Keith, S. "Interest Inventories and Mathematics," Unpublished article, Department of Mathematics, St. Cloud State University, MN 56301, 1991.


A major portion of the course will be devoted to analyzing research in the following journals.
Educational Researcher
Educational Studies in Mathematics
International Journal of Mathematical Education in Science and Technology
Investigations in Mathematics
Journal for Research in Mathematics Education.
Journal of Mathematical Behavior
For the Learning of Mathematics

Selected articles from the following journals will also be examined.
Cognition and Instruction
Cognitive Science
Educational Psychologist
Instructional Science
Review of Educational Research