THEORETICAL FOUNDATIONS OF MATHEMATICS EDUCATION

MATH 610 FALL 2009
DuSable Hall 306

Dr. Alan Zollman
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OFFICE HOURS: by appointment; ***or*** 1-2 pm M/W; 5-6 pm T
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COURSE OBJECTIVES:

The objectives of MATH 510 are: to acquaint you with research on the learning of mathematics; to share with you a historical perspective related to mathematics teaching and learning; to familiarize you with current curriculum issues in mathematics education; and to enhance your understanding of school mathematics. MATH 510 is a survey of current developments in areas of human learning that relate directly to mathematics curriculum and instruction. MATH 510 is a consideration of curriculum concerns, and an introduction to methods of critical reading of research reports. PRQ: Consent of department.

TEXTS:
Required:
Carpenter, T.P., Dossey, J.A., & Koehler, J.I. (Eds.) (2004). *Classics in Mathematics Education Research*. Reston, VA: National Council of Teachers of Mathematics. ISBN 0-87353-565-0.

Supplemental Readings furnished by instructor.

Recommended:
Davis. R., Maher, C., & Noddings, N. (1990). *Constructivist Views on the Teaching and Learning of Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Fennema, E., Carpenter, T.P., & Lamon, S. (Eds.) (1991). *Integrating Research on Teaching and Learning Mathematics*. Albany, NY: State University of New York Press.

Kilpatrick, J., Swafford, J. & Findell, B. (Eds.) (2001). *Adding It Up: Helping Children Learn Mathematics*. Washington, DC: National Academy Press.

National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Schoen, H. L., & Charles, R. I. (2003). *Teaching Mathematics through Problem Solving: Grades 6-12*. Reston, VA: National Council of Teachers of Mathematics.

Steffe, L., Nesher, P., Cobb, P., Goldin, G., & Greer, B. (Eds.). (1996). *Theories of Mathematical Learning*. Mahwah, NJ: Lawrence Erlbaum Associates.

COURSE EVALUATION:

15 points	Material Presentation or Mathematics Program Presentation (Topic & Date TBA)
25 points	Current Issue Paper (December 1st)
5 points	Class Problem-Solving Presentation (Topic & Date TBA)
15 points	Learning Theorist's Paper
30 points	Midterm Reflective Writing Examination (October 13th)
40 points	Final Examination (December 8th)
10 points	Class Discussion Facilitator (Topic & Date TBA)
10 points	Attendance & Reflective/Interpretive Writings

COURSE GRADING:
90% & above = A
80% & above = B
70% & above = C
60% & above = D

ATTENDANCE, CLASS PARTICIPATION, REFLECTIVE WRITINGS.: Your participation in class discussion is essential to your further learning of mathematics education. (Excused absences are described in the NIU Student Handbook. Late assignments will not be accepted without prior approval of the instructor.) For each class you will write a reflective writing assignment to bring with you to class to actively participate in the discussion. You can write this in any format, e.g., ask questions and give responses.

CLASS PROBLEM-SOLVING PRESENTATION: Once, during the semester, you will present a ***5 to10 minute*** activity to the whole class based upon a theoretical-based mathematics topic. Your topic and date of presentation will be randomly assigned during the third class session. Evaluation is based upon your preparation, knowledge, cooperative group work, and overall effectiveness. A typed, photocopied handout of your topic should be given to each class member during your presentation. HELPFUL HINT: Chat with me before preparing your class presentation.

MATERIAL PRESENTATION/MATHEMATICS PROGRAM PRESENTATION: One time during the semester, you will be responsible for directing a **10 minute lesson** on either a mathematics manipulative (e.g., algebra tiles) or a Mathematics Program (e.g., UCSMP). Your topic will be suggested to you, but you will have the chance to request a specific program or manipulative.

CLASS DISCUSSION LEADER: One time during the semester, you will be responsible for directing the class in the reading, discussion, and reflection of one of the assigned theoretical readings. Your topic and date of presentation will be randomly assigned during the third class session. Evaluation is based upon your preparation, knowledge, cooperative group work, and overall effectiveness. A typed, photocopied handout of your topic should be given to each class member during your presentation.

LEARNING THEORIST'S PAPER: You will write a 3-5 page paper on a Mathematics Learning Theorists that will include: a) historical background of the scholar; b) the theorist's philosophical beliefs about learning; c) a glossary of any specialized vocabulary one needs to know to read the theory; and d) what support does the

school offer for these beliefs? You will give copies to everyone in class and discuss your findings. You must have my approval for the Learning Theorist before you begin this assignment.

Suggested Learning Theorists:

Nel Noddings	Edward Thorndike	B.F. Skinner	William Brownell
Thomas Romberg	Jean Piaget	Robert Gagne'	John Dewey
Jerome Bruner	Paul Cobb	Ed Dubinsky	Lev Vygotsky
Zoltan Dienes	David Tall	Paul Ernest	Richard Skemp
P. M. van Hiele	Deborah L. Ball	H. Wu	James Hiebert

CURRENT ISSUE PAPER: You will write an 8-10 page (double-spaced, typed) paper about a topic related to the mathematics curriculum, learning mathematics, or teaching mathematics. You should try to select a topic for which a reasonably well-defined body of research is available. You should include in your paper the implications of your topic for teaching practice (teaching, learning, or curriculum development and implementation) or for further research. You should include specific reference citations in your paper and attach a list of references (APA style). You will present a short report (approximately 10 minutes) of your literature review.

EXAMINATIONS: The midterm will be October 13th. The final exam will be (comprehensive, covering all the semester's topics up to the date of the exam) December 8th.