

MthEd 590: Foundational Issues in Learning Mathematics

Fall 2010

Tuesdays, 4:30 - 7:00 p.m.

197 TMCB

(last updated 11/5/10)

Day	Today's Activities and Assignments	Due Today
	<p><u>Assignments</u> Read</p> <p>National Council of Teachers of Mathematics. (2000). <i>Executive summary: Principles and standards for school mathematics</i>. Reston, VA: Author.</p> <p>Hiebert, J. (2003). What research says about the NCTM standards. In J. Kilpatrick, W. G. Martin & D. Schifter (Eds.), <i>A research companion to Principles and Standards for School Mathematics</i>. Reston, VA: NCTM.</p>	
Tuesday August 31	<p><i>An Introduction to Research in Mathematics Education</i></p> <p><u>Class Activities</u> Course Introduction Discuss Hiebert (2003) and NCTM (2000)</p> <p><u>Assignments</u> Read</p> <p>Thompson, A. G., Phillipp, R. A., Thompson, P. W., & Boyd, B. A. (1994). Computational and conceptual orientations in teaching mathematics. In D. B. Aichele & A. F. Coxford (Eds.), <i>Professional development for teachers of mathematics</i> (pp. 79-92). Reston, VA: National Council of Teachers of Mathematics.</p> <p>Skemp, R. R. (2006). Relational understanding and instrumental understanding. <i>Mathematics Teaching in the Middle School</i>, 12, 88-95. (Reprinted from <i>Mathematics Teaching</i>, 77, 20-26)</p> <p>National Research Council. (2001). The strands of mathematical proficiency. In J. Kilpatrick, J. Swafford, B. Findell (Eds.), <i>Adding it up: Helping children learn mathematics</i> (pp. 115-156). Washington, DC: National Academy Press.</p>	

<p>Tuesday September 7</p>	<p style="text-align: center;"><i>What is Mathematics and What Does it Mean to Understand It?</i></p> <p><u>Class Activities</u> Discuss Skemp (2006), NRC (2001) and Thompson et al. (1994) Discuss Research Proposal Assignment</p> <p><u>Assignments</u> Read</p> <p>Post, T. (1988). Some notes on the nature of mathematics learning. In T. Post (Ed.), <i>Teaching mathematics in grades k-8: Research based methods</i> (pp. 1-19). Boston: Allyn & Bacon.</p> <p>Sriraman, B., & Haverhals, N. (2010). Lakatos-Hersh-Ernest: Triangulating philosophy-mathematics-mathematics education. In B. Sriraman & L. English (Eds.), <i>Theories of mathematics education: Seeking new frontiers</i> (pp. 36-38). Heidelberg, Germany: Springer.</p> <p>Ernest, P. (2010a). Reflections on theories of learning. In B. Sriraman & L. English (Eds.), <i>Theories of mathematics education: Seeking new frontiers</i> (pp. 36-47). Heidelberg, Germany: Springer.</p> <p>Goodchild, S. (2010). Commentary 1 on reflections on theories of learning by Paul Ernest. In B. Sriraman & L. English (Eds.), <i>Theories of mathematics education: Seeking new frontiers</i> (pp. 49-52). Heidelberg, Germany: Springer.</p> <p>Ernest, P. (2010b). Commentary 2 on reflections on theories of learning. In B. Sriraman & L. English (Eds.), <i>Theories of mathematics education: Seeking new frontiers</i> (pp. 53-61). Heidelberg, Germany: Springer.</p>	<p>Summaries</p>
<p>Tuesday September</p>	<p style="text-align: center;"><i>Overeviw of Theories of Learning Mathematics</i></p> <p><u>Class Activities</u></p>	<p>Summaries</p>

14	<p>Discuss Post (1988) and Ernest (2010) Epistemology vs Ontology Empiricism, Rationalism, Constructivism Innatism and nativism Cartesian Epistemology Base-10 Blocks</p> <p>Discuss Research Proposal Assignment</p> <p><u>Assignments</u></p> <p>Read</p> <p>Dienes, Z. P. (2007). Some thoughts on the dynamics of learning mathematics, chapters 1 & 7. In B. Sriraman (Ed.), <i>Zoltan Paul Dienes and the dynamics of mathematical learning: The Montana Mathematics Enthusiast, Monograph 4</i> (pp. 1-17, 87-95). Charlotte, NC: Information Age Publishing.</p> <p>von Glasersfeld, E. (1983). Learning as a constructive activity. In J. C. Bergeron & N. Herscovics (Eds.), <i>Proceedings of the Fifth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education</i> (Vol. 1, pp. 41-69). Montreal, Canada: University of Montreal.</p> <p>Cobb, P., Wood, T., & Yackel, E. (1993). Discourse, mathematical thinking, and classroom practice. In E. A. Forman, N. Minick & C. A. Stone (Eds.), <i>Contexts for learning: Sociocultural dynamics in children's development</i> (pp. 91-119). New York: Oxford University Press.</p>	
Tuesday September 21	<p style="text-align: center;"><i>A Deeper Look at Several Learning Theories</i></p> <p><u>Class Activities</u></p> <p>Discuss Dienes (2007), von Glasersfeld (1983) and Cobb et al. (1992)</p> <p><u>Assignments</u></p> <p>Read</p> <p>Confrey, J. (1993). Learning to see children's mathematics: Crucial challenges in constructivist reform. In K. Tobin (Ed.), <i>The practice of constructivism in science education</i> (pp. 299-321). Hillsdale, NJ: Lawrence Erlbaum Associates.</p>	Summaries

	<p>Simon, M. A. (1995). Reconstructing mathematics pedagogy from a constructivist perspective. <i>Journal for Research in Mathematics Education</i>, 26, 114-145.</p> <p>Steffe, L. P., & D'Ambrosio, B. S. (1995). Toward a working model of constructivist teaching: A reaction to Simon. <i>Journal for Research in Mathematics Education</i>, 26, 146-159.</p> <p>Simon, M. A. (1995). Elaborating models of mathematics teaching: A response to Steffe and D'Ambrosio. <i>Journal for Research in Mathematics Education</i>, 26, 160-162.</p>	
<p>Tuesday September 28</p>	<p style="text-align: center;"><i>From Learning Theories to Teaching Theories</i></p> <p><u>Class Activities</u> Discussion with Dr. Dan Siebert Discuss Confrey (1993), Simon (1995a, 1995b), Steffe and D'Ambrosio (1995) Discuss our research problems (intended double entendre)</p> <p><u>Assignments</u> Read Erlwanger, S. H. (1973). Benny's conception of rules and answers in IPI mathematics. <i>Journal of Children's Mathematical Behavior</i>, 1(2), 7-26.</p> <p>Schoenfeld, A. H. (1988). When good teaching leads to bad results: The disasters of "well-taught" mathematics courses. <i>Educational Psychologist</i>, 23, 145-166.</p> <p>Lampert, M. (1990). When the problem is not the question and the solution is not the answer: Mathematical knowing and teaching. <i>American Educational Research Journal</i>, 27, 29-63.</p>	<p>Summaries</p> <p>Draft 1</p>
<p>Tuesday October 5</p>	<p style="text-align: center;"><i>Early Influential Studies in Mathematics Education</i></p> <p><u>Class Activities</u> Discussion with Dr. Steve Williams Discuss Erlwanger (1973), Schoenfeld (1988), Lampert (1990)</p>	<p>Summaries</p>

	<p><u>Assignments</u></p> <p>Read</p> <p>Sowder, L. (1988). Children's solutions of story problems. <i>Journal of Mathematical Behavior</i>, 7, 227-238.</p> <p>Carpenter, T. P., Franke, M. L., Jacobs, V. R., Fennema, E., & Empson, S. B. (1998). A longitudinal study of invention and understanding in children's multidigit addition and subtraction. <i>Journal for Research in Mathematics Education</i>, 29, 3-20.</p> <p>Norton, A., & Wilkins, J. L. M. (2009). A quantitative analysis of children's splitting operations and fraction schemes. <i>Journal of Mathematical Behavior</i>, 28, 150-161.</p>	
<p>Tuesday October 12</p>	<p style="text-align: center;"><i>Learning Elementary Mathematics</i></p> <p><u>Class Activities</u></p> <p>Discussion with Dr. Hope Gerson Briefly Discuss Midterm Discuss Sowder (1988), Carpenter et al. (1998) and Norton and Wilkins (2009) Discuss our research problem rationales</p> <p><u>Assignments</u></p> <p>Read</p> <p>Ball, D. L. (1993). With an eye on the mathematical horizon: Dilemmas of teaching elementary school mathematics. <i>The Elementary School Journal</i>, 93, 373-397.</p> <p>Kazemi, E., & Stipek, D. (2001). Promoting conceptual thinking in four upper-elementary mathematics classrooms. <i>The Elementary School Journal</i>, 102, 59-80.</p> <p>Jacobs, V. R., Lamb, L. L. C., & Philipp, R. A. (2010). Professional noticing of children's mathematical thinking. <i>Journal for Research in Mathematics Education</i>, 41, 169-202.</p>	<p>Summaries</p> <p>Draft 2</p>

<p>Tuesday October 19</p>	<p style="text-align: center;"><i>Teaching Elementary Mathematics</i></p> <p><u>Class Activities</u> Discuss Ball (1993), Kazemi and Stipek (2001), and Jacobs et al. (2010)</p> <p><u>Assignments</u> Read Cobb, P. (1994). Where is the mind? Constructivist and sociocultural perspectives on mathematical development. <i>Educational Researcher</i>, 23(7), 13-20.</p> <p>Boaler, J. (2000). Mathematics from another world: Traditional communities and the alienation of learners. <i>Journal of Mathematical Behavior</i>, 18, 379-397.</p> <p>Huntley, M. A., Marcus, R., Kahan, J., & Miller, J. L. (2007). Investigating high-school students' reasoning strategies when they solve linear equations. <i>Journal of Mathematical Behavior</i>, 26, 115-139.</p>	<p>Summaries</p>
<p>Thursday October 21</p>		<p>Midterm (via email)</p>
<p>Tuesday October 26</p>	<p style="text-align: center;"><i>Learning Secondary Mathematics</i></p> <p><u>Class Activities</u> Discussion with Dr. Doug Corey Discuss Midterm Discuss Cobb (1994), Boaler (2000), Huntley et al. (2007) Discuss our research questions</p> <p><u>Assignments</u> Read Jacobs, J. K., Hiebert, J., Givvin, K. B., Hollingsworth, H., Garnier, H., & Wearne, D. (2006). Does eighth-grade mathematics teaching in the United States align with the NCTM Standards? Results from the TIMSS 1995 and 1999 video studies. <i>Journal for Research in Mathematics Education</i>, 37, 5-32.</p> <p>Lobato, J., Clarke, D., & Ellis, A. B. (2005). Initiating</p>	<p>Summaries</p> <p>Draft 3</p>

	<p>and eliciting in teaching: A reformulation of telling. <i>Journal for Research in Mathematics Education</i>, 36, 101-136.</p> <p>Wilson, P. S., Cooney, T. J., & Stinson, D. W. (2005). What constitutes good mathematics teaching and how it develops: Nine high school teachers' perspectives. <i>Journal of Mathematics Teacher Education</i>, 8, 83-111.</p>	
Tuesday November 2	<p style="text-align: center;"><i>Teaching Secondary Mathematics</i></p> <p><u>Class Activities</u> Discussion with Dr. Blake Peterson Discuss Jacobs et al. (2006), Lobato et al. (2005) and Wilson et al. (2005)</p> <p><u>Assignments</u> Read Rittenhouse, P. S. (1998). The teacher's role in mathematical conversation: Stepping in and stepping out. In M. Lampert & M. L. Blunk (Eds.), <i>Talking mathematics in school: Studies of teaching and learning</i> (pp. 163-189). Cambridge, United Kingdom: Cambridge University Press.</p> <p>Rowland, T. (1995). Hedges in mathematics talk: Linguistic pointers to uncertainty. <i>Educational Studies in Mathematics</i>, 29, 327-353.</p> <p>Wood, T. (1998). Alternative patterns of communication in mathematics classes: Funneling or focusing? In H. Steinbring, M. G. Bartolini Bussi & A. Sierpiska (Eds.), <i>Language and communication in the mathematics classroom</i> (pp. 167-178). Reston, VA: National Council of Teachers of Mathematics.</p>	Summaries
Tuesday November 9	<p style="text-align: center;"><i>Discourse</i></p> <p><u>Class Activities</u> Discuss Rittenhouse (1998), Rowland (1995) and Wood (1998)</p> <p><u>Assignments</u></p>	Summaries Draft 4

	<p>Read</p> <p>Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. <i>Educational Researcher</i>, 15(2), 4-14.</p> <p>Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? <i>Journal of Teacher Education</i>, 59, 389-407.</p> <p>Davis, B. & Simmt, E. (2006). Mathematics-for-teaching: An ongoing investigation of the mathematics that teachers (need to) know. <i>Educational Studies in Mathematics</i>, 61, 293-319.</p>	
<p>Tuesday November 16</p>	<p style="text-align: center;"><i>Teacher Knowledge</i></p> <p><u>Class Activities</u> Discuss Shulman (1986), Ball et al. (2008) and Davis & Simmt (2006) Praxis Example</p> <p><u>Assignments</u> Read</p> <p>Cooney, T. J. (1985). A beginning teacher's view of problem solving. <i>Journal for Research in Mathematics Education</i>, 16, 324-336.</p> <p>Raymond, A. M. (1997). Inconsistency between a beginning elementary school teacher's mathematics beliefs and teaching practice. <i>Journal for Research in Mathematics Education</i>, 28, 550-576.</p> <p>Skott, J. (2001). The emerging practices of a novice teacher: The roles of his school mathematics images. <i>Journal of Mathematics Teacher Education</i>, 4, 3-28.</p> <p>Leatham, K. R. (2006). Viewing mathematics teachers' beliefs as sensible systems. <i>Journal of Mathematics Teacher Education</i>, 9, 91-102.</p>	<p>Summaries</p>
<p>Tuesday November 23</p>	<p>No Class (Friday classes)</p>	

<p>Tuesday November 30</p>	<p style="text-align: center;"><i>Teacher Beliefs</i></p> <p><u>Class Activities</u> Discussion with Dr. Keith Leatham Discuss Cooney (1985), Raymond (1997), Skott (2001) and Leatham (2006) Discuss our theoretical frameworks</p> <p><u>Assignments</u> Read Gutstein, E., Middleton, J. A., Fey, J. T., Larson, M., Heid, M. K., Dougherty, B., et al. (2005). Equity in school mathematics education: How can research contribute? <i>Journal for Research in Mathematics Education</i>, 36, 92-100.</p> <p>Martin, D. B. (2006). Mathematics learning and participation as racialized forms of experience: African American parents speak on the struggle for mathematics literacy. <i>Mathematical Thinking and Learning</i>, 8, 197-229.</p> <p>Secada, W. G. (1996). Urban students acquiring English and learning mathematics in the context of reform. <i>Urban Education</i>, 30, 422-448.</p>	<p>Summaries</p> <p>Draft 5</p>
<p>Tuesday December 7</p>	<p style="text-align: center;"><i>Equity</i></p> <p><u>Class Activities</u> Discuss Gutstein et al. (2005), Martin (2006) and Secada (1996)</p>	<p>Summaries</p>
<p>Tuesday December 14 7-10pm</p>	<p>Research Presentations (note time change-- 7-10pm)</p>	<p>Electronic Annotated Bibliography</p> <p>Research Proposal</p> <p>Research Presentation</p>

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