EDST 621 – STUDENTS' THINKING IN MATHEMATICS EDUCATION

SPRING 2012 Social & Behavioral Sciences Building 3228
Thursdays 5:30-8:15 pm

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Office hours: by appointment

> *Every normal student is capable of good mathematical reasoning if attention is directed to student activities of his interest, and if by this method the emotional inhibitions that too often give him a feeling of inferiority in lessons in this area are removed.*
>
> *—Jean Piaget (1948/1973, pp. 98-99)*

> *One thing is to study whom you are teaching, the other thing is to study the knowledge you are teaching. If you can interweave the two things together nicely, you will succeed…. Believe me, it seems simple when I talk about it, but when you really do it, it is very complicated, subtle, and takes a lot of time. It is easy to be an elementary school teacher, but it is difficult to be a good elementary school teacher.*
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> *—Liping Ma (1999, p. 136)*

Mission Statement of the School of Education, CSUSM

The mission of the School of Education Community is to collaboratively transform public education by preparing thoughtful educators and advancing professional practices. We are committed to diversity, educational equity, and social justice, exemplified through reflective teaching, life-long learning, innovative research and on-going service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance. *(Adopted by CoE Governance Community, October, 1997).*

Course Description

Explores the implications of understanding K-8 (K-12, as student interest dictates) students' mathematical thinking for instruction. The development of students' mathematical thinking in major content areas will be examined across grade levels. The information to be covered will be driven by current research in the field and students' own investigations.

Course Requirements

Required Texts

American Psychological Association. (2009). *Publication manual of the American Psychological Association, 6th ed.* Washington, DC: APA.

Duckworth, E. (2006). *The having of wonderful ideas: And other essays on teaching and learning* (3rd ed.). New York: Teachers College Press.

Kamii, C. (1999). *Young children reinvent arithmetic: Implications of Piaget's theory* (2nd ed.). New York: Teachers College Press.

Kilpatrick, J., Swafford, J., Findell, B. (Eds.). (2001). Adding it up: Helping children learn mathematics. Washington D.C.: National Academies Press.

Papert, S. (1993). *Mindstorms: Children, computers, and powerful ideas* (2nd ed.). New York: Basic Books.

Recommended Texts

Van de Walle, J. A. (2009). *Elementary and middle school mathematics: Teaching developmentally* (7th Ed.). Boston: Pearson Education, Inc.

Assignments

1. Participation (30%) – Each meeting a student will be assigned to lead the discussion of the reading due that week. Weekly, students will bring to class a personal written summary of the assigned readings, preferably printed in hard copy.

2. Reading Summaries (20%) Twice, students will submit a 4-5 page (APA formatted) paper summarizing and engaging the reading assignments during that time period. Focus the paper on the course theme: understanding students' mathematical thinking for instruction. Discuss the key notions of the readings about students' mathematical thinking, and comment on the impact these notions, or the broader theme of the reading, may impact your classroom.

3. (Mis)Conceptions Analysis (50%) – Students will identify a topic in mathematics that is often misunderstood by students and conduct an action research study around this topic. Complete a brief literature review on students' conceptions and misconceptions about the topic. Then, observe and interview student(s) as they learn about the mathematical topic. Document student work and student thinking; this will compose your research findings. To conclude, analyze the nature of students' difficulties in learning this topic, describe how teachers may help reinforce these misconceptions, and suggest some ways that teachers may correct these misconceptions.

Students will complete an "exempt" application to the IRB to complete their study. The final paper will be written in the traditional 5-part structure: introduction, literature review, methodology, findings, conclusion. It will be less than 20 pages in length. Students will present their findings from their research in class.

Grading Standards

Grades will be based on the following grading scale:

A	……	90 – 100%
B	……	80 – 89%
C	……	70 – 79%
D	……	60 – 69%
F	……	Below 60%

Each written assignment will be graded approximately 80% on content and context (detail, logic, synthesis of information, depth of analysis, etc.), and 20% on mechanics (grammar, syntax, spelling, format, uniformity of citation, etc.).

School of Education Attendance Policy

Due to the dynamic and interactive nature of courses in the School of Education, all students are expected to attend all classes and participate actively. At a minimum, students must attend more than 80% of class time, or s/he may not receive a passing grade for the course at the discretion of the instructor. *Individual instructors may adopt more stringent attendance requirements*. Should the student have extenuating circumstances, s/he should contact the instructor as soon as possible. *(Adopted by the COE Governance Community, December, 1997).*

Graduate Writing Requirements

The California State University maintains a Graduation Writing Assessment Requirement (GWAR) for master's students, to be completed before Advancement to Candidacy can be approved. A student may satisfy the graduate writing requirement in one of two ways: an acceptable standardized test score, or a paper that receives a passing score as described in the GWAR rubric. Toward the goal of providing opportunity for graduate students in the School of Education to satisfy the writing requirement, all papers in all graduate classes must adhere to the rules of style (for writing and format style) detailed in the *Publication Manual of the American Psychological Association, 6th ed.* (2009). This is a required textbook for all CSUSM SoE graduate courses.

Miscellany

CSUSM Academic Honesty Policy

"Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/materials that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks.

Students are responsible for honest completion of their work including examinations. There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor's attention. The instructor reserves the right to discipline any student for academic dishonesty in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole."

Incidents of Academic Dishonesty will be reported to the Dean of Students. Sanctions at the University level may include suspension or expulsion from the University. Consult the University catalog for further questions about academic honesty.

Plagiarism: As an educator, it is expected that each student will do his/her own work, and contribute equally to group projects and processes. Plagiarism or cheating is unacceptable under any circumstances. If you are in doubt about whether your work is paraphrased or plagiarized see the Plagiarism Prevention for Students website http://library.csusm.edu/plagiarism/index.html. When relying on supporting documents authored by others, cite them clearly and completely using American Psychological Association (APA) manual, 6th edition.

Students with Disabilities Requiring Reasonable Accommodations

Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disable Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with their instructor during office hours or, in order to ensure confidentiality, in a more private setting.

EDST 621 Spring 2012 Lawler – Schedule

Date	Topic	Assignment to be completed BEFORE Class Session**
Session 1 Th, 26 jan 2012	Course Introduction	
Session 2 W, 1 feb 2012		Kamii – chs. 1-3
Session 3 Th, 9 feb 2012		Kamii – chs. 4-5
Session 4 online		Kamii – chs. 6-7
Session 5 W, 22 feb 2012		Kamii – chs. 8, 12 **Summary #1**
Session 6 W, 29 feb 2012		Duckworth – chs. 7-11
Session 7 M, 5 mar 2012		Kilpatrick – chs. 1, 3
Session 8 W, 14 mar 2012		Kilpatrick – chs. 4-5
Session 9 M, 26 mar 2012		Kilpatrick – chs. 6
Session 10 W, 4 apr 2012		Kilpatrick – chs. 7-8 **Summary #2**
Session 11 online		Papert – chs. 1-2
Session 12 W, 18 apr 2012		Papert – chs. 3-5
Session 13 Th, 26 apr 2012		Papert – chs. 6-7
Session 14 W, 2 may 2012		Duckworth – chs. 1, 3-6
Session 15 M, 7 may 2012	Action Research Project presentations	**(Mis)Conceptions Action Research**

Although this schedule and syllabus have been carefully planned, either may require modification in response to class needs and interests.