CALIFORNIA STATE UNIVERSITY SAN MARCOS
College of Education
EDMS 543 (TF)
Teaching Mathematics in the Elementary School
(3 units)
Spring 2002

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The mission of the College of Education Community is to transform public education by preparing thoughtful educators and advancing professional practice. We are committed to the democratic principles of educational equity and social justice for all learners, exemplified through reflective teaching, learning, and service. We value diversity, collaboration, professionalism, and shared governance.

REQUIRED MATERIALS:
Customized Course Packet of Readings: *Mathematics Education in Elementary School* by Tom Bennett

      National Council of Teachers of Mathematics (2000): *Principles and Standards for School Mathematics.* Reston, VA: author. This document can be found on the WWW at: http://www.nctm.org/. From left side of NCTM homepage, click on "NCTM Standards". Access "e-standards" link.

      California Department of Education (1999). *Mathematics Framework for California Public Schools.* PDF version can be found at http://www.cde.ca.gov/   Found **within** the Framework is *Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve.* Sacramento, CA author. From left side of CDE homepage, click on CDE PRESS. Then on top of that page click on Free Downloads. Scroll to and download the 1999 Mathematics Framework for CA Public Schools.

COURSE DESCRIPTION:
      Learning to teach mathematics well is difficult and this course will not complete your education in learning how to teach mathematics. This course is but one stage in what is hoped will be a continuing evolution of you as a mathematics teacher. The focus of this course will be on (1) developing an understanding of the current reform efforts in mathematics, (2) learning to teach content specific concepts in reform-minded ways, and (3) practicing how to teach for mathematical understanding. Enfolded into this course will be curriculum development, developing an understanding of children's content specific thinking, creating a classroom environment that promotes the investigation and growth of mathematical ideas, and developing strategies to ensure the success of all students in multi-cultural settings. And last but not least, you will learn to teach mathematics in a fun manner!

CLAD EMPHASIS:
      In 1992, the College of Education voted to infuse Cross-cultural, Language and Academic Development (CLAD) competencies across the curriculum. The CLAD competencies are attached to the syllabus and the competencies covered in this course are highlighted.

METHOD OF EVALUATION: Grades will be calculated using the following weights:
Weekly Assignments: 20%   Student Interviews: 20%   Collaborative Participation: 5%
Classroom Presentation: 25%   Curriculum Assignment: 25%   Standards Presentation: 5%

Weekly Assignments (20%) - Each week students will write a "meaningful" one page reflection on the article(s) assigned to be read for that week. Each assignment will have ½-inch top, bottom and right margins and a 1-inch left margin. Use an "11" font and double spacing with **only** your name and class session as a heading. These reflections should not repeat what is in the assigned readings. Instead, reflect on, analyze, and connect what is contained in the readings to your own educational experiences, beliefs and thoughts. **If your class meets twice weekly, you are to turn in only one reflection per week (your choice).**

Student Interviews (20%) - You and one of your classmates will conduct a series of four different student interviews based on questions provided in class. For each interview, you will ask questions to any one student at a predetermined grade level. The purpose of this activity is to get you to begin thinking about students' mathematical understanding, to learn how to effectively pose questions and interpret the meaning of students' answers, and to provide you with valuable opportunities to interact with students.

Classroom Presentation (25%) - Working in small groups you will develop a lesson on a predetermined mathematical topic that you will present to the class. The purpose of this activity is to help you learn how to design effective mathematical activities that reflect the current reform efforts, to provide you with an opportunity to begin compiling mathematical activities that will prove beneficial when you teach, and to provide you with an opportunity to practice teaching mathematics. You will receive feedback on your lesson from your peers as well as the instructor.

Curriculum Assignment (25%) - Students will review mathematics curriculum (e.g., a textbook) at one grade level and write a short paper outlining the strengths and weaknesses of the curriculum. Students will also be asked to provide suggestions for how the curriculum might be used by teachers to be effective.

Standards Assignment (5%) – You will give a brief, oral presentation (no more than five minutes) in class of a predetermined mathematics curriculum standard(s). This will be assigned to each student during Session 1.

Collaborative Participation (5%) – Defined as **actively** engaging in discussions/activities in **all** class sessions. A **positive attitude** is also part of the criteria for this definition.

GRADING SCALE: Grades will be based on the following grading scale:

A................. 95 - 100 %	A-………..90 - 94 %
B................ 85 - 89 %	B-………..80 - 84 %
C................. 75 - 79 %	C-……… 70 - 74 %
D................ 65 - 69 %	D-……… 60 - 64 %
F................... below 60 %	

Punctual attendance and active participation are essential in this class, not only for you to learn, but so that others may benefit from your input. Due to the dynamic and interactive nature of this course, all students are expected to attend all classes and participate actively. Consistent with the CoE's Attendance Policy, if more than two class sessions are missed, your grade may be lowered one letter grade. For grading purposes, two late arrivals or early departures of more than 15 minutes will be considered the same as one missed class session. Students missing more than 20% of class time may fail this course. Please discuss with me any extenuating circumstances that will cause you to miss class prior to your absence. Attendance will be taken at each class session. Furthermore, grades on assignments turned in late will be lowered unless **prior arrangements** have been made with the instructor.

Plagiarism and cheating: Please be sure to read and understand the university policy on plagiarism and cheating as it will be strictly enforced. Academic dishonesty will not be tolerated and will result in a failing grade for this course and be reported to the University.

Session #1 (2/5/2002)
   <u>COURSE INTRODUCTIONS</u>
  NO ASSIGNMENT DUE TODAY
  ASSIGNMENT OF NCTM STANDARDS FOR SESSION #4

Session #2 (2/8)
   <u>MODELING</u>
     Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). Problem solving as modeling. In <u>Cognitively Guided Instruction in Mathematics: Professional development in primary mathematics</u> (pp.47-49). Madison, WI: Wisconsin Center for Educational Research.

     Carpenter, T.P., Ansell, E., Frank, M.L., Fennema, E., Weisbeck, L. (1993). Models of problem solving: A study of kindergarten children's problem solving processes. <u>Journal for Research in Mathematics Education, 24</u> (5), 427-440.

Session #3 (2/12)
   <u>CHILDREN'S UNDERSTANDING</u>
     Carpenter, T.P., & Lehrer, R. (in preparation). Teaching and learning mathematics with understanding.

     Ginsburg, H.P. & Baron, J. (1993). Cognition: Young children's construction of mathematics. In R.J. Jensen (Ed.), <u>Research ideas for the classroom: Early childhood mathematics</u>, (pp. 3-21). New York, NY: Macmillan Publishing Company.

Session #4 (2/15)
   <u>FRAMEWORK AND STANDARDS</u>
     National Council of Teachers of Mathematics (2000): <u>Principles and Standards for School Mathematics.</u> Reston, VA: author. This document can be found on the WWW at: http://www.nctm.org/.

     California Department of Education (1999). <u>Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve.</u> Sacramento, CA: author. This document can be found on the web at http://www.cde.ca.gov/.

Session #5 (2/19)
   <u>ADDITION AND SUBTRACTION (Part 1)</u>
     Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). What is cognitively guided instruction (CGI)?. In <u>Cognitively Guided Instruction in Mathematics: Professional development in primary mathematics</u> (pp. 1-3). Madison, WI: Wisconsin Center for Educational Research.

     Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). Children's mathematical thinking. In <u>Cognitively Guided Instruction in Mathematics: Professional development in primary mathematics</u> (pp. 4-7). Madison, WI: Wisconsin Center for Educational Research.

Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). Classification of addition/subtrction. In Cognitively Guided Instruction in Mathematics: Professional development in primary mathematics (pp. 8-13). Madison, WI: Wisconsin Center for Educational Research.

Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). Children's solution strategies of addition/subtraction problems. In Cognitively Guided Instruction in Mathematics: Professional development in primary mathematics (pp. 14-29).). Madison, WI: Wisconsin Center for Educational Research.

Session #6 (2/22)
INTERVIEWS
Huinker, D.M. (1993). Interviews: A window to students' conceptual knowledge of the operations. In N.L. Webb (Ed.) Assessment in the mathematics classroom: 1993 Yearbook (pp. 80-86). Reston, VA: National Council of Teachers of Mathematics.

Session #7 (2/26)
TECHNOLOGY
Dick, T. (April 1988). The continuing calculator controversy. Arithmetic Teacher, 37-41

INSTRUCTIONAL PRACTICES (Part 1)
Heaton, R.M. (1996). Learning while doing: Understanding early efforts to create new practices of teaching and learning mathematics for understanding. In D. Schifter (Ed.), What's happening in math class?: Reconstructing professional identities Vol. 2 (pp. 74-80). New York: Teachers College

Lester, J.B. (1996). Establishing a community of mathematics learners. In D. Schifter (Ed.), What's happening in math class?: Envisioning new practices through teacher narratives Vol. 1 (pp. 88-102). New York: Teachers College.

INSTRUCTIONAL PRACTICES (Part 2)
Ball, D.L. (Summer 1992). Magical hopes: Manipulatives and the reform of math education. American Educator, 14, 16-18, 46-47

Session #8 (3/01)
ASSESSMENT
 *Interview #1 Due Today (Everyone--NOT Optional)
Bennett, T.R. (1996). Reform in mathematics assessment: The concerns new assessment practices are trying to address. Unpublished manuscript.

St. Clair, J. (1993). Assessing mathematical understanding in a bilingual kindergarten. In N.L. Webb (Ed.) Assessment in the mathematics classroom: 1993 Yearbook (pp. 65-73). Reston, VA: National Council of Teachers of Mathematics.

Session #9 (3/5)
   FRACTIONS
     *Fractions Interview Due Today (Option For Interview #2)
     Bezuk, N. & Bieck, M. (1993). Current research on rational numbers and common fractions: Summary and implications for teachers (pp. 118-136). In D.T. Owens (Ed.), Research Ideas for the classrooms: Middle grades mathematics. New York: Macmillan.

     Empson, S.B. (October 1995). Using sharing situations to help children learn fractions. Teaching Children Mathematics, 110-114.

     Owens, D.T. & Super, D.B. (1993). Teaching and learning decimal fractions (pp. 137-158). In D.T. Owens (Ed.), Research ideas for the classrooms: Middle grades mathematics. New York: Macmillan.

Session #10 (3/8)
MEASUREMENT AND SCALE
     *Measurement and Scale Interview Due Today (Option For Interview #2)
     Sanford, S. (1993). Assessing measurement in the primary grades. In N.L. Webb (Ed.), Assessment in the mathematics classroom: 1993 Yearbook (pp. 74-79). Reston, VA: National Council of Teachers of Mathematics.

     Hendry, A.M. (1996). Facilitating children's construction of their own mathematical understandings. In D. Schifter (Ed.), What's happening in math class?: Envisioning new practices through teacher narratives Vol. 1 (pp. 9-13). New York: Teachers College.

Session #11 (3/12)
   GEOMETRY
     *Geometry Interview Due Today (Option For Interview #3)
     Nitabach, E. & Lehrer, R. (April 1996). Developing spatial sense through area measurement. Teaching Children Mathematics, 2 (8), 473-476.

     Sovchik, R.J. (1996). Geometry (pp. 493-525). In Teaching mathematics to children, (2nd ed.). New York: Harper Collins.

Session #12 (3/15)
   FUNCTIONS AND ALGEBRA
     *Functions and Algebra Interview Due Today (Option For Interview #3)
     Usiskin, Z. (February 1997). Doing algebra in grades K-4. Teaching Children Mathematics, 3 (6), 346-356.

Session #13 (3/19)
    <u>STATISTICS AND PROBABILITY</u>
     *Statistics and Probability Interview Due Today (Option For Interview #3)
      Russell, S. J. & Mokros, J. (February 1996). What do children understand about average? <u>Teaching Children Mathematics,</u>2 (6), 360-364.

      Fennell, F. (1993). Probability. In T.E. Rowan & L.J. Morrow (Eds.), <u>Implementing the K-8 curriculum and evaluation standards: Readings from the arithmetic teacher</u> (pp. 78-82). Reston, VA: National Council of Teachers of Mathematics.

      Friel, S. N. & Corwin, R.B. (1993). The statistics standards in K-8 mathematics. In T.E. Rowan & L.J. Morrow (Eds.), <u>Implementing the K-8 curriculum and evaluation standards: Readings from the arithmetic teacher</u> (pp 73-77). Reston, VA: National Council of Teachers of Mathematics.

Session #14 (3/22)
    <u>NUMBER CONCEPTS AND PLACE VALUE</u>
     *Number Concepts and Place Value Interview Due Today (Option For Interview #4)
      Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L. (in preparation). Base-ten number concepts. In <u>Cognitively Guided Instruction in mathematics: Professional development in primary mathematics</u> (pp. 67-90). Madison WI: Wisconsin Center for Ed. Research

Session #15 (3/26)
    <u>ADDITION AND SUBTRACTION (Part 2)</u>
     *Addition and Subtraction Interview Due Today (Option For Interview #4)
      Hiebert, J., Carpenter, T.P., Fennema, E., Fuson, K., Human, P., Murray, H., Olivier, A., & Wearne, D. (in preparation). Designing classrooms for learning mathematics with understanding.

Session #16 (3/29)
    <u>MULTIPLICATION AND DIVISION</u>
     *Multiplication and Division Interview Due Today (Option For Interview #4)
      Carpenter, T.P., Fennema, E., Franke, M.L., Empson, S., & Levi, L**.** (in preparation). Multiplication and division. In <u>Cognitively Guided Instruction in mathematics: Professional development in primary mathematics</u> (pp. 30-46). Madison, WI: Wisconsin Center for Ed. Research.

      Carey, D.A., Fennema, L., Carpenter, T.P., & Franke, M.L. (1995). Equity and mathematics education. In W.G. Secada, E. Fennema, & L.B. Adajian (Eds.), <u>New directions for equity in mathematics education</u> (pp. 93-125). New York: Cambridge.

STUDENT TEACHING BEGINS 4/01/2002