TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL

(3 units)—Special Education Intern Cohort

Dr. Sharon Whitehurst-Payne

June 19, 2001 – July 17, 2001

Class meets:	Tuesdays and Thursdays, 5:00 p.m. to 9:15 p.m.
Office hours:	By appointment
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Course goals: The purpose of this course is to prepare students to teach mathematics in the elementary school, emphasizing collaboration, reflective practice, effective teaching of diverse learners, and appropriate use of technology. By the end of this course students should be able to do the following:

1. Be familiar with current national and state recommendations regarding the teaching of elementary school mathematics, and plan instruction that follows these recommendations. In particular, students will become familiar with state standards for elementary school mathematics.
2. Examine their beliefs regarding the goals and content of elementary school mathematics.
3. Apply principles of learning theory to the teaching of mathematics.
4. Utilize methods to help students develop an understanding of concepts and facts, not just rote memorization.
5. Utilize methods to help all students understand mathematics and become confident in their ability to do mathematics.
6. Be aware of issues regarding equity in teaching and learning mathematics.
7. Realize the importance of positive student attitudes toward mathematics.
8. Explain and support the importance of manipulatives and activities in the teaching and learning of mathematics.
9. Be familiar with a wide variety of activities, manipulative materials, and children's books for use in mathematics instruction, and for incorporating assessment as part of instruction.
10. Assess students' mathematical thinking and various levels of understanding of mathematics concepts and procedures, and plan instruction based on those understandings.

11. Understand the scope and sequence of the elementary school mathematics curriculum.
12. Communicate with parents about math curriculum and ways they can help their children at home.

Required Course Materials and Supplies:

Elementary School Mathematics: Teaching Developmentally (4^{th} ed.), Van de Walle.
An E-mail account

Course requirements:

1. Class attendance and participation
2. Completion of assigned readings
3. Satisfactory score on the exam
4. Satisfactory completion of the following assignments:
   -Mathematics autobiography
   -Reflective summaries
   -Alternative algorithms
   -Math menu activity
   -A five-step sequence of math lessons, including planning, implementation, and reflection, including communication with and activities for parents.
   -Use the Internet as a resource
5. Math literature book.

Description of assignments:

1. Mathematics autobiography. Describe your experiences in mathematics. Define your attitude towards mathematics.
2. Reflective Summaries: The purpose of this assignment is to encourage you to read and reflect upon some of the critical issues surrounding the teaching and learning of mathematics. Prior to each class, there will be assigned readings from the textbook. You should complete these readings, and then summarize and reflect on those readings. Your reflective summaries, which will be collected at the beginning of class, should demonstrate that you have read and thought about the material. The time you spend before class reading and thinking about the issues related to the teaching and learning of mathematics will provide substantial benefit to your overall learning in this class. Your reflections should be

approximately one page typed or the equivalent length hand-written.

3. Alternative Algorithm Assignment. The purposes of this assignment are to develop an appreciation for the fact that different cultures have found alternative but correct algorithms from those commonly used in the United States, and to reinforce the view that the algorithms we have come to use are simply a matter of convention and should be seen as "a way," not "the way." Your assignment is to find an alternative algorithm for one of the arithmetic operations that is either currently used or was used by people from another country or culture. An excellent source for this assignment would be the upper grades of an elementary school where the students might ask their parents, grandparents, or other relatives how they learned to add, subtract, multiply, or divide. You have the choice of submitting this assignment in writing or presenting it orally in class (approximately 5 minutes long). Your report for this assignment should include the following information:

- Where you found the algorithm
- Where the algorithm is or was used
- A clear explanation of the algorithm and how it works
- An explanation of why the algorithm works. (One way to do so is to compare it to an algorithm you use now.)

4. Math menu activity: Find or develop one activity either for skill or concept development and set-up and conduct a station for this activity in class. Assume some concept development on your chosen topic has already been done. Topics will be selected in class. Prepare enough copies to distribute one each to class members and instructor.
5. Final Exam: The exam will consist of short-answer and short-essay questions related to the course objectives and based on class discussions, activities, and readings.
6. Lesson Plans: The purposes of this assignment are as follows:

- To think through a mathematical content area in terms of the big conceptual ideas, the relationship between those ideas, and the associated procedural knowledge;

- To determine the knowledge possessed by two different students about your chosen topic;
- To prepare and teach a five-day-long unit plan to teach this content to a small group of students or the whole class, including ways to assess what students learned from this unit;
- To reflect on your lessons and make suggestions for revisions and improvements;
- To incorporate children's literature in mathematics teaching; and
- To practice ways to involve parents in their children's mathematics learning.

7. Literature Book: Develop a literature book.

Course Grading Policy:

Each assignment meeting the requirements specified above will earn an "A", an assignment must be better than average in some way. For example, relating classwork and/or readings to an assignment, using extra creativity, thinking of a way to apply an idea in the classroom, or doing an excellent job of constructive a game would make an assignment better than average. In general, an "A" requires quality "above and beyond" the requirements.

All assignments turned in late will lose 10% of their total point value. Each spelling or grammatical error in a written assignment will result in a 2% deduction from your score for that assignment.

Grade Calculation:

Attendance and participation	10%
Math autobiography	5
Reflective summaries	10
Alternative algorithm	5
Math menu activity	5
Final exam	25
Math lesson plans	20
Literature book	20
Total	100%

Grading Scale for Course Grades

A	95-100	B+	87-89	C+	77-79
A-	90-94	B	84-86	C	74-76
				C-	70-73

Students who have not submitted all assignments by Tuesday July 14, 2000 will receive a grade of "Incomplete". Please note that each unexcused absence decreases your overall percent by 5%. For example, three unexcused absences would result in a potential maximum grade of B (85).

Class Sessions

Class Session 1 – 6/19/2001
Topics: Course introduction, Syllabus, Standards, Five-Step lesson plans.
Reading Assignment: Chapter 1; Appendices A&B.
Written Assignment due: Math Autobiography.

Class Session #2 -- 6/21/2001
Topic: Doing math, Developing understanding
Reading Assignment: Chapters 2,3.
Written Assignment due: RS2, RS3.
Demonstration of math menu activity and alternative algorithm activity.

Class Session #3 -- 6/26/2001
Topic: Early number concepts, What math should we teach?
Reading Assignment: Chapters 6, 4 (pp.47-50).
Written Assignment due: RS6, RS4.
Math menu activity #1 and alternative algorithm activity #1.

Class Session #4 – 6/28/2001
Topic: Meaning of operations (addition & subtraction) using children's literature. Technology and School Mathematics.
Reading Assignment: Chapters 24 & 7 (p. 117 - p. 126)
Written Assignment due: RS24 & RS7.1.
Math menu activity #2 and alternative algorithm activity #2.

Class Session #5 -- 7/3/2001
Topic: Equity, Involving parents, Meaning of operations (multiplication and division)
Reading Assignment: Chapters 23 & 7 (p. 127 - end); Article on parents
Written Assignment due: RS23, RS7.2
Math menu activity #3.
Guest speakers:

Class Session #6 -- 7/5/2001
Topic: Basic facts, Place value.
Reading Assignment: Chapters 8 & 9.
Written Assignment due: RS8, RS9.
Math menu activity #4 and alternative algorithm activity #3.

Class Session #7 - 7/10/2001
Topic: Algorithms.
Reading Assignment: Chapter 11.
Written Assignment due: RS11.
Alternative algorithm activity #4.

Class Session #8 - 7/12/2001
Topic: Fractions concepts.
Reading Assignment: Chapter 12.
Written Assignment due: RS12.
Math menu activity #5 & alternative algorithm activity #5.

Class Session #9 - 7/17/2001
Topic: Fractions computation.
Reading Assignment: Chapters 13.
Written Assignment due: RS13.
Math menu activity #6 & alternative algorithm activity #6.
Final Exam