

Mathematics Instruction Principles & Procedures

EDST 446 CRN: 11692
Fall 2004

Class Meeting Days/Time: M W 14:00 – 15:20
Location: ED276

Instructor: Jill Baxter
Office Hours: by appointment
Office: 125B, College of Education
Phone: 346-2190
e-mail: jabaxter@uoregon.edu

Graduate Assistant: Katie Grantham
e-mail: kgrantha@gladstone.uoregon.edu

Course Description and Goals

In this course we will concentrate on three main tasks that are central to teachers' work:

- Establishing a *classroom culture* that supports the development of students' mathematical proficiency — and, in particular, what this takes at the beginning of the year;
- Interpreting and developing *students' mathematical thinking*;
- Designing, teaching, and improving actual *mathematics lessons* in classrooms

Understanding how to approach and relate these tasks will prepare you to practice skillfully as a beginning teacher. As we work together, you will develop a greater sense of yourself as a professional, as someone joining a community of practice that shares norms, specialized knowledge, and ethical commitments.

Being able to teach mathematics well is shaped by your *knowledge* of (a) what it means to be mathematically proficient and (b) the mathematics needed to do the work of teaching. To put this knowledge to good use, we will focus on honing your *skills* in developing students' mathematical proficiency and promoting equity in mathematics learning. Of central importance to all segments of the course is our commitment to preparing you to work effectively with diverse populations of children, ensure equal educational opportunity for all children, and use research to guide your educational practice.

You will have opportunities:

- to explore, understand, and implement the National Council of Teachers of Mathematics (NCTM) Principles and Standards, state and local standards;
- to examine your personal assumptions, beliefs and values about elementary school mathematics instruction;
- to increase your knowledge and practical experience in the planning, teaching, and assessment of mathematics;
- to better understand the complexities and subtleties of teaching in multi-ability and multicultural classrooms;
- to become curious about how students learn mathematics;
- to become more confident in your ability to do mathematics;
- to become more analytical about instructional strategies and technological innovations as they relate to the teaching of mathematics

How We Will Work Together

One quarter is a short time to achieve these goals. We cannot cover all topics and issues in teaching children mathematics; therefore, we have designed your work this term to help you learn how to *learn teaching*. This involves learning how to study and examine practice, and to develop criteria for judging alternative instructional decisions and moves. In short, it means asking, exploring, and experimenting with the teaching of mathematics in school, *in ways that make children's ideas central to the work, and that preserve the mathematics with intellectual rigor and integrity*. If you work hard and attentively this term, you will learn to *do* mathematics teaching, as well as *analyze* it. You will develop skills of watching and listening that enable you to make sense of how others think mathematically and express themselves in multiple ways. You will develop practices that enable you to attend and respond to students' mathematical ideas and ways of thinking, and to plan, teach, and analyze mathematics lessons. You will elaborate your knowledge of some areas of mathematics for the specific work of teaching it. And, attentive to potential sources of inequity, you will be able to work in support of each of your students' learning in mathematics. Working on these elements of mathematics teaching will enable you not only to get started, but also to go on learning from practice. (from: D. Ball's course syllabus Fall 03)

Four kinds of experience will support our learning in this course:

1. *Our class itself*: Our activities, discussions, and interactions will be central to our work together. What I do with you is teaching, and you and your classmates are directly engaged in learning. There will be things to learn from reflections on our interactions together. You will be making a notebook as a site for recording and using this joint work.
2. *Records from classrooms*: We will study records of practice to learn the work of teaching. These records — videotapes of lessons and students' work — make it possible for us to study together mathematics in use in classrooms, the work of teaching, and students.
3. *Your field placement*: We will engage in some common tasks in the field so that we can discuss and learn from one another's experiences in the field.
4. *Course readings and assignments*: Your engagement with readings and other assignments will help you extend the resources and perspectives you can bring to thinking about mathematics teaching and learning.

Course Materials

- Van de Walle, John A. (2001) *Elementary and Middle School Mathematics: Teaching Developmentally*, 5th Ed. (New York: Addison Wesley Longman, Inc). **Required.**
- Additional readings will be posted on Blackboard or passed out in class.
- Notebook, Calculator, scissors, ruler (cm and inches) **Required**

Course Requirements and Grading

Attendance and class participation: Your participation in class activities and discussions is important not only for your own learning but also the learning of others. I expect you to attend every class, to arrive on time for a prompt start, and to participate in and contribute to class. You cannot readily "make up" the class if you are absent because so much rests on what we do together as we work. If circumstances prevent you from attending class, please send us an email or call us in advance.

Another form of participation in the course will be to keep mathematical and other drawings, writings, and critiques in a special mathematics notebook. The work you do in your notebook is a central part of the course. Please see handout for specific guidelines for working in your notebook, and criteria for the quality of your work.

Weekly Assignments: You will have assignments for each class. These will include reading and analyzing what you read, mathematical problems that help you learn to use mathematics for teaching, a mathography, and an analysis of the classroom culture at your practicum site (details will be passed out in class). We ask that you submit these assignments electronically to Katie **at least 2 hours prior** to the class in which they are due. Please attach these electronic assignments as Word files to an e-mail addressed to Katie. The Word file should be labeled with your last name and the number of the assignment (e.g., "BaxterEA1.doc" would be the label for my first electronic assignment and "BaxterMathography.doc" would be the label for my mathography).

You will be reading primarily from the Van de Walle text for this class. Other readings will be available on Blackboard. Some of the readings will be discussed explicitly in class, while others will simply be used in the context of our work. I will expect you to be able to bring them to bear in assignments and discussions.

Some assignments will also ask you to use your field placement classroom as a site for a variety of small inquiries and opportunities to try things out related to issues you are working on in your courses. It is up to you to arrange time for these with your own teacher. Please be considerate in talking with your teacher about making times for you to do this work.

Projects: There will be two projects. The first will be focused on close study of students' mathematical thinking. Taking some of the mathematics content that we ourselves will have been exploring, you will learn to elicit and make sense of students' ideas. This project will be due in Week #6. You will need to make arrangements to work with at least one individual student during either Weeks #4 or #5.

The second project will engage you in teaching in your field placement classroom. You will use what you have been learning about attending to mathematical content and practices, what it means to be mathematically proficient, and concerns for equity. It will also give you an opportunity to integrate your skills in developing the culture of your classroom and making sense of students' thinking. The second project will be due after Week #10. You will need to make arrangements to teach two complete mathematics lessons during either Week #8 or #9 (Caution: Week 9 is Thanksgiving week).

Specific criteria for grading each of these projects will be given with the assignments.

Mid term & Final Examinations: The course will conclude with a final examination designed to focus on your knowledge and skills for teaching mathematics. Consistent with the course goals of developing your proficiency as a beginning teacher of mathematics, this exam will ask you to demonstrate your performance in the main areas of the course. The tasks you will be asked to do will be consistent with those you will be practicing all term. The Midterm exam will be a brief version of the final exam. You will be able to prepare in advance for the exams. One week before the mid term and two weeks before the final I will distribute a list of possible exam problems and tasks. You will be able to prepare for each, working with others if you choose. You may make notes, gather ideas, and practice skills. The actual examinations will consist of a subset of those tasks and problems. The final will be held on Thursday, December 9 at 15:15.

Collaboration: We encourage you to work together and share ideas, insights, and materials. However, it is critical that you properly cite work that is not solely yours, whether the source is a classmate, a Web site, or a published text.

Grading: This is a professional course. The standards of performance are tied to those you will be expected to meet as a teacher. Thus, you should demonstrate:

- meticulous preparation,
- the appropriate use of professional knowledge,
- careful consideration of alternatives,
- genuine curiosity about ideas and about learners,
- collegial work on teaching,
- analysis and reflectiveness,
- skills of ongoing professional learning,
- clear expression,
- organization,
- timeliness.

Completing assignments and projects with attention to all the elements of professional work will be judged as satisfactory professional performance (equivalent to a letter grade of B). Exceptional performance (equivalent to a letter grade of A) is reflected in work that goes beyond basic requirements of an assignment, demonstrating skills and thinking that are more nuanced or developed. Work that displays lack of care with particular elements, or is underdeveloped, is evaluated as performance in need of improvement (equivalent to a letter grade of C). You may revise and further develop any assignments or projects that I evaluate as in need of improvement, and resubmit them within a specified time period for me to re-evaluate as satisfactory or not. Work that is not turned in on time (without prior arrangement and our agreement) or demonstrates significant lack of care and attention may be determined to be unsatisfactory. Unsatisfactory work cannot be resubmitted.

Your final grade will be determined based on your performance of each of the course requirements:

Assignment	weight
Attendance and participation in class work, recording, working, and reflecting in your notebook	10%
Writing on course readings: EA	10%
Mathography	5%
Creating a classroom culture for doing mathematics	5%
Mid-term	10%
Project #1: Understanding and working with students' mathematical thinking	20%
Project #2: Designing, teaching, and analyzing a lesson	20%
Final exam	20%

* Your notebook will receive an overall grade at the end of the term (see guidelines).

- A above 90%
- B 80 to 89%
- C 70 to 79%

Course Incompletes

Please see <http://interact.uoregon.edu/pdf/sas/AlncGrdCon.pdf> to review University of Oregon policy regarding course incompletes and grade changes.

Policy on Cultural Diversity

It is the policy of the University of Oregon to support and value cultural diversity. To do so requires that we:

- Respect the dignity and essential worth of all individuals.
- Promote a culture of respect throughout the University community.
- Respect the privacy, property, and freedom of others.
- Reject bigotry, discrimination, violence, or intimidation of any kind.
- Practice personal and academic integrity and expect it from others.
- Promote the diversity of opinions, ideas and backgrounds which is the lifeblood of the university.

If you believe you have been the victim of or a witness to a bias incident, harassment, or a hate crime, the University of Oregon encourages you to report it to the Bias Response Team. The team can help you document the incident and can provide support.

Bias Response Team <http://darkwing.uoregon.edu/~brt/> 346-1139

Affirmative Action and Equal Opportunity <http://aaeo.uoregon.edu/> 346-3123

Student Accommodation for Disability

If you need course adaptations or accommodations because of a disability, or if you have emergency medical information to share with me, please make an appointment as soon as possible.

Academic Misconduct Policy

The UO Student Conduct Code is contained in each term's schedule of classes. All College of Education students are subject to the regulations stipulated in this code. This code represents a compilation of important regulations, policies, and procedures pertaining to student life. It is intended to inform students of their rights and responsibilities during their association with this institution, and to provide general guidance for enforcing those regulations and policies essential to the educational and research missions of the University.

Certain student behavior will result in the lowering of the course grade by at least one grade level, may result in an "F" grade for the course, and may result in the student's suspension or expulsion from the university. These behaviors include, but are not limited to:

- a. Dishonesty, including cheating, plagiarism, or knowingly furnishing false information or signatures on extra credit work
- b. Writing up a report of a lesson you did not plan or carry out
- c. Intentional disruption, obstruction, or interference with the process of instruction

Please see the review policy at: <http://www.uoregon.edu/~conduct/> .

Course and Instructor Evaluation Plan

You will have the opportunity to formally evaluate the course and my teaching at two points during the course. A Formative Evaluation is used to gather feedback from you during the fourth or fifth week of the course. Information will be gathered on your understanding of the assignments and grading system, and your suggestions for improving the course. Adjustments may be made in the course in response to this evaluation. In addition, you are welcome to offer oral or written feedback to me throughout the course. A formal evaluation will be conducted at the end of the course.

Class Activity Outline and Schedule (Tentative & subject to change):

Dates	Topics	Complete before class
Week 1: M 9/27/04	Building ways to talk about teaching mathematics	Van de Walle Text, Ch. 1
Week 1: W 9/29/04	Developing Understanding in Mathematics	Text Ch. 3 EA1: Writing to Learn 8, Disc. 1 or 2.
Week 2: M 10/4/04	Technology and School Mathematics	Guest presenter: Dave Moursund Moursund article, pp.1-17
Week 2: W 10/6/04	Technology and School Mathematics http://darkwing.uoregon.edu/~moursund/Math/	Guest presenter: Dave Moursund Moursund article, pp. 18-36. Mathography due
Week 3: M 10/11/04	Developing Understanding in Mathematics	Ladson-Billings, Ch 3 EA2: Insights
Week 3: W 10/13/04	Teaching Through Problem-Solving	Text Ch. 4 EA3: WtoL #6, Discussion #2
Week 4: M 10/18/04	Teaching Through Problem-Solving	Lester, pp. 88-114 Class Culture due
Week 4: W 10/20/04	Developing Early Number Concepts and Number Sense	Text Ch. 9 EA4: WtoL #5, Disc. #1
Week 5: M 10/25/04	Developing Early Number Concepts and Number Sense	Midterm
Week 5: W 10/27/04	Whole-number Place-Value	Text Ch. 12 EA5: Discussion #1
Week 6: M 11/1/04	Strategies for Whole-Number Computation	Text Ch. 13 EA6: Discussion #5 & #7
Week 6: W 11/3/04	Strategies for Whole-Number Computation	Paley, 122-131 Project #1 due
Week 7: M 11/8/04	Fractions	Text Ch. 15 EA7: WtoL 4, 8 & Disc. #1
Week 7: W 11/10/04	Fractions	Ladson-Billings, Ch. 4 EA8: Response
Week 8: M 11/15/04	Fractions	Text Ch. 16 EA9: Discussion #1 & #2
Week 8: W 11/17/04	Geometry	Text Ch. 20 EA10: Writing to Learn 5 & 8
Week 9: M 11/22/04	Geometry	Ladson-Billings, Ch. 5 EA11: Insights
Week 9: W 11/24/04	Geometry	Optional class: Building Geoboards with Ann Woeste
Week 10: M 11/29/04	Geometry	Response to one optional reading EA12
Week 10: W 12/1/04	Summary: Next Steps	Project #2 due Notebooks due

EA = electronic assignment, WtoL= Writing to Learn section at the end of each chapter.

Ladson-Billings, G. (1994). *Dreamkeepers: Successful teachers of African American children*. San Francisco: Jossey-Bass.

Moursund, D.G. (September 23, 2004). Introduction to teaching and learning for increased math maturity. (copies will be passed out in class)

Paley, V. (1986). On listening to what children say. *Harvard Educational Review*, 56, 122-131.