

University of Washington, Bothell
Spring Quarter 2015

BEDUC 418 - Knowing, Teaching, and Assessing in: Mathematics
Tuesdays 1:00-4:00
Woodmoor Elementary School
12225 NE 160th St, Bothell, WA 98011

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As a collaborative, scholarly and professional community, the University of Washington Bothell School of Educational Studies exists to develop and support educators who have the commitments and capabilities to promote the learning of all students in diverse contexts. We support interdisciplinary scholarship that explores the multifaceted dimensions of learning and schooling. We give particular focus to (a) the purposes of education in a social and political democracy, (b) the responsibility of universities to collaborate with community partners, and (c) the critical role of professional educators in supporting equity in learning.

COURSE OVERVIEW

This course centers on children's thinking in mathematics and classroom practices that support and develop children's thinking. Our work together will focus on the mathematical content and the pedagogy of teaching K-5 mathematics. We will focus on developing an understanding of children's strategies for solving problems. We will investigate what it means for children to understand key mathematical ideas, such as: place value, the structure of our base ten number system, and the meaning of operations. Through this mathematical work, we will also build our own understanding, or content knowledge, of the mathematics we will teach. We will experience and unpack the role of discussion in the mathematics classroom with an eye for creating discourse that is both mathematically productive and socially supportive for students.

Two key features of our course are: 1) Learning about practice *in* practice as we collaboratively plan, facilitate, and reflect on teaching at Woodmoor each week. We will be co-teaching in order to study the work of teaching each session! And, 2) Simultaneously learning about content and pedagogy through our class sessions. We will often engage in discussion that models the style of mathematical discourse you'll facilitate with students. Learning about mathematics in our course is inseparable from learning about pedagogy. The study of teaching and learning mathematics will constantly be layered into our sessions, as we talk about important issues such as: the role of questioning, supporting all learners, what it means for a student to struggle and when struggling is meaningful, and framing mistakes as desirable contributions. Frequently we will pause to explicitly unpack pedagogy in order to think together about what it means to engage students in mathematically productive inquiry-oriented learning. Much of the work that we will engage in together may be quite new to you. I ask that you approach this class with curiosity about how children think mathematically and allow yourself to question and explore your role as a teacher and a learner of mathematics.

Our partner in learning: Woodmoor Elementary School

Woodmoor Elementary is a large elementary school with over 850 students. Woodmoor students come from linguistically, ethnically, economically diverse families. There are approximately 21 languages spoken. 29% of our students are from families who are currently receiving federal support to help subsidize low income. Embedding our coursework within this context, we engage in rich, reciprocal learning alongside the teachers, students and staff at Woodmoor.

COURSE LEARNING GOALS

By the end of this course you will have:

- Learned to interpret and describe children's learning trajectories and problem types in number and operations, specifically from Cognitively Guided Instruction
- Learned computational strategies, grounded in conceptual understanding, for solving problems in the mathematical strand of number and operations
- Learned planning and facilitation strategies for fostering classrooms discussions that support children's learning of mathematics
- Learned to describe, critique, and employ equitable teaching practices that align with ambitious mathematics teaching

EXPECTATIONS

- This class is centered on close, careful observation of students and classrooms and lively classroom discussions. Although the mathematical content will be familiar to you, what matters most is your willingness to consider how children come to develop robust mathematical knowledge. This means that you will have an opportunity to develop the specialized knowledge of mathematics that you need in your role as a teacher. This process will be exhilarating! For us to have a strong intellectual community, we need everyone to complete readings before class and be ready to engage in class activities thoughtfully. Please bring the readings to class.
- You will chronicle your own learning through this course. That can be using whatever avenue feels most fitting to you – maybe a laptop or a notebook. Here you can keep photos of student work, notes from classroom observations, your sketches for practicing mathematical problems, notes of students' strategies, teaching ideas, etc..... Always capture images of student work when you're able and insert those into your assignments.
- All of your written work will be held to high standards and should conform to proper rules of grammar, usage, punctuation, and spelling. Please use Times 12 pt font with 1 inch margins. Also, include the last names of the authors in the document title.
- I expect you to be on time for class and to participate in all class sessions. If you cannot attend class, please let me know ahead of time with an email.

CLASS

SESSION 1+	<p>Why Mathematics? Finding joy and wonder for mathematics in your world</p> <p>What do I need to know to teach math? Subject Knowledge AND Pedagogical Knowledge</p> <p>Developing norms for our collaborative study of teaching with Woodmoor teachers, students, and staff. How will our reciprocal studies of teaching advance all of our learning?</p> <p>Meeting our first grade buddies!</p> <ul style="list-style-type: none">• Studying teaching and learning through “Number Sense Routines” and “Instructional Activities”• Asking questions and eliciting student thinking• Representing children’s ideas
SESSIONS 2-3	<p>How are we going to engage in this <i>ambitious</i> work together? Nurturing our collaborative norms</p> <p>Children have ideas?! Understanding children’s thinking (trajectories, problem types, and common strategies)</p> <ul style="list-style-type: none">• Cognitively Guided Instruction• What is ambitious teaching?• Number sense routine/Instructional Activity: Quick Images• Classroom Discussions: Using Math Talk to help students learn• “Open Strategy Sharing” Discussion• Overview of “Talk Moves”• Establishing the “Teacher Time Out” in our work together
SESSIONS 4-5	<p>How do our first grade buddies think about problems?</p> <ul style="list-style-type: none">• CGI student interview and analysis• Eliciting student thinking and using knowledge of children’s thinking to make instructional decisions• Problem Launching• Cognitive Demand: The potential of the task & implementing the task
SESSIONS 6-8	<p>What should children know and be able to do in mathematics? Common Core State Standards for Mathematics and Mathematical Practices</p> <p>How do I actively engage students in developing understanding of math concepts?</p> <ul style="list-style-type: none">• Number sense routine/Instructional Activity: Number Strings• Planning for and facilitating Open Strategy Sharing

Why might I plan for and facilitate different types of mathematical discussions? Open sharing vs. Targeted Sharing

- Open strategy sharing into Targeted Sharing
- Planning for and facilitating a “Compare and Connect” discussion
- Engaging in co-analysis of Instruction and Engagement

Typical Schedule for our sessions at Woodmoor

Time	Event
12:40	Math begins: Gathering of Woodmoor teachers, administration, and UWB students
12:40-2:45	Focus on content and pedagogy in preparation to work with our buddies
2:45-3:30	Classroom visit
3:30-3:40	Break on way back to room
3:40-4:00	Collaborative debrief and unpack practice Plan for work between sessions

REQUIRED TEXTS & MATERIALS

Carpenter, T., Fennema, E., Franke, M.L., Levi, L., Empson, S.B. (1999). *Children’s mathematics: Cognitively Guided Instruction*. Portsmouth, NH: Heinemann.

This book provides an overview of the development of children’s thinking in whole number and provides an introduction to setting up classrooms that focus on children’s thinking.

Chapin, S., O’Connor, C., & Anderson, N. (2009). *Classroom Discussions: Using Math Talk to Help Students Learn, 2nd Edition (Paperback)*. Math Solutions.

This book focuses on the significant role that classroom discussions can play in teaching mathematics. New to this edition are more research-based examples of classroom talk at early grade levels, an expanded range of vignettes, discussion questions at the end of each chapter, and connections to NCTM standards.

Fosnot, C. & Dolk, M. (2001). *Young Mathematicians at Work: Constructing Number Sense, Addition, and Subtraction (Paperback)*. Portsmouth, NH: Heinemann.

This book focuses on young children between the ages of four and eight as they construct a deep understanding of number and the operations of addition and subtraction.

Parrish, S. (2010). *Number Talks*. Sausalito, CA: Math Solutions.

This text is a resource full of short, targeted sequences of math problems for discussion, to help students develop specific strategies when working with numbers. Number Talks are useful in any classroom, and complement curriculum.

BETWEEN SESSION HOMEWORK AND MAJOR ASSIGNMENTS

We will use “homework sheets” for each class session to be explicit about what readings and/or tasks you need to complete prior to the next session. Completing this work will be necessary for your participation for each class session. Homework sheets will describe in detail the weekly readings, writings, and math problems.

In addition to homework sheets, we will have two major assignments (we will gather data for both assignments from our work sessions with our Woodmoor buddies):

1. Analysis of a mathematical interview
2. Analysis of Instruction and Engagement

Detailed descriptions for both assignments will be handed out and discussed in class.

GRADES

Assignments will be weighted according to the following scheme (which is standard at UW, please see: <http://faculty.washington.edu/scstroup/Gradescale.html>). In an effort to coordinate your assignments across courses this quarter, all our assignments will be due on our course day of the week (Tuesdays). Post your assignment to our course Canvas cite. Before posting, *please save file as a .doc or .docx and incorporate your name into the file name (your last name_assignment title.doc)*

In-Class Work	15	Grading Scale	
<ul style="list-style-type: none"> ○ Participation and engagement (includes active listening, building on what other's have said, sharing your ideas, coming prepared and incorporating readings, practice teaching with elementary students, exit slips) 		98-100	4.0
		96-97	3.9
		95-94	3.8
		92-93	3.7
		91	3.6
		89-90	3.5
		87-88	3.4
		86	3.3
		85	3.2
Homework sheets	25	84	3.1
		83	3.0
Analysis of a Mathematical Interview	30	(for points, grades lower than 83 or 3.0 please see link provided above)	
Analysis of instruction and engagement	30		

What is meant by participation and engagement during in-class work?

Your participation in our class activities and discussions is important not only for your own learning but also the learning of others. Conducting a close read of assigned readings and then sharing your ideas and questions with the group, as well as responding to those of your classmates, is critical to our work together. As a teacher, you need to do more than understand your own thinking—you have to listen to others' thinking, figure out what others are saying, and determine whether and how they make sense. In our class, the "others" will be your colleagues – including your fellow cohort members as well as the Woodmoor teachers, instructional coaches, and administration. In your work as a teacher, the "others" are your students (as well as their families and your colleagues). So "active listening" to and interacting with others in our class is important to help you develop dispositions and skills that matter for teaching. I understand that some of you may not feel comfortable with verbal participation (either in small or whole group discussions), while others will be challenged to listen. This is a chance for us to hold each other accountable for developing the kind of learning community we hope to foster for our students, one that is safe, equitable, and in which everyone learns through various forms of participation.

Access and Accommodations

Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on disability, please seek a meeting with DRS to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 425.352.5307 rlundborg@uwb.edu.