

EDUC 263B: Curriculum & Instruction in Mathematics
CERAS Room 302
Tuesdays, 3:15 pm - 6:15 pm

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Office hours by appointment

Introduction

This is the second of a 3-course sequence focused on mathematics teaching and learning. The 3-course sequence is designed to create an opportunity for sustained learning and professional growth.

This quarter we will examine two crucial and closely connected aspects of classroom instruction: planning lessons and assessing student learning. We will discuss approaches to the “backward design” of curricula in which educators begin their planning with a vision of the understandings they want their students to achieve and of the dimensions of performance that would demonstrate those understandings. We will explore and map important understandings in secondary mathematics and the misconceptions often held by students.

We will also consider different forms of assessment – formative and summative - noting the importance of designing assessments that match our instructional goals: assessing understanding in multiple ways, offering rationale for each design and goal, and integrating assessment and instruction.

We will also examine dimensions of mathematics instruction teachers must consider as they prepare lessons: informal assessment, participation structures, selection and implementation of tasks, and the role of the teacher in the lesson. There will be a joint focus throughout the course on research and practice. Journals and other assignments will encourage you to learn from both course readings and your classroom placements through informed reflection.

We will also explore problem solving as a teaching approach. Before you can develop in students the skills to solve mathematical problems, you need to know yourself as a problem solver, and you need to know particular processes involved in problem solving. Throughout the quarter, we will inspect and work on a set of mathematical tasks that will help us accomplish both of these goals.

We will engage in tasks in class, using a variety of formats: individual, pairs, groups and whole class. We will delve deep enough into the tasks to illustrate an important aspect of problem-solving, but you may need to continue pondering and working on the extensions outside of class. In addition to reflecting on your own mathematical experience with each task, we will systematically consider the mathematics likely to surface, the background skills needed to access the tasks, and the range of approaches students are likely to take.

Course Requirements

We expect you to come to class having completed the reading and assignments due for that day and prepared to participate in class discussions and activities. Attendance to all sessions is mandatory. Please give us ample notice if you must be late or need to miss a class.

Assessments and Grading

Your assignments for this quarter are (Please refer to Canvas for detailed descriptions):

- Due September 27th by 10:00 PM Norms Assignment
- Due October 25th by 10:00 PM Assessment for Learning Part I
- Due November 29th by 10:00 PM Assessment for Learning Part II

Your grade will be based primarily on the quality of the assignments mentioned above. We will also take into account your attendance, and your active contributions to class discussions. As with all your work in C&I this year, you may revise and resubmit any written assignment for a higher grade.

All assignments should be digitally submitted to *Canvas* unless otherwise specified by the instructors. All assignments should be uploaded to the assignment in Canvas no later than *10 pm on the due date*. If you have extenuating circumstances and would like to request an extension, please do so before the deadline. All feedback will be provided digitally within your submitted documents. Please turn in all assignments as Microsoft Word documents. It is fine to embed photographs in the word document, and we really appreciated having one continuous file for each assignment. It is difficult to comment on pdf files, and we are certain we can open your assignments if they are saved in Word. Please save all files using the following naming convention: Lastname_Assignment.docx. For example: Brown_Journal Reflection.docx

University Policies

All Stanford students are expected to follow the **Stanford Honor Code** and **Fundamental Standard**, as noted in the STEP Handbook and Stanford Student Guide.

<http://www.stanford.edu/dept/vpsa/judicialaffairs/about/welcome.htm>

Students with Disabilities

Students who may need academic accommodations based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk; phone: (650) 723-1066; web site <http://studentaffairs.stanford.edu/oae>

| Week | Topic | Readings | Assignments |
|------------|---|--|---|
| 1 9/21 | Classroom Culture and Norms | Kazemi, E. (1998). Discourse that promotes conceptual understanding. <i>Teaching Children Mathematics</i> . 410-414. | |
| 2 9/28 | Teacher Questioning | Herbel-Eisenmann, B. A., & Breyfogle, M. L. (2005). Questioning our patterns of questioning. <i>Mathematics teaching in the middle school</i> , 10(9), 484-489. Daro, P., & Asturias, H. (2019). Branching out: Designing high school math pathways for equity. 9-12,23 | Norms Assignment DUE: Monday, 9/27 by 10 pm |
| 3 10/5 | Assessment for Learning | Boaler, J. <i>Mathematical Mindsets</i> , (2015). Ch. 8. Assessment for a Growth Mindset | |
| 4 10/12 | Assessment: Building Self-aware Students | Boaler, J., Dance, K., & Woodbury, E. (2018). From Performance to Learning: Assessing to Encourage Growth Mindsets. Youcubed. Retrieved from: https://www.youcubed.org/wp-content/uploads/2018/04/Assessment-paper-final-4.23.18.pdf ·Boaler, J., & Zoido, P. (2016, November 1). Why Math Education in the U.S. Doesn't Add Up. <i>Scientific American</i> . Retrieved from https://www.scientificamerican-com.stanford.idm.oclc.org/article/why-math-education-in-the-u-s-doesn-t-add-up/ | |
| 5 10/19 | Culturally Relevant Pedagogy | Video: Gloria Ladson-Billings - Culturally Relevant Pedagogy Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. <i>American educational research journal</i> , 32(3), 477 - 484 | |
| 6 10/26 | Backwards Design: Big Ideas and Learning Objectives | · Boaler, J. <i>Mathematical Mindsets</i> , (2015). Ch. 3. The Creativity and Beauty in Mathematics Boaler, Munson, & Williams (2017). What is mathematical beauty? Teaching through big ideas and connections. https://bhi61nm2cr3mkgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/2017/08/What-Is-Mathematical-Beauty-1.pdf | A4L Part 1 DUE: Monday 10/25 by 10 pm |

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| 7 11/2 | Revising and Launching Tasks | Boaler, J. (2015). Mathematical Mindsets. Ch. 5. Rich Mathematical Tasks. | |
| 8 11/9 | Education Technology | · Erlwanger, S. H. (1973). Benny's conception of rules and answers in IPI mathematics. Journal of Children's Mathematical Behavior, 1(2), 7-26. | |
| 9 11/16 | Data Science Guest: Melissa Schmidt | LaMar, T. & Boaler, J. (2021). The Importance and Emergence of K-12 Data Science. Phi Delta Kappan, July 12, 2021. https://kappanonline.org/math-importance-emergence-k12-data-science-lamar-boaler/ | |
| 10 11/30 | Working with English language learners Guest: Jack Dieckmann | Moschkovich, J. (2013). Principles and Guidelines for Equitable Mathematics Teaching Practices and Materials for English Language Learners. Journal of Urban Mathematics Education, 6(1). | A4L Part II DUE: Monday, 11/29 by 10 pm |