Course Information and Instructors

EDUC 263F: Quantitative Reasoning in Mathematics II (3 units)
Wednesdays, 2:30-5:15 PM
[RAIKES ROOM 111]

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Course Overview/Goals

The EDU263F (Quantitative Reasoning in Mathematics II) course is Part 2 of the three-course sequence in elementary mathematics teaching methods. This sequence is designed to provide teacher candidates with a coherent set of experiences for mathematics teaching and learning in elementary schools. Through assigned readings, classroom discussions, content rich mathematics activities and assignments that require work in your field placement, you will be supported to make sense of how to approach the profession of teaching.

Our second course centers on *Complex Instruction,* an approach to group work developed through decades of research at Stanford. It rests on a simple premise: every student has something essential to offer. In heterogeneous classrooms, where differences in prior achievement and perceived status shape who gets heard, Complex Instruction offers a set of practices designed to make each student's contribution visible and necessary. These include a multiple-ability orientation, group-worthy tasks, delegated authority, and deliberate status interventions.

Our goals for this quarter are to help you:

I. Reconcile two visions of learning (and teaching) mathematics
- A. Teaching through problem solving
- B. Explicit instruction

II. Plan and carry out Complex Instruction lessons in mathematics
- A. Identify students' skills and abilities in mathematics (i.e. noticing).
- B. Implement strategies to strengthen the conditions for collaborative group work in your classroom (e.g. skillbuilders, norms).
- C. Create or adapt groupworthy tasks.
- D. Carry out status interventions in your classroom.

III. Leverage teaching-through problem solving to develop student conceptual understanding
- A. Identify foundational concepts in within your grade-level content
- B. Incorporate *problems* to your lessons, when you deem appropriate and feasible

IV. Incorporate finding from cognitive science into mathematics instruction
- A. Incorporate in your lessons, when you deem appropriate and feasible: *instant feedback, spaced retrieval practice, explanations* (contrasting cases, multiple representations)

Course Materials

Technology: All course details and materials will be posted on our Canvas course site. You will need to have access to a device that connects to the internet so that you can access email and Canvas. You should bring your STEP-provided iPad or another device to each class session.

Readings: All course readings will be posted electronically to Canvas at the beginning of the quarter, so you have the choice to print them free of charge in CERAS, if desired. The materials are also linked below in the Autumn Course Schedule.

Coursework and Grading

We expect you to come to class having completed the reading/viewing and assignments due for that day, and to be prepared to participate in class discussions and activities. This means that you have a clear idea of the main points; you may have formulated some questions; and/or you have noted any related issues that the reading or topic raised for you.

Your participation depends upon your timeliness in attendance. If for any reason, you will miss or be late to class, please email the instructors ahead of time. Regarding participation, we are looking for you to contribute to small and whole group discussions in class. Whether you are more talkative or more introverted in nature, we expect that you make concerted efforts to both listen and contribute, monitoring your level of sharing, and making space for others to join in. We recognize that you may have more to say about one topic over another, but across the 9 sessions, we should have heard your thoughts and ideas in both small and whole group discussions, as well as online. This will help your learning as well as the learning of the group.

Our expectation is that everyone will receive an A grade. If your work – including the quality of your participation and major assignments – is not at that standard we will discuss ways to improve it, and you will have the opportunity to revise and resubmit. Our goal is learning, not evaluation!

Major Autumn Assignments (Preliminary)

The assignments in this quarter will scaffold your required submission for the math section of edTPA.

- Instruction + Template for submitting assignments
- Official edTPA instructions here

What	When:
Part A (context)	**10/13**
Part B (Learning Segment)	**10/20**
Part C (Formative Assessment) Part D (Evaluation Criteria)	**10/27**
Draft of reengagement task	**11/03**
Full edTPA Math section (Parts A - G)	**11/17**

Autumn Course Schedule (Tentative)

Date	Reading/Viewing for Class
9/23	**Session 1** – Understanding Mathematics and Introduction to Groupwork **Math**: Intro to fractions
	Takahashi, A. Characteristics Of Japanese Mathematics Lessons.*Tsukuba Journal of Educational Study in Mathematics. Vol.25, 2006* (pp. 37-44).
09/30	**Session 2** – Creating the Environment for Groupwork: Skill-Builders, Norms, and Roles **Math**: Intro to fractions (cont.)
In-class support: - **Introducing edTPA** - **Exploring the "big picture" of the math section**	Featherstone, H., Crespo, S., Jilk, L. M., Oslund, J. A., Parks, A. N., & Wood, M. B. (2011). *Smarter Together! Collaboration and Equity in the Elementary Math Classroom* Reston, VA: National Council of Teachers of Mathematics: • Prologue (pp. vi-xii) and • Preparing for Groupwork by Teaching Norms and Roles (pp. 41-55).
10/7	**Session 3** – Status Issues and Noticing Student Strengths **Math**: Addition and subtraction with fractions
	Featherstone, H., Crespo, S., Jilk, L. M., Oslund, J. A., Parks, A. N., & Wood, M. B. (2011). Why isn't Miguel Learning Math? Status at Work. In *Smarter Together! Collaboration and Equity in the Elementary Math Classroom* (pp. 31-40). Reston, VA: National Council of Teachers of Mathematics. **Video**: Status Treatment in the Classroom
10/14	**Session 4** – Addressing Status Issues: Multiple Abilities Orientation and Recognizing Competence **Math**: Addition and subtraction with fractions
-Part A due prior day (context)	Featherstone, H., Crespo, S., Jilk, L. M., Oslund, J. A., Parks, A. N., & Wood, M. B. (2011). Addressing Status Issues through Lesson Design and Addressing Status Issues during the Lesson. In *Smarter Together! Collaboration and Equity in the Elementary Math Classroom* (pp. 69-99). Reston, VA: National Council of Teachers of Mathematics.
10/21	**Session 5** – Providing Access to Meaningful Mathematics: Groupworthy Tasks **Math**: Addition and subtraction with fractions (cont.)
-Part B due prior day(Draft Learning Segment that will be observed in the coming weeks) **In-class support:** - **Part C (Form. Assessment)** - **Part D (Eval. Criteria)**	Horn, I. S. (2013). Providing Access to Meaningful Mathematics: Groupworthy Tasks. In *Strength in Numbers: Collaborative Learning in Secondary Mathematics* (pp. 35-45). Reston, VA: National Council of Teachers of Mathematics.

10/28	**Session 6** – Opening Up: Problem-Based Lessons and Mathematics Problem Solving **Math**: Multiplication with fractions
-Instruction of Learning Segment expected to be ongoing in placement - Part C due prior day (Formative Assessment) - Part D due prior day (Eval. Criteria) **In-class support:** - **Analyzing student learning + planning reengagement lesson (sections from Part G)**	Takahashi, A. (2006). Characteristics of Japanese Mathematics Lessons. *Tsukuba Journal of Educational Study in Mathematics, 25*(1), 37-44.
11/4	**Session 7** – Workshop - Finding and adapting problems using our own curriculum **Math**: Multiplication with fractions (cont.)
-Instruction of Learning Segment + reengagement lesson expected to be ongoing in placement - Draft of reengagement task due prior date **In-class support:** - **Analyzing student learning + planning reengagement lesson (sections from Part G)**	Bring your own materials/textbooks.
11/11	**Session 8** – Incorporating finding from cognitive science into mathematics instruction **Math**: Division with fractions (cont.)
In-class support: - **Analyzing outcomes from reengagement lesson (sections from Part G)**	*Merlo, S. (2024). The Science of Maths and How to Apply it.* Center for Independent Studies, Australia. (pp 17-26.)
11/18	**Session 9** – Incorporating finding from cognitive science into mathematics instruction **Math**: Division with fractions (cont.)
- Full assignment due prior day	TBD

Course Policies

Submitting to Canvas

All assignments should be digitally submitted to Canvas as a single file, unless otherwise specified by the instructors. You may choose to submit a word document or a link to a shared google document. Be sure to change the permissions to "anyone in Stanford University with the link can comment" on google docs before submission. All feedback will be provided digitally within your submitted documents in Canvas.

Please save all files using the following naming convention:
LastName – Assignment
For example: Ramirez – Noticing Student Strengths

Deadlines and Late Submissions

Assignment deadlines are listed in the course schedule, along with estimated times of completion, to enable you to effectively plan and balance your academic work and other commitments. Despite the best planning, however, we know that life happens! So:

- Please contact us in advance if you have any concerns about completing the major assignments on time. Extensions may be granted by your instructors, if requested.
- Late work that is submitted without an extension may be subject to a grade penalty.
- As with all of your work in this sequence this year, you may revise and resubmit any written assignment for a higher grade.
- Do your best to complete readings such that you can be an active participant in the next class session! If the reading is longer or more academic in nature, find the most salient parts or pieces that stand out to you.

The Honor Code

All Stanford students are expected to follow the Stanford Honor Code and Fundamental Standard, as noted in the STEP Handbook and Stanford Student Guide. Please review Stanford's Honor Code, these recommendations from the Office of Community Standards, and documentation and citation resources from the Hume Center for Writing and Speaking.

Academic Accommodations

Stanford is committed to providing equal educational opportunities for disabled students. Disabled students are a valued and essential part of the Stanford community. We welcome you to our class. If you experience a disability, please register with the Office of Accessible Education (OAE). Professional staff will evaluate your needs, support appropriate and reasonable accommodations, and prepare an Academic Accommodation Letter for faculty. To get started, or to re-initiate services, please visit oae.stanford.edu.

If you already have an Academic Accommodation Letter, we invite you to share your letter with us. Academic Accommodation Letters should be shared at the earliest possible opportunity so we may partner with you and OAE to identify any barriers to access and inclusion that might be encountered in your experience of this course.

Learning Resources

Your peers and instructors are valuable sources of learning, and we hope you will make the most of our time together! In addition, Stanford has a wealth of resources for graduate students, from group study halls to well-being coaches to professional development offerings. Which of the resources below will you explore?

- Writing tutors from the Hume Center for Writing and Speaking, to get additional feedback on your teaching portfolio materials
- English as a Second Language (ESL) courses for international graduate students
- Pedagogy workshops and programs from the Center for Teaching and Learning (CTL), to continue your teaching development
- IDEAL Pedagogy self-paced course, learning community, and/or syllabus consultation from CTL, to continue developing inclusive pedagogy practices
- Peer Academic Coaching from CTL, to help with time management and other work strategies
- Study Halls from CTL, to work in quiet companionship with other students
- Grad Grow from the Office of the Vice Provost for Graduate Education, to develop key professional competencies, including in teaching and mentorship
- Well-being coaches from Vaden, to receive holistic support and guidance