Topics in Mathematics Education:
Representing and Comparing Fractions in Elementary Mathematics Teaching

CNJ PEMA Fall 2013 Hybrid Course
Course# 15:254:592, Section 01, Index# 40277

Welcome to *Representing and Comparing Fractions in Elementary Mathematics Teaching.* We are very happy to see you again in your second Central New Jersey Partnership to Enhance Mathematics Achievement (CNJ PEMA) graduate course as a Teacher Fellow. Please remember that CNJ PEMA has several goals:

- To develop Teacher Fellow's mathematical understanding of Common Core content,
- To enhance Teacher Fellow's capacity to teach algebraic thinking for understanding, mathematical reasoning, strategic problem solving, and computational accuracy, and
- To create a vibrant community of teachers engaged in coursework and professional development that leads to greater student achievement on objective state measures.

Each Teacher Fellow is a valued member of the CNJ PEMA mathematics learning community, and will engage with mathematical practices to learn for "pedagogical content knowledge" – that is, to practice multiple ways of understanding and explaining mathematics in order to better recognize and correct common misconceptions and mistakes among student learners.

Our partnership is really a partnership. The instructional staff includes Rutgers mathematicians, and experienced teachers and researchers on mathematics education. As you learn about mathematical content from university faculty, they have the opportunity to learn from you about mathematics teaching in the schools. Rutgers will make use of what it learns to improve the mathematical education we offer to prospective teachers and to contribute to research on mathematics education in ways that can be useful to practitioners. The opportunity to work with you is exciting. We believe that motivation and potential make a powerful combination, and that you bring with you the best of both traits.

CNJ PEMA is made possible by a generous Mathematics and Science Partnership (MSP) grant from the New Jersey Department of Education (14E00029) and support from Rutgers University. We also appreciate the commitment and support provided by our partner districts.

Course Organization

Meeting Dates and Location:	Hybrid course – both face-to-face and online meetings Face-to-face meeting location: Hill 703/705	
Faculty instructors	Jennifer V. Jones (co-instructor)	jvjones@rci.rutgers.edu
	Cecilia C. Arias (instructor of record)	carias@rci.rutgers.edu
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Evaluation: RBS	Kelly Feighan	feighan@rbs.org

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CNJ PEMA Personnel
Amy Cohen, Project Director: acc@math.rutgers.edu
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Course Overview

This course is designed as a practical research-based set of experiences, adopting elements of lesson study in order to further our understanding of representation and comparison of fractions in elementary mathematics teaching. Participants will engage in activities that include on-campus meetings and activities carried out asynchronously online through a course website (Sakai and/or CTools) to examine tasks, and strategies used to understand, represent, and compare fractions in classroom settings.

The on-campus activities will include working in small groups to examine fraction problem-solving tasks, discuss and design modifications for specific classroom use, and participate in debriefings for tasks, student work, and shared experiences of classroom implementations.

The online course work will include reading assignments that relate to the topic of fractions in elementary mathematics teaching as a whole, and add to the overall focus on supporting students' learning, reasoning and explanations. Participants will be expected to consider implications drawn from their own practice in light of research for instruction and specific challenges of addressing the Common Core State Standards (CCSS) as well as earlier standards documents (such as NCTM and NJ standards).

Topics in Mathematics Education: Representing and Comparing Fractions will be using materials developed by the University of Michigan's Dev-TE@M including videos, handouts, and web pages.

Course Requirements

You are invited to be an active class participant in the on-campus meetings and web-based discussions. Successful completion of the course requires that you engage in all activities and complete all assignments. Specifically, you are expected to:

1. Attend all on-campus and online sessions.

2. Actively participate in online discussions about course assignments (readings and videos) by responding to guiding questions posted on the course website and to comments of your colleagues. Discussion questions will be posted with e-mail notice and each participant will be expected to a) make at least one original response posting by Monday evening of the

following week, and b) respond to at least two group member postings during the following week.

3. Be prepared to discuss all the assigned readings and video clips at on-campus meetings.

4. Submit a Clinical Interview Project that you prepare and complete with at least one student toward the end of the semester. This project should include a summary narrative (including a description of the problem/task and interview protocol used, student work, and any other artifacts), and an analysis of an individual task-based interview that you prepare and conduct with one (or more) student(s) toward the end of the term.

5. Submit a ***Reflective Assessment*** of your work in the course. You should reflect on your knowledge of the mathematics, and implications for teaching with regard to Common Core Standards and NCTM standards. You may review your postings on the course web site, notes from problem solving and sharing of solutions, and course resources as you develop your reflective assessment.

You will be evaluated on participation both in person and online, completion of all assignments, and a course final assessment.

Grading Policy

Since this course is a graduate course applicable to a master's degree, grades reflective of individual achievement must be submitted. The course will be engaging and accessible, and provide support for growth in mathematical and pedagogical knowledge within a professional mathematics learning community. We ask that you take an active part in all components of the course and we will offer plenty of help. As participants, we expect that you will also provide mutual support and encouragement to each other.

<u>50% Classroom/Online Attendance and Participation</u>

Includes active participation in small and whole group discussions at on-campus meetings, and online participation.

<u>30% Clinical Interview Project</u>

(see Course Requirements above, 4)

20% Reflective Assessment

We recognize that CNJ PEMA Teacher Fellows are drawn from different grade levels, have different certifications and experiences teaching mathematics, and different educational backgrounds. Thus, we believe it is appropriate to have an assessment system that values - in addition to mathematical knowledge - effort, teamwork, and progress in learning mathematics, development of mathematical understanding and mathematical communication skill, and reflection on learning (both your own and your students' learning).

Final Course Grades

Grade	***Evaluation:*** **Expectations, characteristics of achievement at that level**
A	*Very, very good:* Excellent understanding of material. Regular attendance and active participation in class work. Work going beyond minimum expectations on work in class. Superior communication skills in presentations and written work.
B+	*Very good:* Progress in deepening understanding and improving communication. Regular class attendance, active participation. Helpfulness and support for colleagues. Timely completion of work.
B	*Good:* Shows effort to understand, learn, and communicate mathematics. Regular class attendance. Reasonable participation in class. Cooperation with peers. Completes most work on time.
C, C+	*Fair:* (We don't expect to use these grades.) These grades count towards completing the Course and toward the Middle Grades Math Specialization, but will not count toward a masters degree. It may reflect insufficient progress in mastering course material due to any of the following: irregular attendance; insufficient effort to improve understanding; poor communication skills; assignments often incomplete, late, or missing.

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Academic Integrity

We expect that Teacher Fellows will uphold the highest level of academic integrity. It is your responsibility to be familiar with the university's academic integrity policy, available at

http://academicintegrity.rutgers.edu/

In particular, please be aware of the following definition of plagiarism from Rutgers University:

Plagiarism: Plagiarism is the use of another person's words, ideas, or results without giving that person appropriate credit. To avoid plagiarism, every direct quotation must be identified by quotation marks or appropriate indentation and both direct quotation and paraphrasing must be cited properly according to the accepted format for the particular discipline or as required by the instructor in a course.

Some common examples of plagiarism are:

- Copying word for word (i.e. quoting directly) from an oral, printed, or electronic source without proper attribution.
- Paraphrasing without proper attribution, i.e., presenting in one's own words another person's written words or ideas as if they were one's own.
- Submitting a purchased or downloaded term paper or other materials to satisfy a course requirement.
- Incorporating into one's work graphs, drawings, photographs, diagrams, tables, spreadsheets, computer programs, or other non-textual material from other sources without proper attribution.

If you have questions about how to appropriately cite references, how to quote and paraphrase authors, or what is acceptable in terms of working with other teachers, please ask us!

What does it mean to display your professionalism?

- Show a positive attitude
- Be a team player – mathematics need not be a competitive sport – work in groups
- Be an active participant – mathematics should not be a spectator sport
- Attend daily, be punctual
- Be committed, take your work seriously
- Be/become a "risk taker" – offer suggestions and conjectures even if you aren't sure

- Improve yourself as a mathematician; be willing to learn more
- Help others – if you know the mathematics being studied, practice your mentoring skills
- Work to the best of your ability
- Celebrate your colleagues' learning
- Be patient with yourself – there is a time delay between exposure to new ideas and the ownership of those ideas, and that time delay will vary from person to person
- Complete evaluation forms to help us improve the Course

Textbooks and References

Course materials for Topics in Mathematics Education: Representing and Comparing Fractions were developed by the University of Michigan's Dev-TE@M and include video recording collected in real classrooms and professional development settings.

Financial Support

As a reminder, CNJ PEMA Teacher Fellows are eligible for the following financial support:

- All participants will receive a stipend of $2000 upon successful completion of Program 1 (2013-2014).
- Tuition and fees (except one-time GSE application fee of $65) are covered by the grant.

Acknowledgement

We would like to acknowledge previous iterations of Topics in Mathematics Education courses offered by the Graduate School of Education to pre-and in-service teachers, and thank the Dev-TE@M members at the University of Michigan for allowing us to use research-based professional development curriculum materials.