Alston: Topics in Math Education: Lesson Study on Math Reasoning
Fall 2013 – Hybrid Course
Course number: 15:254:599, Section 81, Index #31195

Berkeley Heights, Edison, Franklin, Carteret and North Brunswick
(Central New Jersey)
Section 81
Hybrid Course Syllabus

On-Campus Meeting Dates: 9/7, 12/7
Saturdays, 9:00 –1:00, GSE Lecture Hall

Tentative Regional Meeting Dates: 9/25, 10/23, 11/20
Wednesdays (all day Lesson Study implementation in one of the schools, followed by
afterschool workshop sessions for approximately 2 hours)
Locations to be arranged

In-District Classroom Implementations:
Each teacher is expected to implement each task with his or her students. Implementation
visits in at least two classrooms will occur on the same dates as the regional meeting.
Task 1: Before or on September 25.
Task 2: Before or on October 23.
Task 3: Before or on November 20.

CONTACT INFO

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Individual Meeting Opportunities

By appointment at the GSE or in district on the classroom visitation and/or regional
meeting days.

Course Overview
This course is designed as a practical research-based set of experiences using a modified
Lesson Study approach and focusing on the development of reasoning and justification.
Participants will engage in a variety of activities that include in-person, on-campus
meetings with the other two sections of the course, regional sessions for our Northern
Regional section, and in-school Lesson Study implementations. Continuing discussions

between these activities will occur asynchronously online through a course eCollege web site.

The on-campus and regional activities will include working in small groups on a series of mathematical problem-solving tasks, discussing possible modifications for specific classroom use, participating in implementations and debriefings for each of the focus tasks using a Lesson Study approach, and sharing actual experiences and student work.

The online course work will include reading assignments that relate to each of the problem tasks and add to the overall focus of students' reasoning and justification. Online course assignments will also include video clips of children engaged in solving the same or similar problem tasks as those introduced in the group sessions. These assignments will include guiding questions in the eCollege discussion thread intended to elicit teachers' reflection and discussion of the problem tasks, video clips and readings and their relevance to learning and teaching. Each of you will be expected to respond directly to these questions within the first week after a group or regional meeting. During the next week – and before the following regional session, you are expected to expand on your earlier comments by responding to those of your colleagues.

Particular emphases for each assignment will be on the mathematics, children's learning, and conditions of the learning environment. Examples will be selected from the content strand of counting and combinatorics, from early grades through high school, and 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 (NCTM and NJ).

As one component of the course, each participant will complete assessments (pre and post) measuring the impact of course activities in the focal mathematical strand on what you notice and how you describe what you observe in a video, as well as on your beliefs about learning and teaching math and your own mathematical thinking in this domain. Completing the assessments is not optional; it is a course requirement. However, each participant will be given a consent form about whether assessments can be among those analyzed for ongoing research. Each participant will also complete the pre and post-assessment designed for this course for the external evaluator of PEMSM.

COURSE REQUIREMENTS

You are invited to be an active participant in the class in the general and regional meetings, web-based discussions, classroom implementations and your final portfolio project. Successful completion of the course requires that you engage in all activities and complete all assignments. Specifically, you are expected to:

1. Complete the pre- and post-assessments.

2. Attend all on-campus and regional sessions, including Lesson Study implementations
    in your classroom and/or several of your colleagues – and the debriefing discussion
    following those implementations.

3. Implement each of the tasks with your own students. Some selection and/or
    modification may be appropriate depending on your class. Problem statements for
    each of the tasks will be available as resources on the eCollege site for the appropriate
    component of the course. Take notes about these implementations and collect written
    work that records your students' solutions.

4. Based on your observations – and students' work - throughout the first weeks of the
    course, select one or two students whose thinking about the tasks and mathematics
    generally is particularly interesting. Be sure to follow this student's activity closely
    during each task and collect any written work that is relevant. After you have
    implemented all of the tasks, plan and carry out an interview with the student(s).

5. Actively participate in online discussions about course assignments (implementations,
    readings and videos) by responding to guiding questions posted on the eCollege
    course website and to comments of your colleagues. Discussion questions will be
    posted immediately after each of our sessions – beginning with the whole-group
    meeting on September 7. Each participant will be expected to make at least one
    original response posting by Tuesday evening of the following week and respond to
    at least two group member postings during the following weeks.

6. Be prepared to discuss all the assigned readings, video clips and your implementation
    of the tasks in your classroom at the appropriate regional meeting. Be sure to bring
    samples of your students' work to share with the group.

7. Complete an *Individual Final Portfolio***.** This project should include the following:
    (1) A summary *narrative of your implementation* of each of the problem tasks with
    your students, accompanied by student work and other artifacts from each of the three
    tasks, (2) 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, and (3) A *reflective
    assessment* of your work in the course in which you reflect on your knowledge of the
    mathematics, research on how students learn, and implications for teaching with
    regard to NCTM and Common Core Standards. You may review your postings on the
    course web site and notes from problem solving and sharing of solutions as you
    develop your reflective assessment. Be prepared to share the first two parts of your
    portfolio in our discussion on **November 20** and your overall set of experiences with
    the three groups together on December 7. The complete portfolio is due on or before
    December 11. You will be expected to complete the post-assessments between
    November 20 and December 7.

8. You will be evaluated on your work products for the individual portfolio, completion
    (not content) of all pre and post assessments, and your participation both in person
    and on line.

9. Policy on Academic Integrity: You are responsible for knowledge of and will be held accountable to the Academic Integrity at Rutgers policy found at http://academicintegrity.rutgers.edu.

COURSE OUTLINE AND ASSIGNMENTS

9/07/2013 9:00 – 1:00 ON-CAMPUS FULL-COHORT SESSION	**Class Activities:**
	Complete RBS pre-assessment.
	Engage in Task One: Building Towers, 4-cubes Tall, selecting from 2 colors, with problem extensions and focused discussion about representations.
	Break into regional groups to finalize schedule and discuss course expectations.
Before First Regional Session ON-LINE	**On-line Activities:** Respond to the guiding questions posted online for engagement in threaded discussion about the various towers problem-solving tasks and related videos and readings.
	Assigned Reading: Lewis, C. (2002). *Lesson study: A handbook of teacher-led instructional change.* Philadelphia: Research for Better Schools, Selected chapters.
	Maher, C., and Yankelewitz, D. (2011) Representations as tools for building arguments. In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphisms.* Chapter 3.
	Maher, C., Sran, M. and Yankelewitz, D. (2011) Towers: Schemes, strategies and arguments. In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphisms;* Chapter 4.
	Maher, C., Sran, M. and Yankelewitz, D. (2011) Building an inductive argument. In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphisms;* Chapter 5.
	Study videos found on the Rutgers Video Mosaic Collaborative site: 1. Stephanie and Dana, grade 2 and 3 2. PUP Math Building towers (grades 3 and 4) 3. Guess My Tower (series of 5) - 5th grade

IN YOUR CLASSROOM	**All teachers are to implement the Shirts and Pants problems as an informal activity with their students. Also – be sure to have implemented the Towers tasks (beginning with building towers 4 cubes tall) in your classrooms before the meeting on September 25.** **If you choose – you may want to follow this LATER with the Guess My Towers task -** Those teachers who are hosting the first Lesson Study implementations should select the classroom that they prefer for the implementation – and, if possible, implement the Towers tasks with other groups before the Lesson Study implementation day.
9/25/2013 FIRST REGIONAL GROUP MEETING (Locations for the 3 regional meetings to be determined on September 7)	**Group Activities:** Share classroom experiences and student work from Shirts and Pants tasks and Task I (building towers selecting from 2 colors). Engage in pizza problem tasks: pizzas, selecting from 4 toppings. Pizzas with Halves selecting from 2 – and then 4 toppings. Share how solutions were found and examine representations used in problem solving. Discuss isomorphism. Consider how these tasks might be used in classroom instruction. Discuss the possibility of two implementations – and how the problems might be sequenced.
Before Second Regional Session (10/23) ON-LINE	**On-line Activities:** Respond to the guiding questions to be posted online for engagement in threaded discussion about the various Pizza problem-solving tasks and related videos and readings. **Reading:** Maher, C. and Martino, A. (1998). Brandon's proof and isomorphism. In C. Maher (Ed.) *Can Teachers Help Children Make Convincing Arguments? A glimpse into the process.* A. Murata (2011). Introduction: Conceptual overview of Lesson Study. In L. Hart, A. Alston and A. Murata (Eds.) *Lesson Study Research and Practice in Mathematics Education.* Maher, C., Sran, M. and Yankelewitz, D. (2011) Making pizzas: Reaoning by cases and recursion. In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphisms;* Chapter 6. Ginsburg, H. (1997). Not a cookbook: Guidelines for conducting a clinical interview. In H. Ginsburg: *Entering the Child's Mind.* Chapter 4. **Study videos found on the Rutgers Video Mosaic Collaborative site:** 1. Brandon Invents Isomorphism – 4th grade interview 2. PUP Pizza segments – 5th grade series of 2 clips 3. Pizza problems with 4 and 5 toppings - 11th grade series of 6 clips

IN YOUR CLASSROOM	**All teachers are to implement the Pizza Problems in their classrooms before the meeting on October 23. Depending on your schedule, implementing the series of tasks may take several class sessions.** **Be sure to collect student work for sharing in our session – and for your final portfolio.** Those teachers who are hosting the second Lesson Study implementations should select the classroom that they prefer for the implementation – and, if possible, implement the Pizza tasks with other groups before the Lesson Study implementation day.
10/23/2013 SECOND REGIONAL GROUP MEETING	Share classroom implementation experiences and student work from Task 2 – the Pizza Problems. Engage in and discuss the two possibilities for Task 3: (a) Building 3-tall towers, selecting from 3 colors, and extension problem, Ankur's Challenge. Or (b) the Taxicab Problem. Share how solutions were found and examine representations used in problem solving. Consider how these tasks might be used in classroom instruction. Discuss individual task-based **Interview Assignment**.
Before Third Regional Session (11/20) ON-LINE	**On-line Activities:** Respond to the guiding questions to be posted online for engagement in threaded discussion about the various problem-solving tasks – both Towers with 3 colors and the Taxi-cab variations and the related videos and readings. Think about – and reflect in your discussion as you carry out these implementations - the connections that your students may be making with the earlier tasks – especially as you prepare for interviewing a focus student(s). Select student(s) for individual task-based interview – review their work and your notes from observing the students as they completed the first two tasks – and prepare interview for discussion at 3rd regional meeting. **Assigned Reading:** Maher, C. and Muter, E. (2011) Responding to Ankur's Challenge: Co-construction of argument leading to proof. In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphisms;* Chapter 8. Powell, A. (2011) So let's prove it! In C. Maher, A. Powell, & E. Uptegrove (Eds). *Combinatorics and reasoning: Representing, justifying and building isomorphism's:* Chapter 13 **Videos:** 1. PUP Math Romina's proof to Ankur's challenge - 10th grade 2. Taxicab Problem series of 5 clips – 12th grade

IN YOUR CLASSROOM	**All teachers are to implement at least one of the two problem tasks – and – both – if at all possible in their classrooms before the meeting on November 20. Depending on your schedule, implementing the series of tasks may take several class sessions.** **Be sure to collect student work for sharing in our session – and for your task-based interview and final portfolio.** Those teachers who are hosting the third Lesson Study implementations should select the classroom that they prefer for the implementation – and, if possible, implement the selected tasks with other groups before the Lesson Study implementation day. During the third implementation day, along with the classroom observations, one student should be selected by the host teacher for a pilot interview, to be conducted by the instructor – with participating teachers observing.
11/20/2013 THIRD REGIONAL GROUP MEETING	**Group Activity:** Share classroom experiences and student work from the two sets of tasks: Towers with 3 colors and the Taxi-cab problem(s). Share progress and ideas about individual interviews. Discuss guidelines for preparing final project portfolios for December 8th on-campus meeting. **Assignments –** Guidelines to be posted for preparing final projects and reflective narratives. Begin work on final project and reflective narrative.
Before final whole-group session **12/07/2013** ON-LINE	**Assignment:** Preparation of final project, including the interview, your analysis of it and your reflective narrative. Complete on-line post-assessments.
12/07/2013 **SATURDAY SESSION**	**Class Activities:** Complete RBS post-assessment. Group discussion about the Lesson Study experience and sharing of Final Projects. **ALL ON-LINE POST ASSESSMENTS ARE DUE**
12/11/2013!!!	**FINAL PORTFOLIO PROJECT and REFLECTIVE NARRATIVES DUE!** **These should be submitted both electronically and as hard copy – remember to include representative student work!**

As a general guideline for engaging in online discussions, we offer a few words on "Netiquete".
This is drawn from Palloff, R. M., & Pratt, K. (1999). Building learning communities in cyberspace. San Francisco: Jossey-Bass, p. 101.
a. Check the discussion frequently and respond appropriately and on the subject.
b. Focus on one subject per message and use pertinent, informative, and not-too-long subject titles
c. Capitalize words only to highlight a point or for titles. Capitalizing otherwise is generally viewed as SHOUTING.
d. Be professional and careful with your online interaction
e. Cite all quotes, references, and sources.
f. When posting a long message, it is generally considered courteous to warn readers at the beginning of the message that is a lengthy post.
g. It is inappropriate to forward someone else's message(s) without their permission.
h. Use humor carefully. The absence of face-to-face cues can cause humor to be misinterpreted as criticism or flaming (angry, antagonistic criticism). Feel free to use icons such as :-) or ;-) to let others know that you're being humorous.