Alston: Topics in Math Education: Lesson Study on Math Reasoning
Fall 2011 – Hybrid Course
Course number: 15:254:599, Section 80, Index #17675)

Plainfield/Carteret/Edison (Northern New Jersey) Section 80
Hybrid Course Syllabus

On-Campus Meeting Dates: 9/10, 12/3
Saturdays, 10:00-12:30, GSE Room 124

Tentative Regional Meeting Dates: 9/20, 10/18, 11/15
Tuesdays, 4:00 – 6:30
Locations to be arranged

In-District Classroom Implementations:
To be arranged, with at least one in each district
Task 1: Week beginning 9/12- Date TBD with teachers
Task 2: Week beginning 10/10 – Date TBD with teachers
Task 3: Week beginning 10/31 – Date TBD with teachers

CONTACT INFO

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Individual Meeting Opportunities

By appointment 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 blend in-person, on-campus
meetings with the other two sections of the course, regional sessions for the Northern
section, and in-school Lesson Study implementations with interactions done
asynchronously online through a course 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, observing at least one day of implementations using a Lesson Study

approach, and sharing the actual experiences and student work resulting from follow-up implementations by each of the participants.

The online course work will include reading assignments that relate to each of the problem tasks within 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. Each assignment will include guiding questions to elicit small group reflection and discussion of the readings and their relevance to learning and teaching.

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 years through high school, and participants will be expected to consider implications drawn from their own practice in light of research for instruction and NCTM Standards.

As one component of the course, each participant will complete assessments (pre and post) for the external evaluator of PEMSM and post-assessments 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 episode and a set of student products, as well as on participant beliefs about learning and teaching math. 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.

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 at least one implementation in the classroom of one of your colleagues – and the debriefing discussion following that implementation.

3. Implement each of the three tasks with your own students. Some selection and/or modification may be appropriate depending on your class. Take notes about these implementations and collect written work that records your students' solutions.

3. Actively participate in online discussions about course assignments (implementations, readings and videos) by responding to guiding questions posted on the eCompanion course website and to comments of your colleagues. Discussion questions will be posted on Friday of each week. Each participant will be expected to make at least one

original response posting by Monday evening of that week and respond to at least two group member postings by the following Friday.

4. Be prepared to discuss all the assigned readings and video clips at the appropriate regional meeting.

5. Complete an *Individual Final Portfolio*. This project should include the following: (1) A summary narrative of your implementations 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 student toward the end of the term, and (3) A *reflective assessment* of your work in the course. You should reflect on your knowledge of the mathematics, research on how students learn, and implications for teaching with regard to NCTM 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 **December 3**. The complete portfolio is due on **December 10.**

6. 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.

7. 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

9/10/2011 10:00 – 12:30 ON-CAMPUS FULL-COHORT SESSION	**Class Activities:** Complete RBS pre-assessment. Engage in Task One: Building Towers, 5-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.
Week One 9/10/2011 ON-LINE	**All teachers implement Task 1 (Beginning with Building Towers, 4-cubes Tall) in their classrooms between 9/12 and 9/20.** **On-line Activities:** Respond to the guiding questions to be posted online for engagement in threaded discussion about the various towers problem-solving tasks and related videos and readings. **Assigned Reading:** 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. **Videos:** Stephanie and Dana, grade 2 and 3 and Guess My Tower clips from Grade 5
Week Two 9/16/2011 ON-LINE	**A reminder for all teachers to implement Task I in their classrooms between 9/12 and 9/20.** **In-school activities:** Implementation of Towers problems in teachers' classrooms. Instructor and other class participants will share in Lesson Study implementation with teacher(s) in one of the districts **during the school days before the regional meeting on 9/20**. If possible, teachers from all three districts will be released to observe and debrief. **On-line Activities:** Respond to the guiding questions to be posted online for the threaded discussion about the various towers problem-solving tasks and related videos and readings. **Assigned Reading:** 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. **Videos:** Guess My Tower clips from Grade 5 - especially Milan Shares His Inductive Argument
9/20/2011 FIRST REGIONAL GROUP MEETING	**Group Activities:** Share classroom experiences and student work from Task I. 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.
Week Three 9/23/2011 ON-LINE	**All teachers implement the Pizza tasks in their classrooms between Sept 20 and Oct 14. Hopefully, during two sessions.** **Study Video**: Brandon Invents Isomorphism Share observations/ impressions of video. **On-line Activities:** Respond to the guiding questions posted online for engagement in threaded discussion about the assigned readings and videos. **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.*
Week Four 9/30/2011 ON-LINE	**Reminder for all teachers to complete the first Pizza Task implementation in their classrooms between Sept 20 and Oct 7.** **In-school activities:** Instructor and other class participants will share in Lesson Study implementation with teacher(s) in one of the districts during the **week of 10/10**. If possible, teachers from all three districts will be released to observe and debrief. **Online Activities:** Respond to the guiding questions to be posted online about student work and implementation experiences from Task 2: the Pizza problems. **Reading about Lesson Study** 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.*

Week Five 10/7/2011	**Teachers should complete the implementations of the Pizza Tasks.** **Study Videos**: PUP Pizza segments. Share observations/ impressions of video in on-line discussion. **Assigned Reading:** 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.
Week Six 10/14/2011	**Teachers should complete the second Pizza Task implementation before the October 18 regional meeting.** Reading Assignment: Ginsburg, H. (1997). Not a cookbook: Guidelines for conducting a clinical interview. In H. Ginsburg: *Entering the Child's Mind.* Chapter 4.
10/18/2011 SECOND REGIONAL GROUP MEETING	Share classroom implementation experiences and student work from Task 2. Engage in Task 3: Either Building 3-tall towers, selecting from 3 colors, and extension problem, Ankur's Challenge. Or (alternatively) 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**.
Week Seven 10/21/2011 ON-LINE	**All teachers implement Task 3 in their classrooms between Oct 18 and November 15.** **On-line Activities:** Respond to the guiding questions to be posted online for engagement in threaded discussion about the assigned readings. **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. Or 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

Week Eight 10/28/2011 ON-LINE	**Reminder for all teachers to implement Task 3 in their classrooms between Oct 18 and November 15.** **In-school activities:** Instructor and other class participants will share in Lesson Study implementation with teacher(s) in one of the districts during the **week of 10/31 or 11/7**. If possible, teachers from all three districts will be released to observe and debrief. **Online Activities:** Respond online to guiding questions about the implementations and student work from the first two tasks – especially in preparation for interviewing.
Week Nine 11/4/2011 ON-LINE	**Reminder to implement Task 3 in your classrooms between Oct 20 and November 15.** **Online Activities:** Respond online to guiding questions about the implementations and student work from all three tasks. **Video: (depending on problem selection):** Romina's Proof or Taxicab clips
Week Ten 11/11/2011 ON-LINE	**Select student(s) for individual task-based interview – review their work and your notes from the tasks – and prepare interview for discussion at 3rd regional meeting.**
11/15/2011 THIRD REGIONAL GROUP MEETING	**Group Activity:** Share classroom experiences and student work from Task III. Share progress and ideas about individual interviews. Discuss guidelines for preparing final project portfolios for December 3rd on-campus meeting. **Assignments –** Guidelines to be posted for preparing final projects and reflective narratives. Begin work on final project and reflective narrative.
Weeks 11 & 12 11/19 & 26 ON-LINE	**Assignment:** Preparation of final project, including the interview and your analysis of it and your reflective narrative. Complete on-line post-assessments.
Week 13 12/3/2011 **SATURDAY SESSION**	**Class Activity:** Sharing of Final Projects. **ALL ON-LINE POST ASSESSMENTS ARE DUE**
Week 14 12/9/2011	**FINAL PORTFOLIO PROJECT and REFLECTIVE NARRATIVES DUE!** **These should be submitted both electronically and as hard copy –**

	remember to include representative student work!

Notes about reading assignments:

Primary reading assignments come from:

Maher, C. A., Powell, A. B. & Uptegrove, E. (Eds.), (2010). *Combinatorics and reasoning: Representing, justifying and building isomorphisms*. New York: Springer Publishers. Information will be forthcoming about the possibility of purchasing this volume as an eBook from Springer Publishing Company.

Additional assigned readings will be announced and made available through the eCompanion site for this course.

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 emoticons such as :-) or ;-) to let others know that you're being humorous.