
Adapting Lesson Study for Community College Mathematics Instruction

Diana E. Cruz, Community College Research Center
Jacqueline Raphael, Education Northwest
Michael R. Price, Clackamas Community College

CCRC COMMUNITY COLLEGE
RESEARCH CENTER

TEACHERS COLLEGE, COLUMBIA UNIVERSITY



education
northwest



Clackamas
Community College

Adapting Lesson Study Project

- Can *Lesson Study*, a form of professional development that has shown promise in K12 settings, be adapted for use in the community college context?
- What are math faculty experiences with Lesson Study?
- Does the model show promise for improving teaching and student learning?

Oregon's Math 98

“Math 98, Quantitative Literacy, is a rigorous mathematics course that is designed to be part of an alternate pathway from the traditional algebra track. Rigor implies that students display conceptual understanding and procedural fluency while working on authentic applications.”

Five major course topics:

1. Applied Number Sense
2. Applied Algebraic Reasoning and Modeling
3. Graphical Sense
4. Measurement
5. Statistical Reasoning



Reforms to Developmental Education

Structure

Structural
reorganization of instructional time and delivery (e.g., co-requisite).

Curriculum

Curricular
rationalizing and refining content (e.g., math pathways).

Pedagogy

Pedagogical
changes to teaching (e.g., student-centered activities, metacognition).

Project Activities

- Three community college teams participate in four cycles of Lesson Study with support from experts at Education Northwest
- CCRC researches feasibility and faculty experiences and collects formative data on student learning and outcomes



This project is supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A170454 to Teachers College, Columbia University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

**To what extent do faculty
have opportunities to
collaborate on improving
instruction?**

Many survey respondents report limited exposure to professional development focused on mathematics instruction

15%

No professional development in the last year

14%

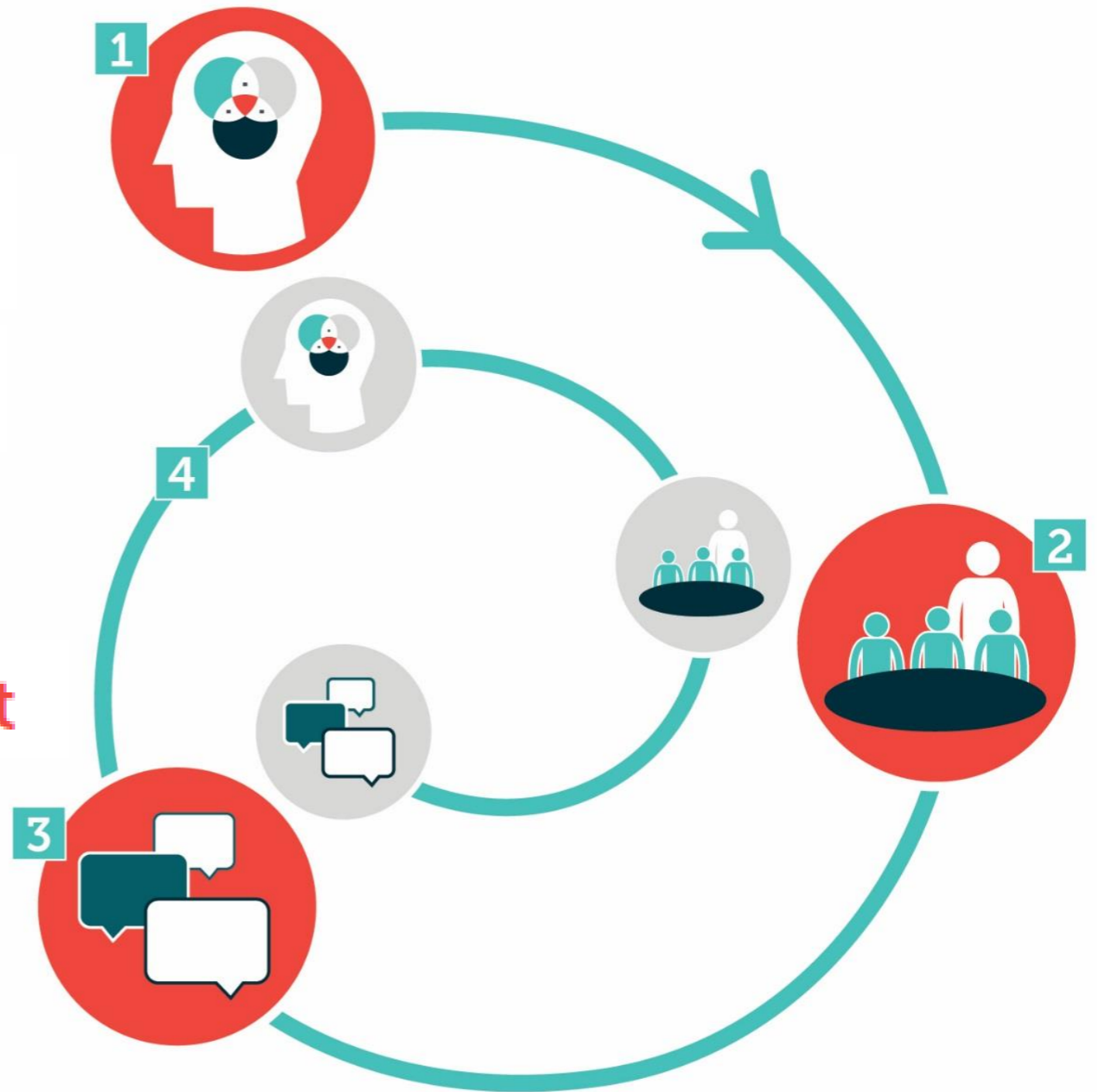
No mathematics professional development

33%

Less than five hours of mathematics professional development

Lesson Study

- 1 Plan**
- 2 Teach and Observe**
- 3 Debrief**
- 4 Revise, Reteach, Reflect**



Plan



- What qualities do we hope to strengthen in students?
- What topics are challenging for students to learn or difficult for faculty to teach?
- What lessons cover a concept critical to the topic? What sequence will help them develop the desired understanding?



Teach and Observe



- What do the observation data reveal about student understanding and learning?



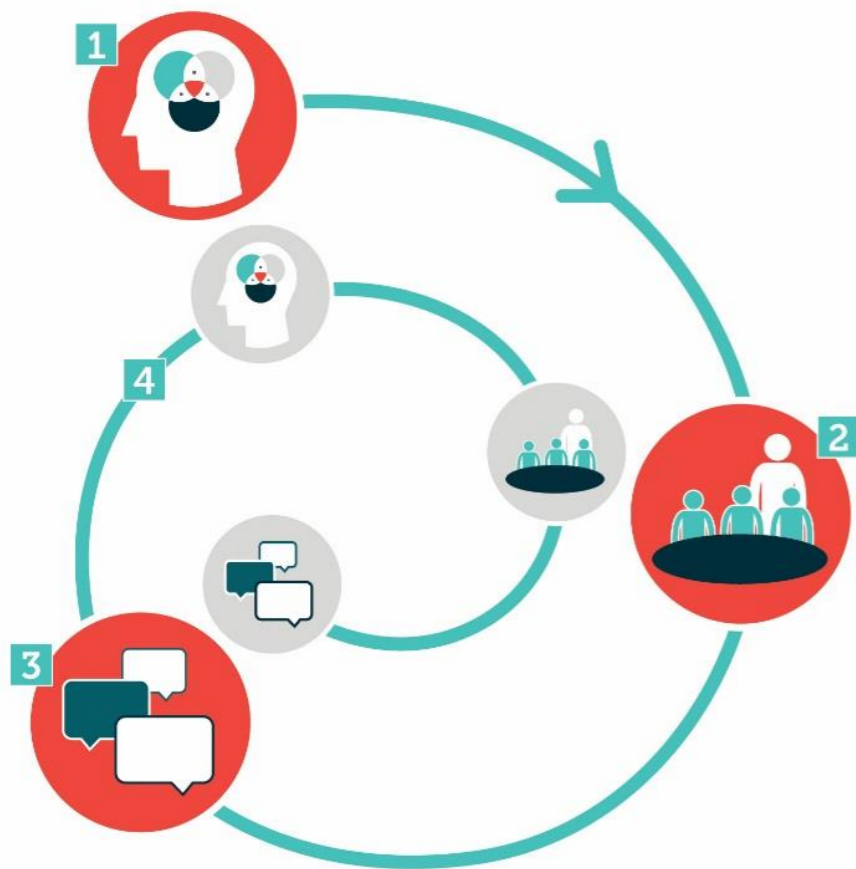
Debrief



- To what extent were the goals of the lesson achieved? What aspects of the lesson contributed to student learning?



Revise, Reteach, and Reflect



- How can the lesson help students more effectively reach the goals?
- Did the revised lesson bring about the desired changes?
- What did we learn that can be applied more broadly to our professional practice?



Simulation

- In small groups, designate one “observer” and have others be “students.”
- While the students discuss and work on the task, the observer takes notes on how students use the materials and the reasoning they employ during the tasks.



Simulation

- **Students:** You will be given a physical manipulative.
- Use this materials to estimate percentages.



Debrief



1. Instructor's Reflection

3. General Discussion

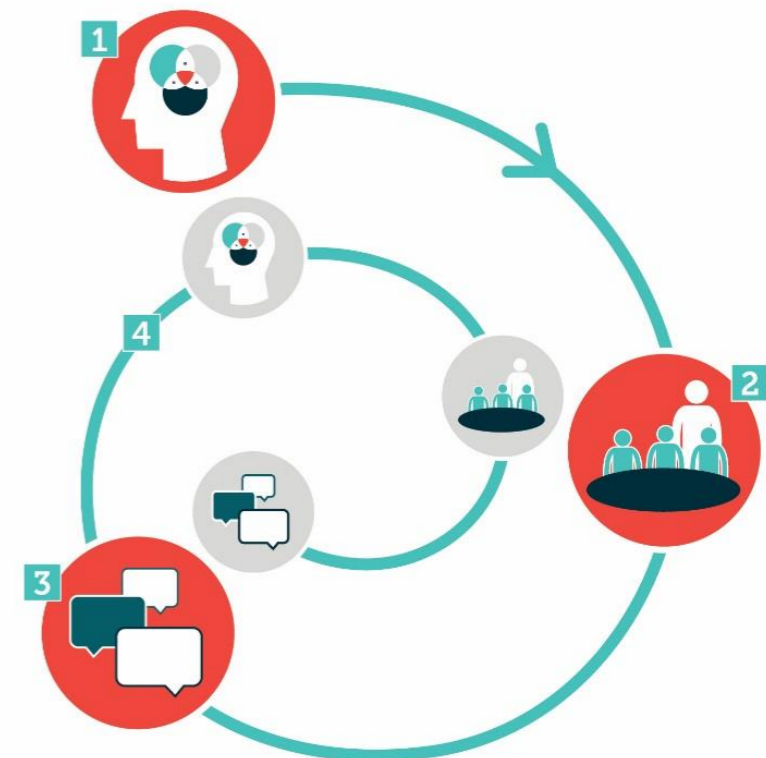
2. Share Observational Data

4. Final Commentary



Planning at Clackamas

- Research theme: How do students develop and recognize their willingness to engage in mathematics? **Curiosity, Persistence, Confidence**
- Topic: Finding percentages using partitioning and iterative techniques
- Student learning outcome:
 - Students will be able to use a partitioning strategy in order to find 20% of uncountable object.
 - Students will not feel afraid and will feel like they have a way in.
 - Students will explore percentages with the manipulatives provided



Teaching at Clackamas

Planning

| Time | Learning Tasks and Activities, Key Questions | Anticipated student responses | Instructor Support | Assessment |
|------|---|--|---|--|
| | <ul style="list-style-type: none"> • Pose Questions • Give Task • Activity • Group Work • Class Discussion | <ul style="list-style-type: none"> • List here possible ways students respond to the task or questions asked • This would include common or anticipated misconceptions | <ul style="list-style-type: none"> • Scaffolding for students who are struggling with misconception without taking away from the cognitive demand • Modeling students methods or strategies for other students • Deeper questions for higher-achieving students. | <ul style="list-style-type: none"> • What are you looking for to show that students are achieving the goals of the lesson? • Look for how students explain or justify their reasoning. • Are there still misconception? |

Teaching at Clackamas

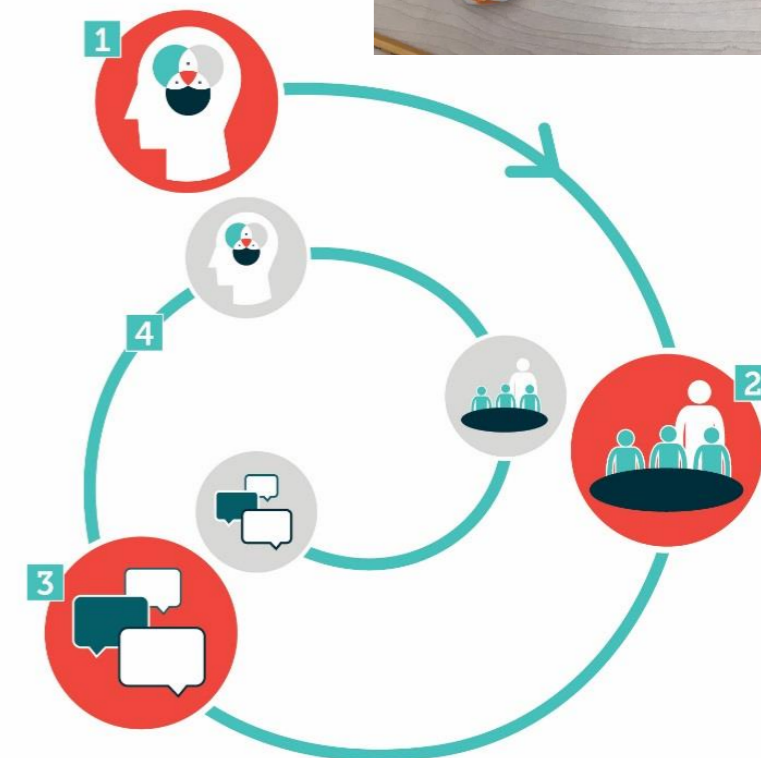
Anticipated student responses:

1. Divide into 10ths, take two
2. Divide into 5ths
3. Divide in half, then in half, then a little less
4. Pulls off a little piece
5. Two groups of 100 and take 20 from each group, two groups, take the same amount from each



Anticipated student responses from other parts of the lesson:

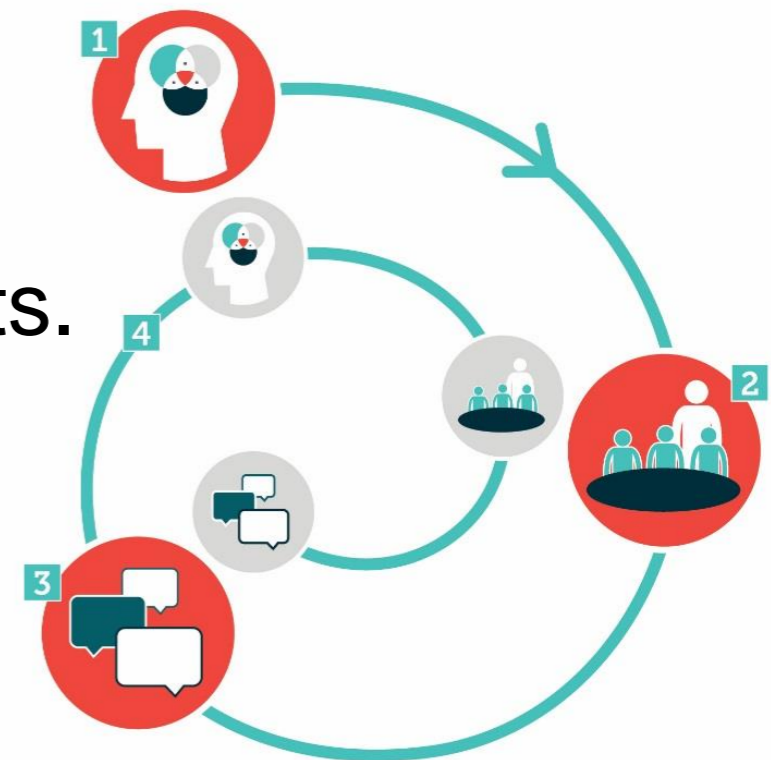
1. Counting and using calculator, decimal, multiply by .2, some have percent keys
2. Use Google



Teaching at Clackamas

Things I learned from Lesson Study so far:

- Power of lesson centered observation
 - Specifically how student engage, reason, and conceptualize the topic.
 - Make sure this is not a peer evaluation
 - “developing the eyes to see students”
- Lesson collaboration is hard but awesome!
- Helps me avoid the defect model of thinking about developmental math students.

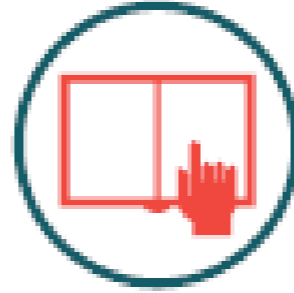


Underlying Principles of Lesson Study



DEVELOP AND SUSTAIN A COLLABORATIVE LESSON STUDY TEAM

- Establish purpose and long-term goals
- Articulate and attend to collaboration norms
- Maintain an inquiry focus on student learning



STUDY RESEARCH AND APPLY EVIDENCE-BASED PRACTICES

- Explore research literature on student development of mathematical understanding
- Investigate instructional approaches aligned with evidence-based practices



GENERATE AND SHARE PROFESSIONAL KNOWLEDGE

- Synthesize and document lessons learned
- Consider broader application for teaching practice
- Share knowledge with the field





Reimagining Developmental Education

How can we do better for our students?

SAVE THE DATE

November 21–22, 2019
New York City, NY

Sign up for announcements at
postsecondaryreadiness.org

CAPR |

CENTER FOR THE ANALYSIS OF
POSTSECONDARY READINESS

CCRC COMMUNITY COLLEGE
RESEARCH CENTER

TEACHERS COLLEGE, COLUMBIA UNIVERSITY

 education
northwest

 **Clackamas**
Community College

