Representing and comparing fractions in elementary mathematics teaching

1

Four elements (strands) of content

- Mathematics geared to the demands of teaching
- Student thinking about mathematics
- High-leverage mathematics teaching practices
- Approaches for systematically learning from and improving teaching

2

Distinctive features of the module

- Experiences that integrate the four elements of module content
- Content that is applicable across grade levels and strands of mathematics
- Examples from elementary classrooms and professional development sessions
- Activities that connect professional development content with classroom teaching

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Specific module content

- Mathematics geared to the demands of teaching
- Student thinking about mathematics
- High-leverage mathematics teaching practices
- Approaches for systematically learning from and improving teaching

4

Module content

- Mathematics: fraction representation, definition, comparison, and equivalence
- Student thinking: students' ideas about and approaches to working with fractions
- Teaching practice: practices of using representations in classroom teaching
- Learning from practice: processes for documenting and analyzing images of "public recording space" to improve practice

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Overview of Session 1

- Studying an example of mathematics teaching
- Equivalence in mathematics

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Studying mathematics teaching

- Records of practice
- Close attention to talk, student thinking, teacher's moves and comments
- Detail and evidence
- Learning to see and hear practices of teaching

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Video clip from a third-grade lesson on fractions

- Third graders (8 year-olds)
- Early May (three weeks into a five-week fractions unit)
  - Emerged from study of division (problems with remainders)
  - Single objects as the whole (cookies, brownies, graham crackers)
  - Drawings (rectangles, circles)
  - Sets of objects as the whole (boxes of crayons)
  - Number line
  - Mapping one representation onto others
- Diverse classroom, many English language learners

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Which is more –

$$\frac{4}{4} \text{ or } \frac{4}{8} ?$$

What might third graders think, and why?
How might they explain it?

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Focus questions

- What mathematical issues do you see arising?
- What do you notice about the role or practices of the teacher?
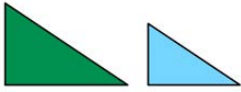- How do students think about the problem?

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Third-grade video – comparing $^4/_4$ and $^4/_8$

What representations were students using to compare fractions?
What other representations could they have used?
What would using those representations involve?

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Possible instances of equivalence in mathematics

42 40 + 2 30 + 12	
$\dfrac{2}{5}$ $\dfrac{4}{10}$	3(x + 4) 3x + 12

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Classroom Connection Activities

"Professional homework" designed to:
- Connect professional development content with classroom teaching
- Support feedback on teaching
- Extend thinking about the content of previous sessions
- Preview the content of later sessions

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Summary

In this session, you began to work on:
- Studying mathematics teaching
- Equivalence in mathematics

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