The Policy Context and the Implementation of Reform:

Connecting Professional Education to Professional Practice

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Connecting Two Big Problems

- How to get more “hands-on” “inquiry-based” science instruction in classrooms
- How to help teachers learn to teach in these ways

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Overview

- Problems of teacher education

An alternative perspective:

- What is teaching and what does it take to get better at it?
- What might be involved in learning *in and from practice*?

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1. What are central problems of teacher education?

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Central problems of teacher education

- Teachers' lack of content knowledge
- Disconnection from practice
- Weak impact compared with years of experience as student and in schools
- Lack of time
- Lack of professional "curriculum"

Taking an alternative perspective on the problems . . .

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2. What is teaching and what does it take to get better at it?

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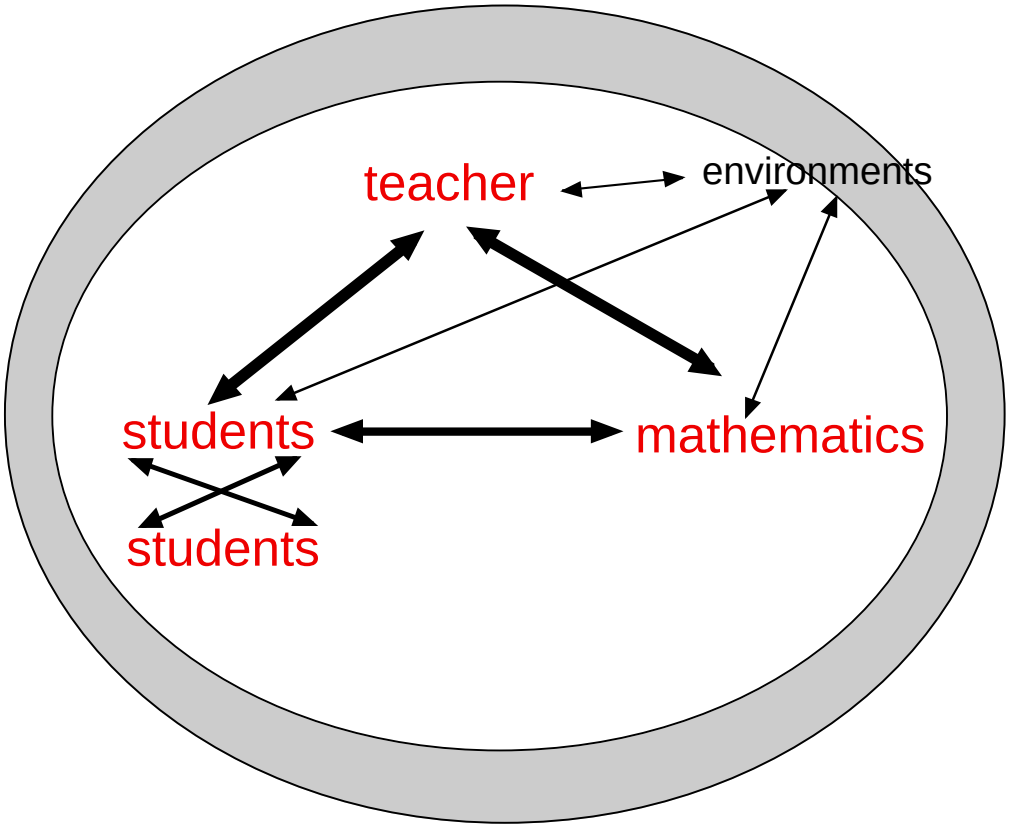
A set of premises about teaching and about learning the practice of teaching

- Learning teaching occurs mostly from experience.
- Experience is often a poor teacher.
- Teaching is a practice, not merely a domain of knowledge.

- Needed are forms of "harnessing" practice to make learning from experience more possible, both individually and collectively.

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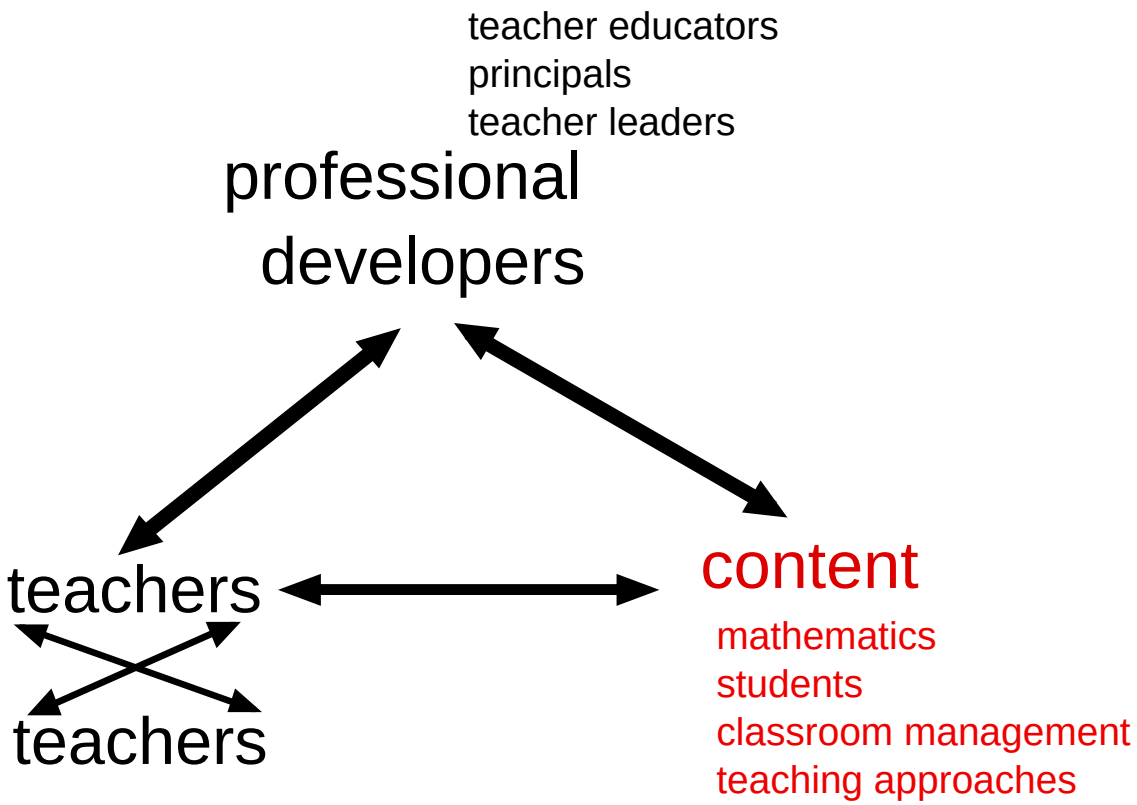
Teaching is a complex practice, not just a domain of knowledge.



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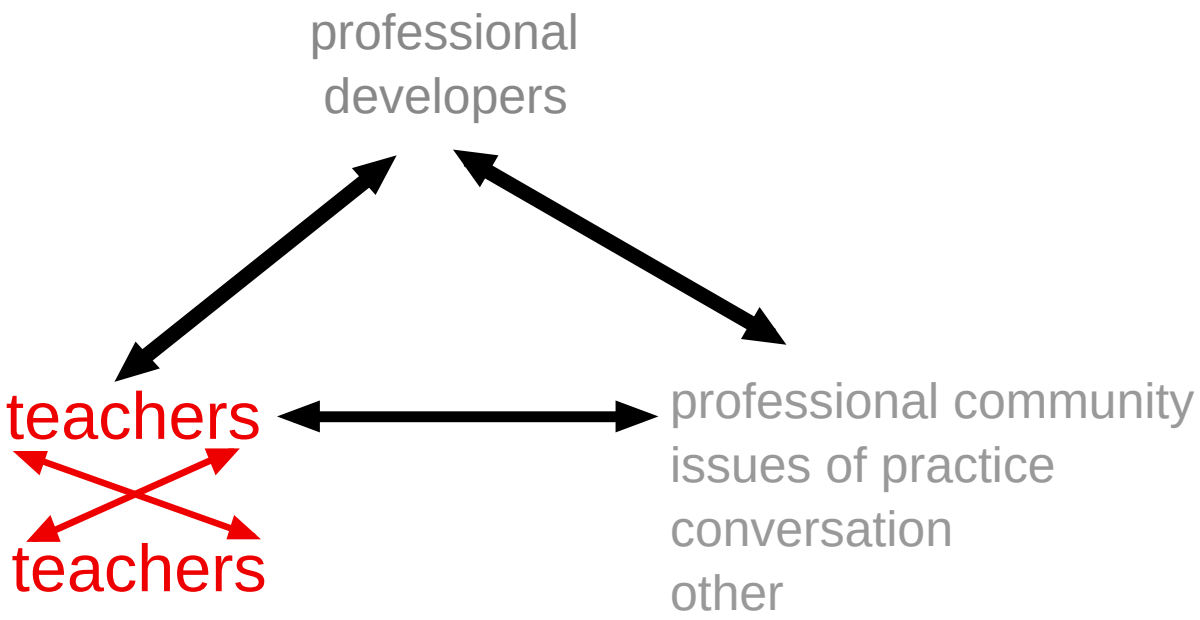
Three perspectives on teachers' professional learning

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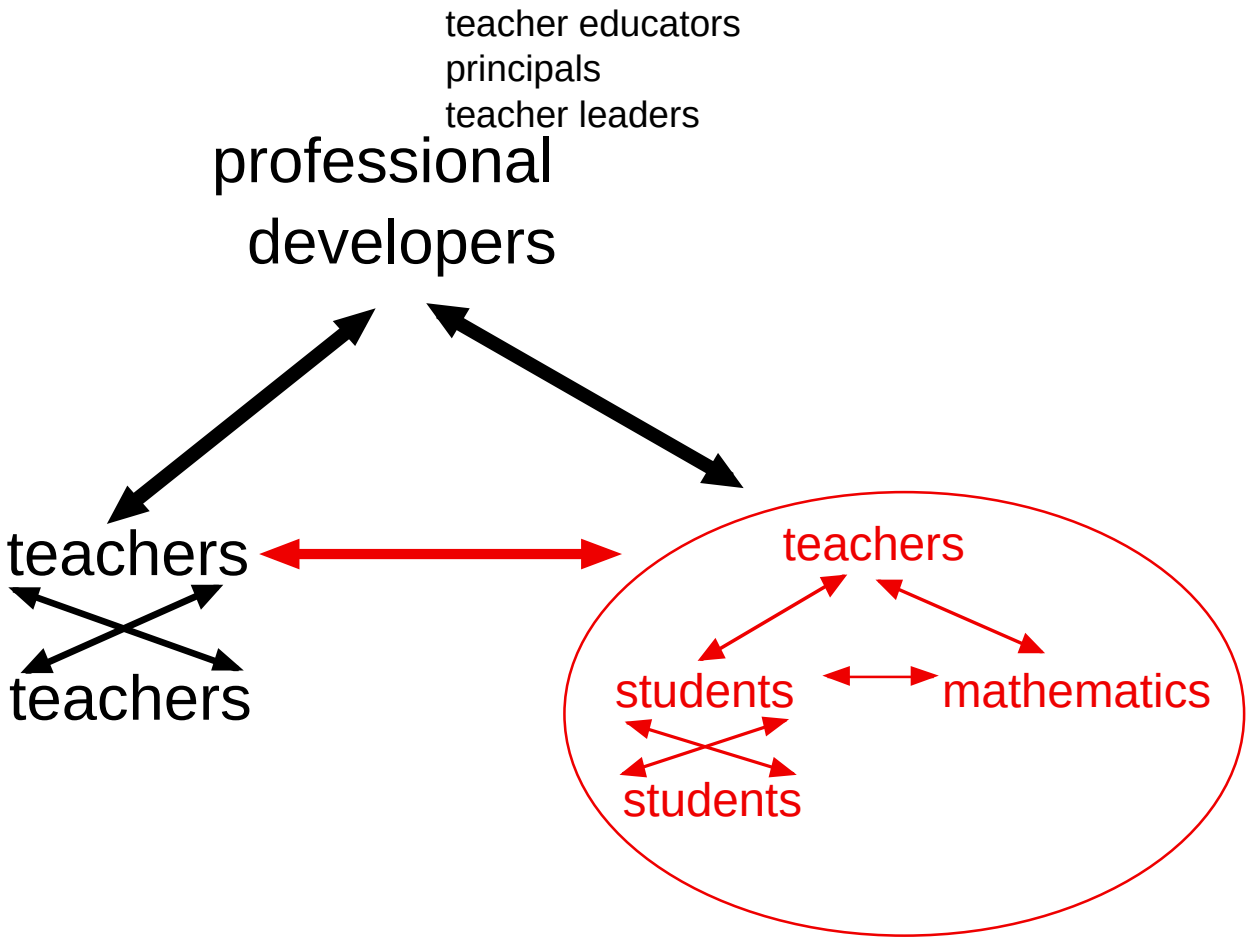
Learning by acquiring new knowledge

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Learning through collegial interaction

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Learning in and from practice

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3. What might be involved in learning and from practice?

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What are examples of "harnessing" practice?

- Case studies
- Records of practice (video, student work, teacher notes, lesson plans, assessments)
- Lesson study
- Problems of practice

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Professional learning: Working on problems of practice

- Listening to and interpreting students' ideas
- Deciding which ideas to take up and in what ways and on what role to play in a discussion
- Sizing up where you are in the larger mathematical territory
- Considering particular children
- Unpacking the mathematics
- Considering the mathematical implications and connections
- Deciding what to do next

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Example #1:

MAKING DECISIONS ABOUT WHAT TO DO WITH STUDENTS' MATHEMATICAL IDEAS IN A DISCUSSION

Subtraction

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Write number sentences for 10.

8 + 2 = 10

99 - 89 = 10

What mathematics is involved in this problem?

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Studying a segment of practice

Write number sentences for 10.

- Listening to and interpreting students' ideas
- Deciding which(and whose) ideas to take up and in what ways
- Deciding how much to insert yourself into a discussion
- Sizing up where you are in the larger mathematical territory
- Deciding what to do next

- Shea's claim: "There are 11 solutions."
- Rania: "I want to prove that his answer is right."
- Bernadette disagrees: "The answers go on forever."
- Lin cites her mother: "50 ÷ 5 = 10" but cannot explain

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Example #2:

LEARNING MATHEMATICS IN THE CONTEXT OF LEARNING TO SOLVE MATHEMATICAL PROBLEMS OF TEACHING

Multiplication

Generalization

Decimals, order

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Which of these students is using a method that could be used to multiply any two whole numbers?

Student A	Student B	Student C
35 x 25 125 +75 875	35 x25 175 +700 875	35 x25 25 150 100 +600 875

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Suppose you wanted to find out if your students understand how to put decimal numbers in order.

Which of the following lists of numbers would give you the best evidence of students' understanding ? Why?

A.	**.5**	**7**	**.01**	**11.4**
B.	**.60**	**2.53**	**3.14**	**.45**
C.	**.6**	**4.25**	**.565**	**2.5**

D. Any of these would work well for this purpose. They all require students to read and interpret decimals.

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What does the study of practice afford?

- provides common context for teachers' learning
- offers "texts"of practice that can be examined, analyzed
- places professional learning in the context of practice
- ensures that subject matter knowledge generated is useful for and usable in practice
- can provide exposure to practices that teachers have not seen or do not know
- can develop teachers' abilities to learn in and from their own practice (practices of learning teaching)
- select particular problems of mathematics (or science) teaching and learning to work on

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