Selections (including RealAudio sound files and PDFs) are available on the web at:
http://www4.nas.edu/pga/math.nsf

Slides from this presentation available at
http://www-personal.umich.edu/~dball

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Lesson Study: Harnessing Practice as a Medium for Professional Learning

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Overview of session

- Introductions
- Conceptual framework: Learning from experience and the study of practice
- Background about US-Japan workshop
- View and discuss video segment from Japanese 6th grade lesson
- View and discuss video segment of post-lesson discussion
- Since Japan: Influences and follow-up
- Questions

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A set of premises about learning the practice of teaching

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

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

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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

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How do teachers in Japan and the U.S. use practice to work on their teaching?

- What do teachers do?
- What do they work on?
- What do they use to work on this?
- Who works with teachers, and what do they do?
- What do teachers seem to learn, and how do they learn that?

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Japan-U.S. workshop

- August 2000 in Japan
- 80 educators from Japan and U.S.
- Supported by MSEB, USNCMI, ICME-10 organizers, NSF

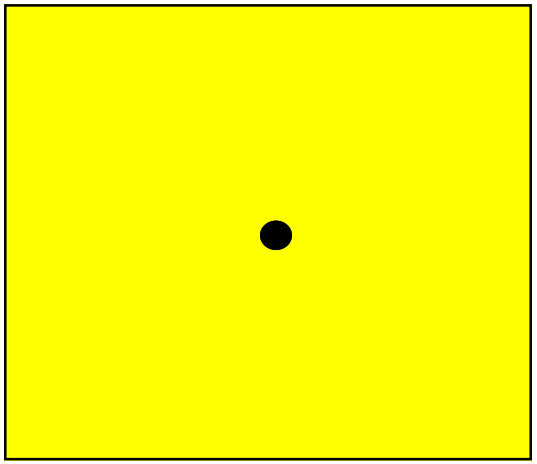
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What does the study of practice afford?

- 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 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)
- can select particular problems of mathematics teaching and learning to work on

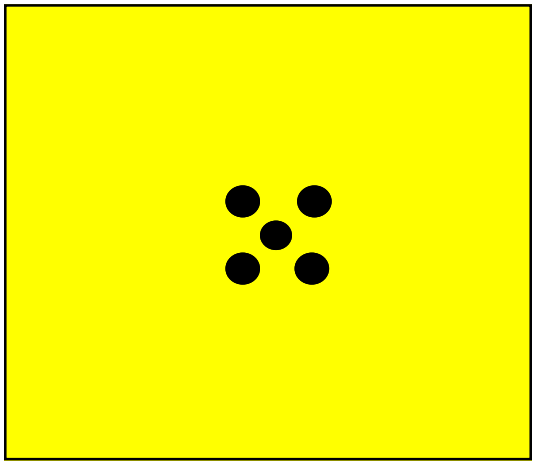
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Kurosawa-sensei began the lesson by posting a yellow sheet of paper with a single black dot on the blackboard:



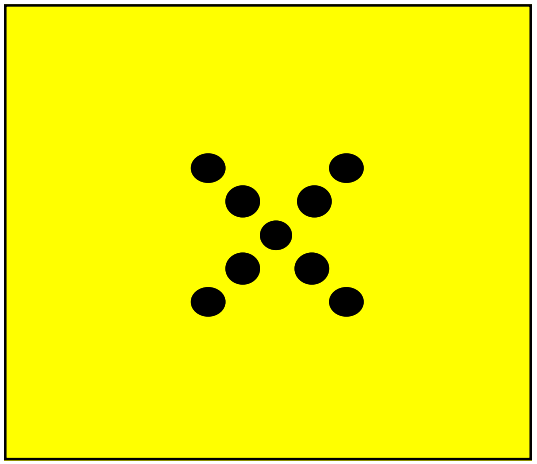
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He then posted another sheet with five black dots:



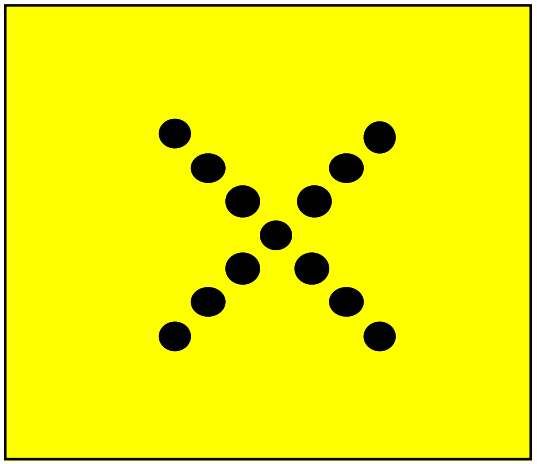
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This was followed by a sheet with nine black dots:



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And finally, there was a sheet with thirteen black dots:



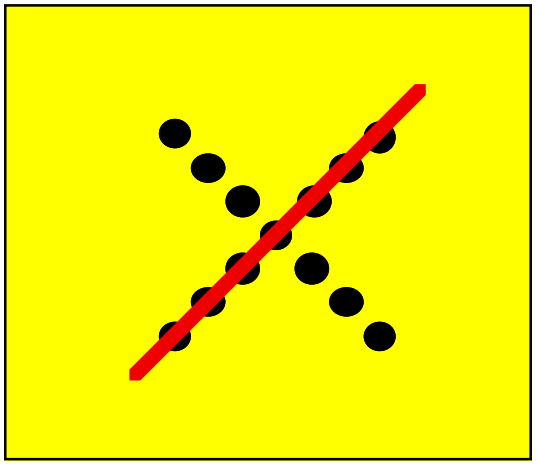
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Kurosawa-sensei asked students, “What is the subject of ‘growing’? *What* is growing?

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Students came up with a variety of responses:

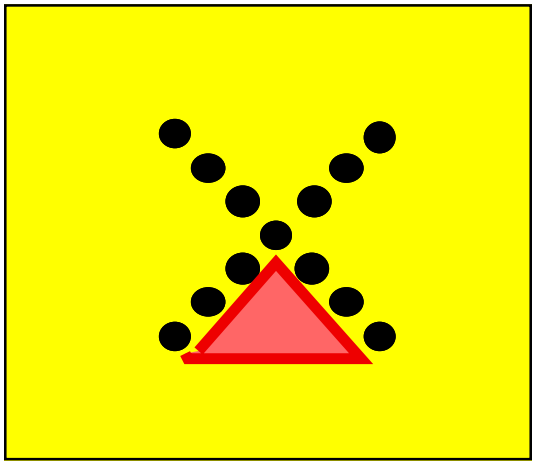
The line is getting longer--



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Students came up with a variety of responses:

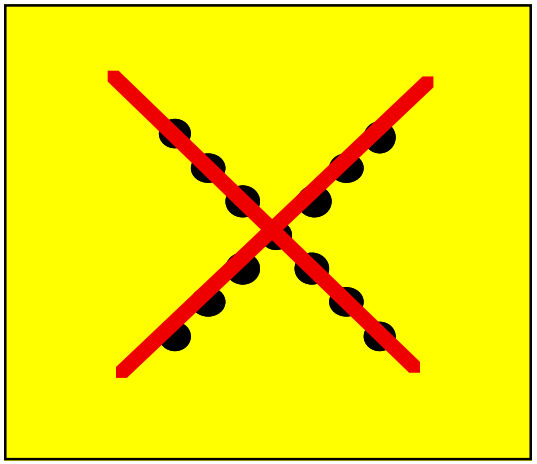
The triangular area is getting larger--



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Students came up with a variety of responses:

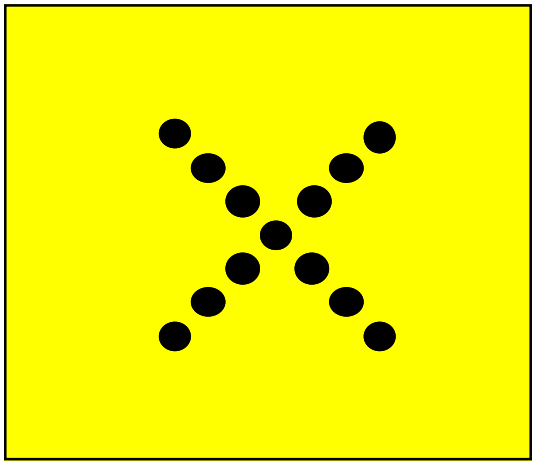
The size of the cross is getting bigger--



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Students came up with a variety of responses:

The number of black dots is growing--



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After approximately 10 minutes of discussion, Kurosawa-sensei posed the same question again…

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A: 48 x 4 +1? **B: 4 x 48 + 1?**

C: 1 + 4 x 48

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Goal 1: "…to run the class in such a way that the students come up with the math questions by themselves."

Goal 2: "…to teach the students the concept of a function."

Goal 3: "…to teach the students how to read and understand the equation that represents how things change."

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The proceedings of the U.S.-Japan Workshop, *Studying Classroom Teaching as a Medium for Professional Development* can be ordered by writing to The Mathematical Sciences Education Board (mseb@nas.edu)

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Discussion of Two Japanese Video Clips
Monday, April 22, 2002
NCTM Annual Meeting session

These notes were taken on participants' comments in the session.

a) Comments on 6th grade lesson

1. When the students worked, were they allowed to talk with their neighbors?
2. He showed the commutative property of multiplication in a very wonderful way.
3. The kids made a distinction between the multiplier and the multiplicand. They saw the importance of the difference.
4. The "caution points" idea was interesting: One was when they ended up with the three different expressions or forms of the solution.
5. Surprising that after presenting the problem, he asked them to interpret the "growth." Took the time to ask students what the problem meant.
6. Wait time was apparent; we often feel pressure to cover content, but the wait time here increased the level of accountability.
7. Great visual representations at the end to represent the solution.
8. Teacher never told them a method, but elicited from students what they should do, what to do next, etc.
9. The students clarified the distinction among the expressions because they generated them.
10. Interesting to pose one problem and get so much out of one problem in a class period. This is very different from what we typically do where we cut to the chase so fast and do more problems and assume that students understand.
11. The virus analogy was inappropriate because it grows exponentially, not linearly. One of the kids noted this, but he went on.
12. There was a lot of self-esteem in the room.
13. Students' contributions were labeled on the board.
14. He allowed for risk-taking.
15. Recording permitted students to go back to and refer to as the lesson went on.
16. There was a sequence of the development of students' thinking across the lesson. They were ready for the steps near the end because of this, a planned anticipation of what the students would do at the end: produce the generalization.
17. The teacher had to do and understand the mathematics himself to be able to do this with students.

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18. After the students created the problem, one student had an answer and he did not allow an instant response—he insisted that they work on the problem.
19. He involved them in mathematizing the problem which added meaning because they were involved in framing the problem.

b) Comments on Japanese educators' discussion of the 6th grade lesson

1. The commentators were knowledgeable about the mathematics.
2. In spite of the fact that they were knowledgeable, they were willing to say that they did not know how to elicit more skillfully from students.
3. The teacher's invitation for reactions and opinions. Is that a culturally important step to invite criticisms and reactions?
4. The observing teachers felt free to raise questions and offer alternatives, rather than holding back and worrying about the teacher's feelings. Not treated so personally.
5. Interesting -- the process of the observers making so many comments before the teacher had a chance to respond.
6. High degree of respect and also great humility by all involved.
7. Impressed with the detail; considering specific phrases of the teacher and the students. Analyzing how the discussion might have gone differently if slightly different things had been said.
8. If we were able to do this more often, we would experience bigger changes in our own teaching.
9. Analyzing a lesson was an ingrained process, rather than a performance. Not an evaluation. No authority issues entangled here.
10. Was eliciting student thinking a goal that all the teachers were working on specifically? Were the other teachers working on that?
11. In observing all of this, we usually act individually here and rarely do we cooperate and work together to create better lesson plans and evaluate how they work and improve the lessons as part of the process.
12. The content of their questions was different than what US teachers seem to talk about – more mathematics.
13. Sometimes in regular team meetings, we don't use that time well. We could do some of that here.

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