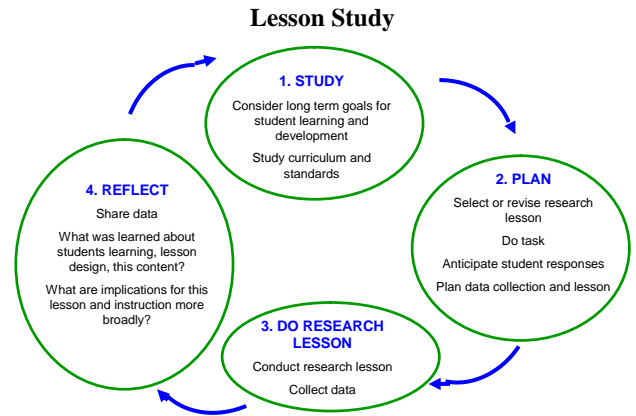


## Lesson Study in North America Progress and Challenges

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## Areas of Growth in U.S.

- Interest
- Resources and Tools
- Proof of Effectiveness

## Progress 1: Growth of Interest

- 1999: 0 sites
- 2004: 32 states, 150 lesson study clusters/ groups, 2300 teachers
- Listserves with 900+ members
- Many public research lessons

Source: [www.tc.columbia.edu/lessonstudy/timeline.html](http://www.tc.columbia.edu/lessonstudy/timeline.html)

Until lesson study we never discussed the value of the content being taught. ...Never had those discussions involved...problem-solving techniques, how to develop a particular concept...what to expect for outcomes.

Lesson Study Communities Teacher (EDC), Massachusetts

I like stretching my own brain.

*Teacher from San Mateo, California*

Being able to talk together as a whole group is such a big part of lesson study... you're not just going down this little road of your own.

*Teacher from North Marion Middle School, Oregon, NWREL  
Collaborator*


## Progress 2: Tools and Resources

- Video of US & Japanese lesson study  
[www.lessonresearch.net\\_globalresources.com](http://www.lessonresearch.net_globalresources.com)
- Lesson Study Books & Handbook  
[www.rbs.org](http://www.rbs.org)
- Articles, reports
- Protocols at websites

This DVD shows excerpts from a lesson study cycle that occurred during a 10-day summer workshop on lesson study and algebra.

During the first days of the workshop, teachers solve and discuss algebra problems, study state mathematics standards, and identify elementary-grade concepts critical to students' subsequent success in algebra. They study several existing lessons and choose one as the basis for their research lesson, taking it through two cycles of planning, teaching, observation, and reflection.

Although lesson study is sometimes portrayed as a way to "cook" lessons, their work focuses not just on improving the lesson, but on deepening their own understanding of mathematics, of students, and of teaching.



**HOW MANY SEATS?**  
Lesson Study  
© Catherine Lewis 2004  
for Mills College Lesson Study Group

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This material described and presented in this video is based on research by the National Science Foundation under grant REC-0207259.

Any opinions, findings and conclusions or recommendations expressed in this video are those of the authors and do not necessarily reflect the views of the National Science Foundation.

A series of three lessons taught by Akihiko Takahashi to fourth-graders in the San Mateo Foster City School District, California. The three lessons (abridged) provide hands-on problem solving activities in which students extend their existing knowledge and build a foundation for finding formulas for the area of a parallelogram, a triangle and a trapezoid.

Using geoboards and the concept of equivalent-area transformation students begin to develop formulas for finding area.


**Mathematical highlights:**

- Equivalent area transformation, using geoboards
- Problem-solving that builds student concepts of area

**Pedagogical highlights:**

- Using challenging open-ended problems
- Helping students see common properties among pairs' solutions
- Helping students look at their own solutions from other perspectives
- Developing logical reasoning by comparing solutions and making conjectures

**About the instructor:**  
Akihiko Takahashi was an elementary teacher in Japan for 28 years before becoming an educator of mathematics teachers. During his elementary teaching career, he was nationally active in mathematics lesson study and mentored 200 pre-service teachers. In 2002, he received his Ph.D. from the University of Illinois at Urbana-Champaign. His dissertation research focused on interest in mathematics education. He is currently an assistant professor of mathematics education at The Paul University in Chicago.

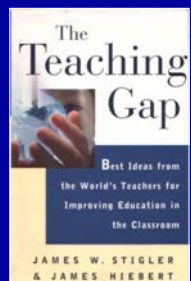


**CAN YOU FIND THE AREA?**  
Third Mathematics Research Lesson

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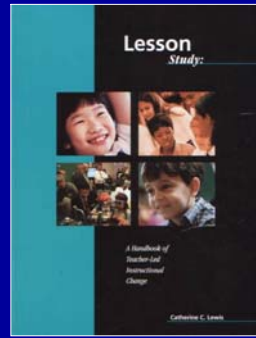
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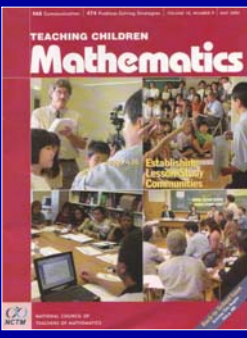
**The Teaching Gap**  
Best Ideas from the World's Teachers for Improving Education in the Classroom  
JAMES W. STIGLER & JAMES HIEBERT

[The Teaching Gap](http://www.lessonresearch.net)  
Stigler & Hiebert (1999)  
The Free Press



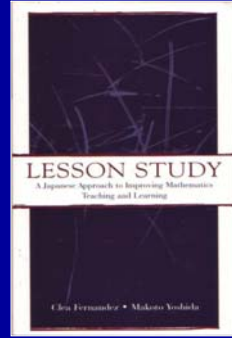
**Lesson Study**  
A Handbook of Teacher-Led Instructional Change  
Catherine C. Lewis

[Lesson Study: A Handbook of Teacher-Led Instructional Change](http://www.lessonresearch.net)  
Lewis (2002)  
Research for Better Schools (RBS)




**TEACHING CHILDREN Mathematics**  
Establishing Lesson Study Communities  
Takahashi & Yoshida

"Ideas for Establishing Lesson Study Communities"  
Takahashi & Yoshida  
[Teaching Children Mathematics](http://www.lessonresearch.net) (2004)  
National Council of Teachers of Mathematics (NCTM)



**LESSON STUDY**  
A Japanese Approach to Improving Mathematics Teaching and Learning  
Cleo Fernandez • Makoto Yoshida

[Lesson Study: A Japanese Approach to Improving Mathematics Teaching and Learning](http://www.lessonresearch.net)  
Fernandez & Yoshida (2004)  
Lawrence Erlbaum Associates, Publishers



**Building Our Understanding of Lesson Study**  
Wang-Iverson & Yoshida (2005)

Research for Better Schools (RBS)  
[www.rbs.org](http://www.rbs.org)

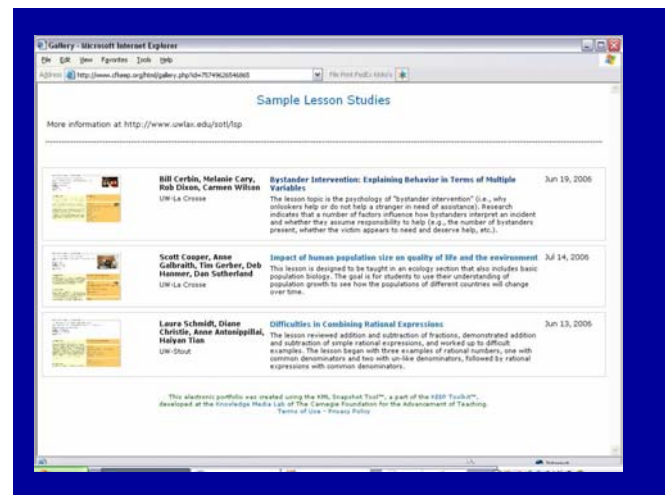
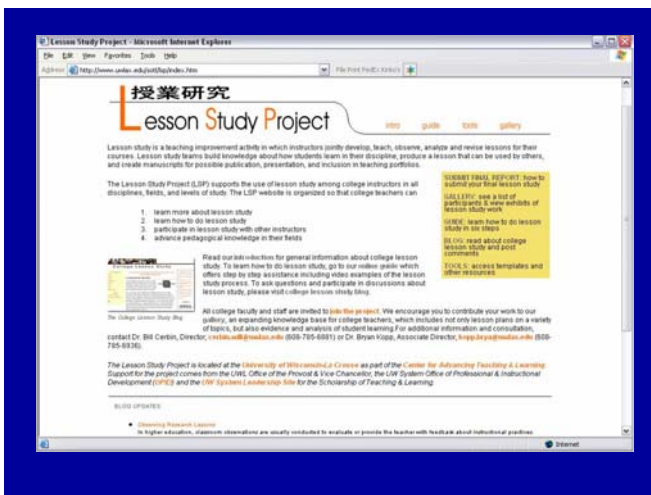
**Too Many Websites to List!**

**Education Development Center**  
[www2.edc.org/lessonstudy/lessonstudy/](http://www2.edc.org/lessonstudy/lessonstudy/)

**Northwest Regional Lab**  
[www.nwrel.org/msec/lessonstudy/index.html](http://www.nwrel.org/msec/lessonstudy/index.html)

**Global Education Resources**  
[www.globaledresources.com/](http://www.globaledresources.com/)

**Univ. of Wisc. Lesson Study Project**  
[www.uwlax.edu/sotl/lsp](http://www.uwlax.edu/sotl/lsp)



## Growth of Websites that Provide Lesson Study Tools & Information

- Mills College Lesson Study Group**  
[www.lessonresearch.net](http://www.lessonresearch.net)
- Research for Better Schools**  
[www.rbs.org](http://www.rbs.org)
- Global Education Resources**  
[www.globaledresources.com/](http://www.globaledresources.com/)
- Teachers College Lesson Study Research Group**  
[www.tc.edu/lessonstudy/](http://www.tc.edu/lessonstudy/)

## Diverse Lesson Study Settings

- Many Levels (university, high school, middle school, preschool)
- Many Subjects (e.g., social studies, second language learning, science, special ed)
- Many Themes (e.g., “accountable talk,” understanding, interest, fluency)

## Progress 3: Proof of Effectiveness

- Lesson Study Cases
- School-wide Lesson Study Site

For any given number of triangles arranged as shown, how many circles are there?

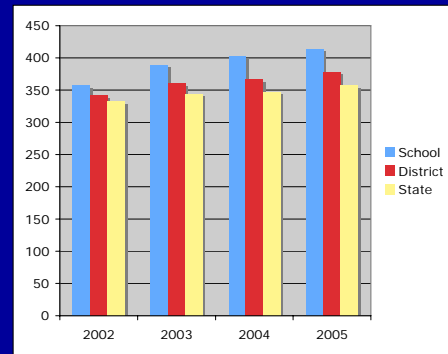
INPUT Number of Triange Tables	OURT Number of Seats
1	3
2	4
3	
4	
5	
6	

## Video Context

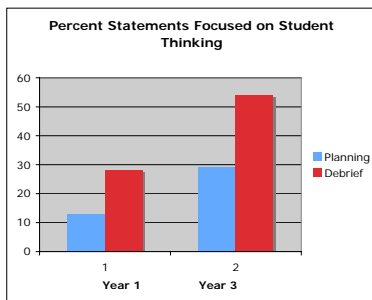
- Voluntary summer workshop
- “Dive-in” lessons
- Plan-teach-revise-teach

## Teachers' Learning

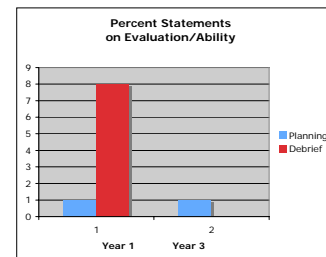
- Distinguish “plus one” and “plus two” pattern
- Connect numerical and geometric patterns
- Consider impact of chart on students
- See importance of student counting methods



Math Scale Scores, State Achievement Test



Schoolwide Lesson Study School



## Challenges in U.S.

1. Access to Rich Mathematics
2. Simplistic Research Models
3. Need to Learn Across Sites and From Japanese Colleagues

## Challenge 1: Access to Rich Mathematics

©Cartoonbank.com



"Big deal, an A in math. That would be a D in any other country."



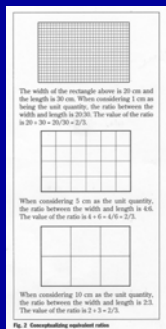
A fourth-grade class needs 5 leaves each day to feed its 2 caterpillars. How many leaves would they need each day for 12 caterpillars?

Answer: \_\_\_\_\_

Use drawings, words, or numbers to show how you got your answer.

(NCTM, 2002)

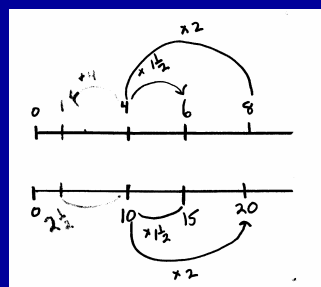
## Asian Aids to Understand Proportional Reasoning



(Lo, Watanabe, & Cai, 2004)

## Ideas from Asian Curricula

- Double number line can summarize methods



## Ideas From Planning

- These methods differ from the standard cross-multiply and divide algorithm

(McDougall Littell, 2004)

**EXAMPLE** Using the Cross Products Property

Use the cross products property to solve the proportion  $\frac{3}{m} = \frac{5}{15}$ .

**Solution**

$\frac{3}{m} = \frac{5}{15}$  Write original proportion.

$3 \cdot 15 = m \cdot 5$  Cross products property

$\frac{3 \cdot 15}{5} = \frac{m \cdot 5}{5}$  Divide each side by 5.

$9 = m$  Simplify.  $m$  is by itself.

**ANSWER** The solution is 9.

**CHECK** You can check the solution by showing that  $\frac{3}{9}$  and  $\frac{5}{15}$  simplify to the same fraction:

$\frac{3}{9} = \frac{1}{3}$  and  $\frac{5}{15} = \frac{1}{3}$ , so  $\frac{3}{9} = \frac{5}{15}$ .

## Challenge 2: Simplistic Research Models

### What Is Good Research Model for Lesson Study?

#### Lesson Study as

- Aspirin?
- Recipe?

OR

- Flexible Learning System With Core Principles?
- Cultural Change



### How does lesson study improve instruction?

#### Visible Features of Lesson Study

- Consider Goals
- Study Curriculum and Standards
- Plan and Conduct Research Lesson
- Collect Data
- Debrief Lesson
- Use Debrief to Inform Instruction

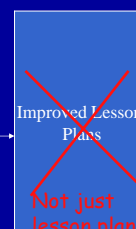


Instructional Improvement

### How does lesson study improve instruction?

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Instructional Improvement

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### Visible Features of Lesson Study

- Consider Goals
- Study Curriculum and Standards
- Plan and Conduct Research Lesson
- Collect Data
- Debrief Lesson
- Use Debrief to Inform Instruction

### Intervening Changes

- Teachers' Knowledge
- Teachers' Commitment-Community
- Teaching & Learning Resources

### Instructional Improvement

## What is Lesson Study?

A system of collaborative learning from live instruction that includes most features in the left column and that creates, over time, an increase in

- Teachers' Knowledge
- Teachers' Commitment-Community for Instructional Improvement
- Teaching-Learning Resources

## How Does Lesson Study Improve Instruction? (Hypotheses)

1. Teachers' Knowledge
2. Teachers' Commitment-Community for Instructional Improvement
3. Teaching-Learning Resources

## 1. Teachers' Knowledge

- Subject matter
- Instruction
- Student thinking
- Data collection in classrooms
- Connections between daily practice and long-term goals

## 2. Teachers' Commitment-Community for Instructional Improvement

- Belief that improvement is needed and possible
- Capacity to work with colleagues
- Sense of accountability to valued practice community
- Data collection in classrooms
- Connections between daily practice and long-term goals

## 3. Teaching-Learning Resources

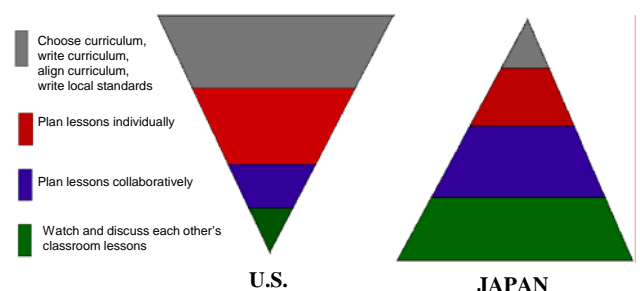
- Tasks that reveal student thinking
- Data collection protocols
- Meeting protocols that support exchange of ideas

## Challenge 3: Need to Learn Across Sites

### Need National Learning Community on Lesson Study. Difficulties:

- Geographic expanse of U.S.
- Lack of tradition, funding for cross-site lesson study sharing
- Commercial motives undermine learning across sites in some cases

## Teachers' Activities to Improve Instruction



## Lesson Study in the US has progressed!

### Thanks to the hard work of

- Many courageous US teachers
- Many generous Japanese colleagues
- Some far-sighted organizations & administrators

This experience has affected the way some of us structure our lessons, and has given us the courage to try challenging lessons

*Massachusetts*

Great trust has developed over time that allows us to be both teachers and learners with each other. Isn't that what it's all about?

*Massachusetts*

If we had to use one word to describe our work for the past two years, it would be **COURAGE**

.... to maintain this philosophy and pedagogical thinking as we struggled with our deficient MCAS scores ... overcrowded classrooms...

*Massachusetts*

I feel the biggest mistake we can make when pitching lesson study to US teachers is to tell them it is easy and painless. It is hard and possibly painful and they should prepare for it. The rewards, however, are fantastic. Real, concrete, observable improvement occurs in teaching.

New Jersey

## Thank You

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