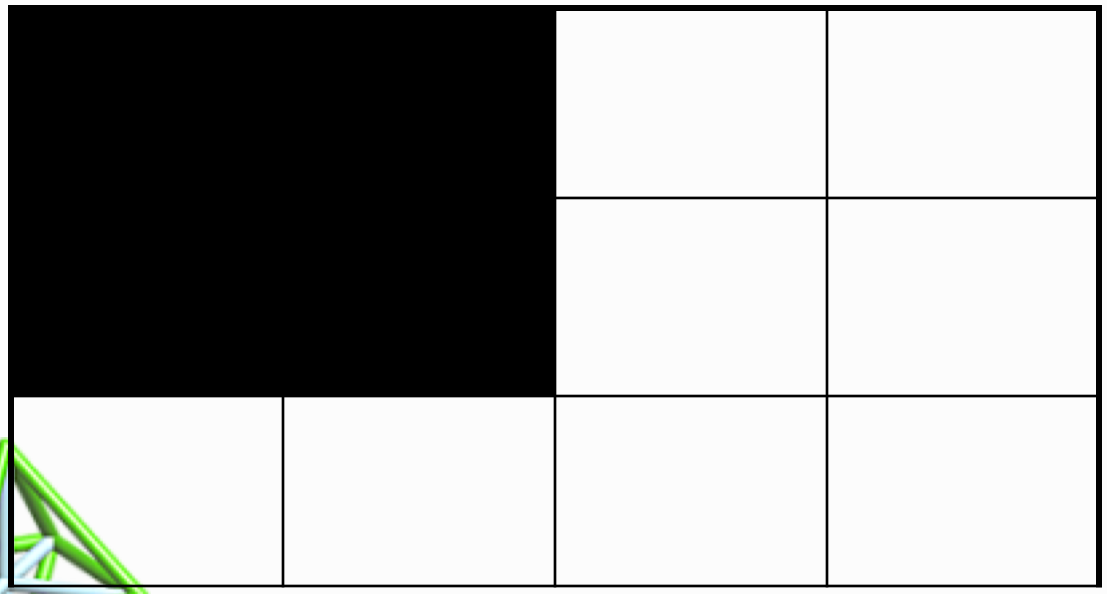
Reflecting on Practice: Worthwhile Tasks

Session 2:
How to can teachers adapt tasks to make them worthwhile?

In the figure below, what fraction of the rectangle ABCD is shaded?



a) 1/6

b) 1/5

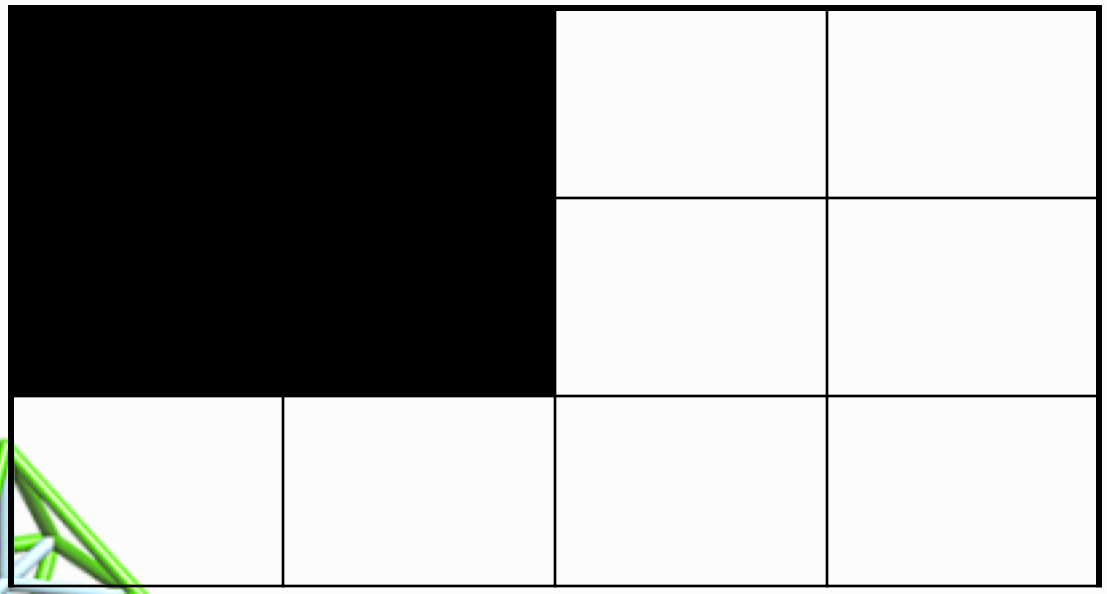
c) 1/4

d) 1/3

e) 1/2

NCES, Grade 8, 1996

In the figure below, what fraction of the rectangle ABCD is shaded?



a) 1/6 (5%)

b) 1/5 (3%)

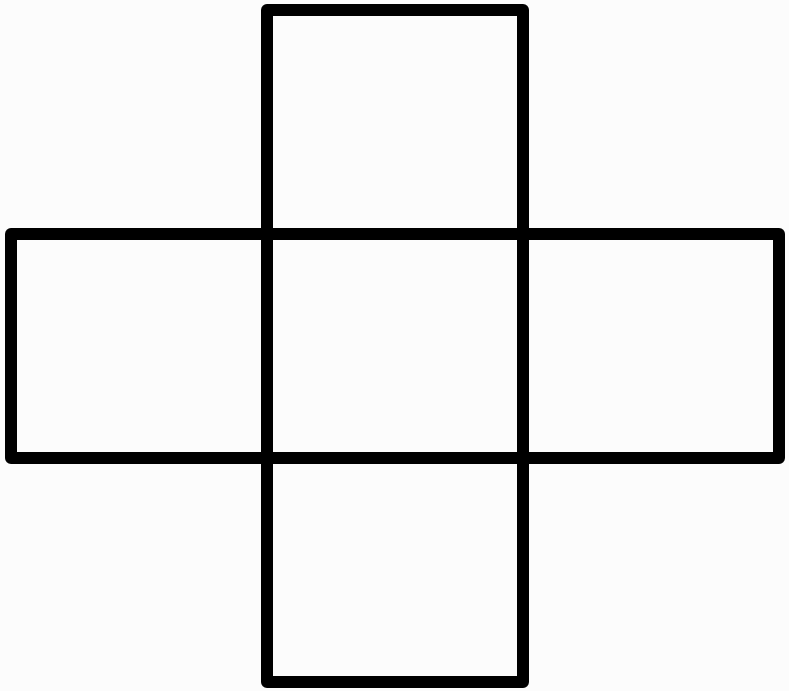
c) 1/4 (24%)

d) 1/3* (66%)

e) 1/2 (2%)

NCES, Grade 8, 1996

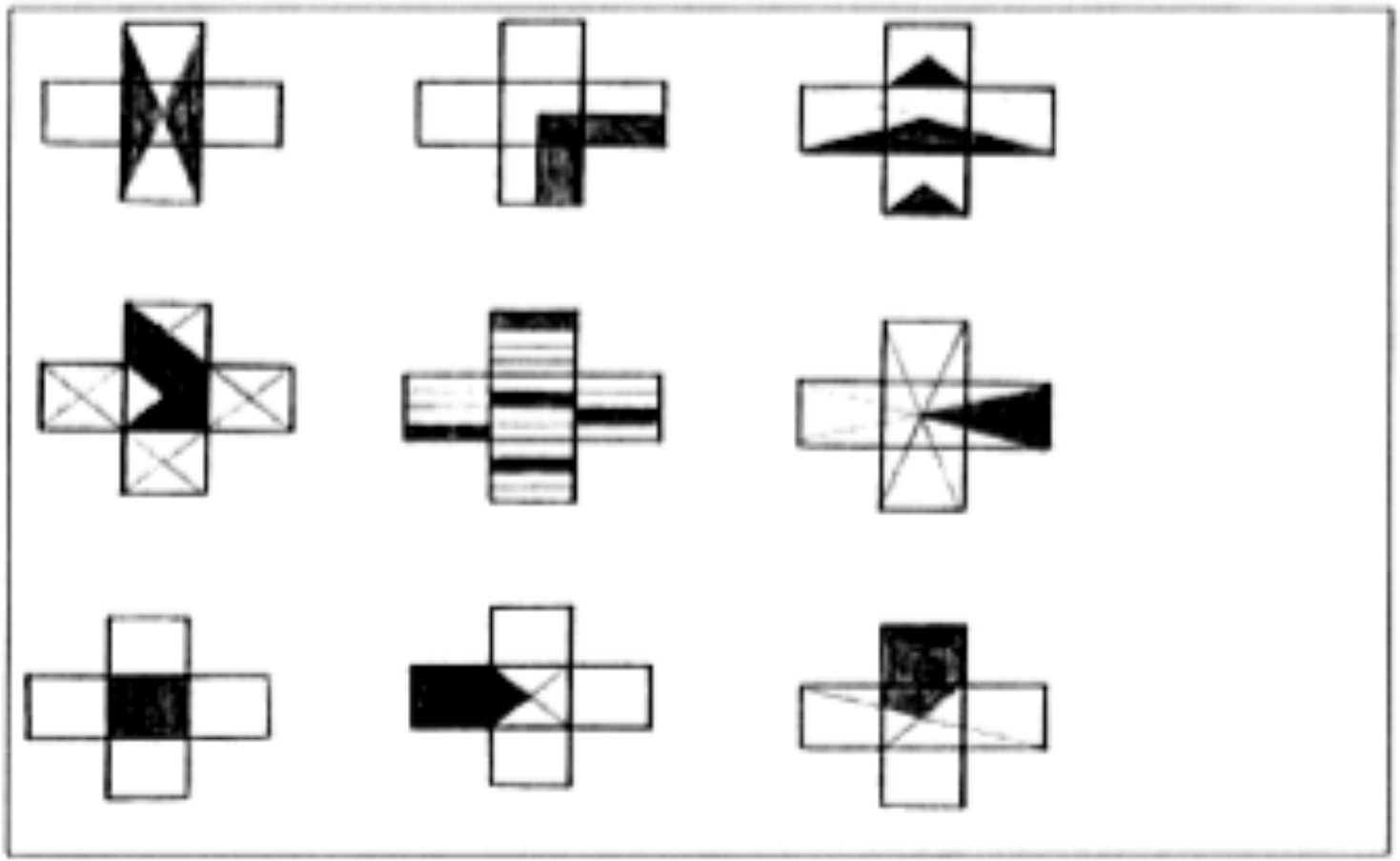
Color ¼ of the drawing.



Another approach to ¼

(Dekker & Querrelle)

In which is ¼ of the shape shaded?



Dekker & Querelle, 2002

What did you like or not like about this task in terms of promoting discussion and eliciting student understanding?

Tasks should be chosen so that there is an opportunity for error in reasoning or thinking that opens up the ability to discuss or explain - not just an error in the next step (for example, lost a negative sign or multiplied incorrectly).

Jeopardy

Choose one of the tasks and find a solution.

1. Create a story for the problem 3 divided by ⅗ and find a solution to the problem.

2. Create a system of equations that has the solution (-2, 3) and explain how you determined your system. Tweak your system so the solution is the empty set.

3. Create an equation whose graph would be that in the figure.

Fig. 5 Students are asked to provide a possible equation to match this graph.

(Sanchez, 2013)

Pair Up

- Find another partnership at a different table who did the same task and discuss your solution with them.

Jeopardy

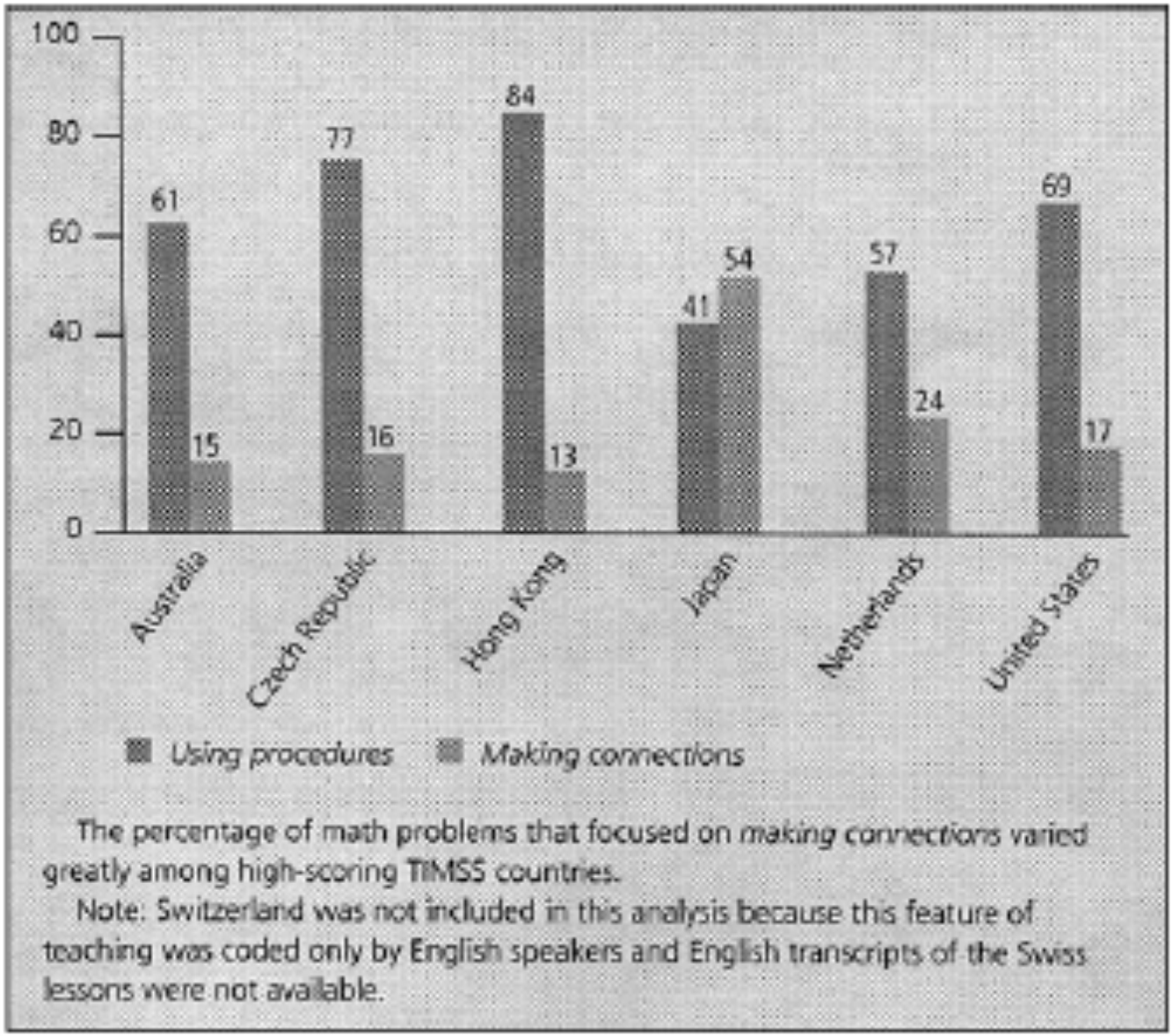
- We often call this approach Jeopardy … Give students the answer and ask for the question.
- How did Jeopardy promote discussion and elicit student thinking and understanding?

Sorting – Given 16 different systems of equations, arrange them into groups. Create at least two different set of groupings based on shared characteristics of the systems.

$5x + y = 9$ $10x - 7y = -18$	$3x - 2y = 2$ $y = -10 - x$	$6x-2y=7$ $3x-y=5$	$-14 = -20y - 7$ $10y + 4 = 2x$
$y = x^2 + 4x + 3$ $y = 2x + 6$	$2x-3y=6$ $6x-18=9y$	$8x + y = -1$ $-3x + y = -5$	$x - y = 11$ $2x + y = 19$
$x^2 + y^2-4=0$ $2y^2+x+2=0$	$x^2 + y^2=25$ $x - y=5$	$-4x -2y = -12$ $4x + 8y = -24$	$3 + 2x - y = 0$ $-3 -7y = 10x$
$x^2+y^2-16x+39=0$ $x^2- y^2-9=0$	$-7x + y = -19$ $-2x + 3y = -1$	$x=3y-5$ $y=2x+4$	$2x-y=3$ $y-3=3x$

What mathematical ideas emerged during your discussions either with your partner or as a whole table?

Types of math problems presented



The percentage of math problems that focused on *making connections* varied greatly among high-scoring TIMSS countries.

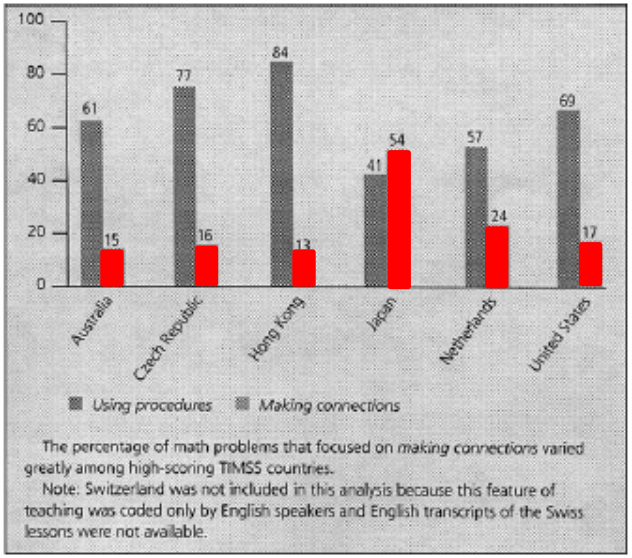
Note: Switzerland was not included in this analysis because this feature of teaching was coded only by English speakers and English transcripts of the Swiss lessons were not available.

http://bit.ly/hiebert2004

Hiebert & Stigler, 2004

Teacher implementation of the making connections math problems

Of the making connections problems…



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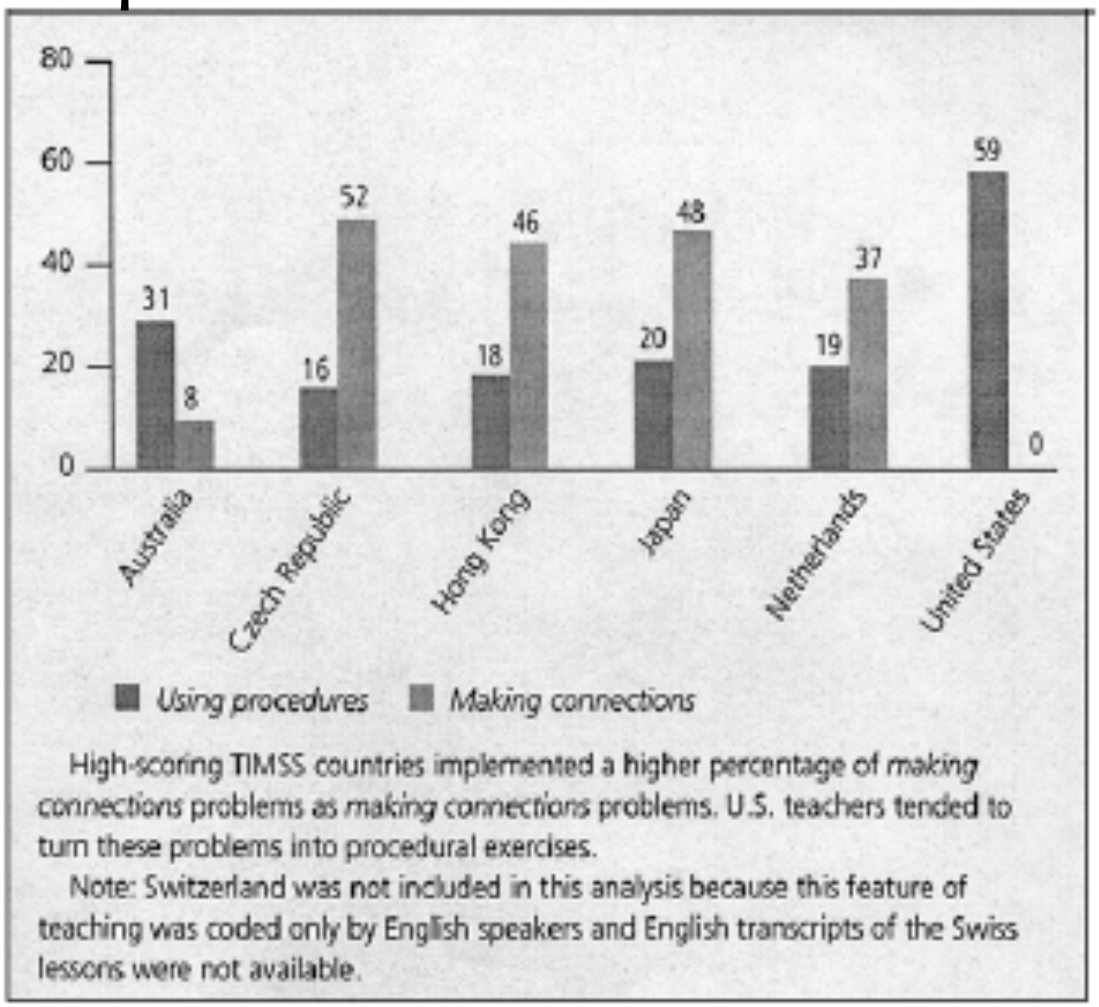

High-scoring TIMSS countries implemented a higher percentage of *making connections* problems as *making connections* problems. U.S. teachers tended to turn these problems into procedural exercises.

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http://bit.ly/hiebert2004

Hiebert & Stigler, 2004

Readings

- Hiebert, J., & Stigler, J. (2004). Improving Mathematics Teaching *Improving Achievement in Math and Science*, 64(5), 12-17.
- Sanchez, W. (2013). Open ended questions and the process standards. 107(3). *Mathematics Teacher*.

Take a few minutes to reflect using the prompts in your notes:

- What is one message from this session that you would want to bring back to another teacher? How would you make it meaningful and accessible for them (when they haven't been here with you)?

On your Exit Card:

- What question would you like to raise for us to think about as we move forward?

References

- Dekker,T. & Querelle, N. (2002). Great assessment problems *(and how to solve them)*. CATCH project www.fi.uu.nl/catch
- Hiebert, J., & Stigler, J. (2004). Improving Mathematics Teaching *Improving Achievement in Math and Science,* 64(5), 12-17.
- National Council of Teachers of Mathematics. (2014). Principles to action: Ensuring mathematical success for all students. Reston VA: The Council
- Sanchez, W. (2013). Open ended questions and the process standards. 107(3). *Mathematics Teacher*.