Don't Take Away My Chalkboard: The Art of Using Board Space to Develop Mathematical Communication

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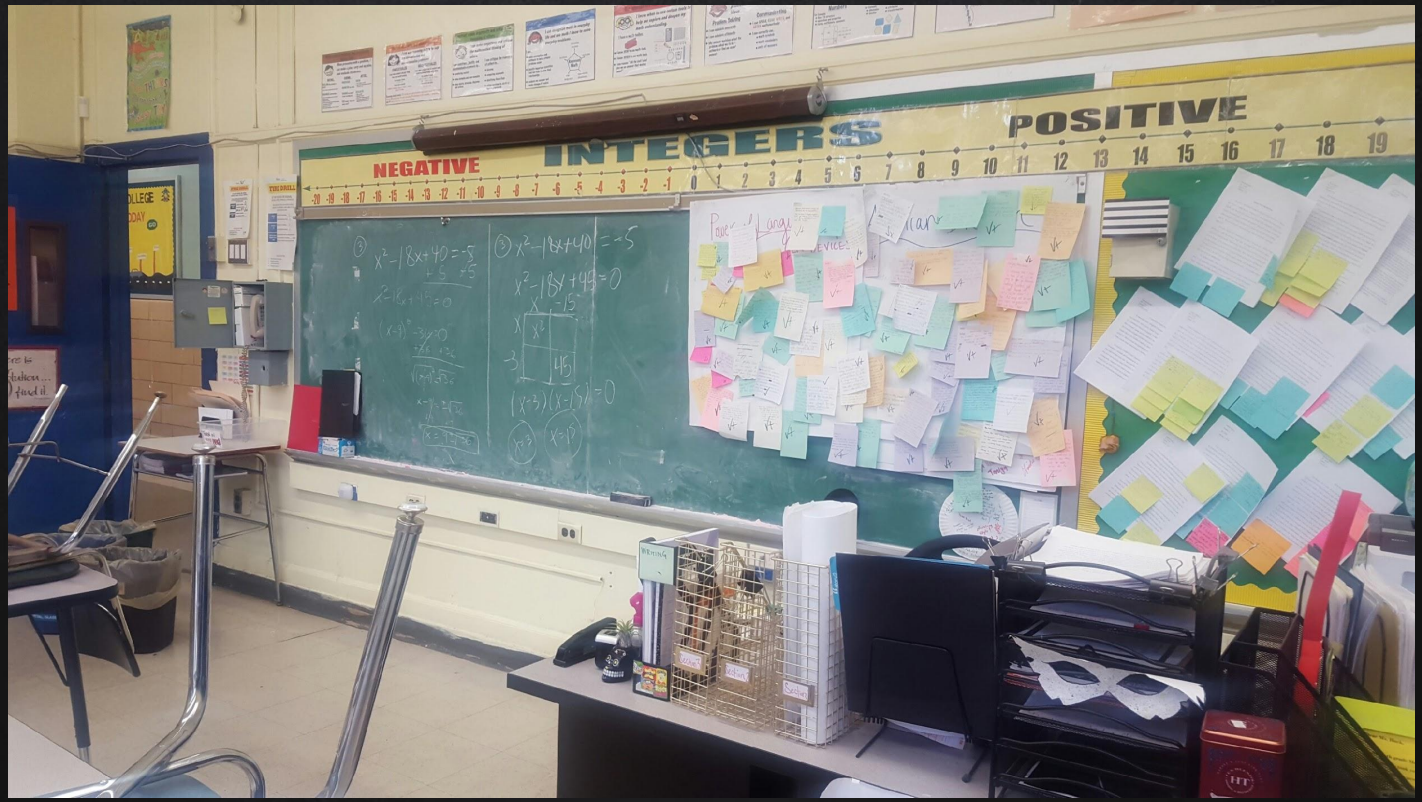
Community

Why "Don't Take Away My Chalkboard"?

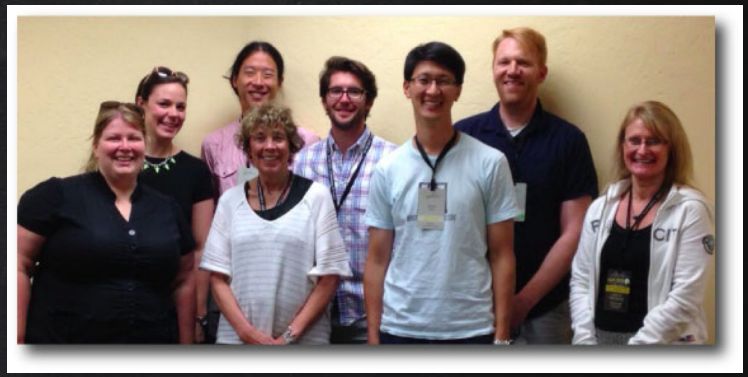
Because of this

So I always fight to have this



Japanese Lesson Study

-Attended Park City Math Institute 2015



-Participated in Japanese Lesson Study

-Introduced to "Bansho"

What is Bansho?

Philosophy of Bansho

TABLE 1

The Japanese organizational strategy of bansho divides board space into sections; this table outlines the purpose of each section in relation to the lesson cycle.

Purpose of the board space using bansho

Activate prior knowledge	Explore a problem	Discuss and extend
• Post prompting image • Post keywords, math vocabulary, and current understandings of students' • Post problem situation	• Systematically display various student-generated solutions from concrete to semiconcrete to abstract ideas	• Apply new knowledge • Display important summarizing ideas • Conclude lesson and connect to future lessons

Phase 1: Activate Prior Knowledge

Traditional Bansho

Activate prior knowledge

- Post prompting image
- Post keywords, math vocabulary, and current understandings of students'
- Post problem situation

Bansho Transformed

→ Have students do a helper problem

→ Old material might seem out of place, but it will become helpful

Why keep your opener on the board?

OPENER

$-2x^2+x+3=0$

$(-2x+3)(x+1)=0$

$-2x+3=0$

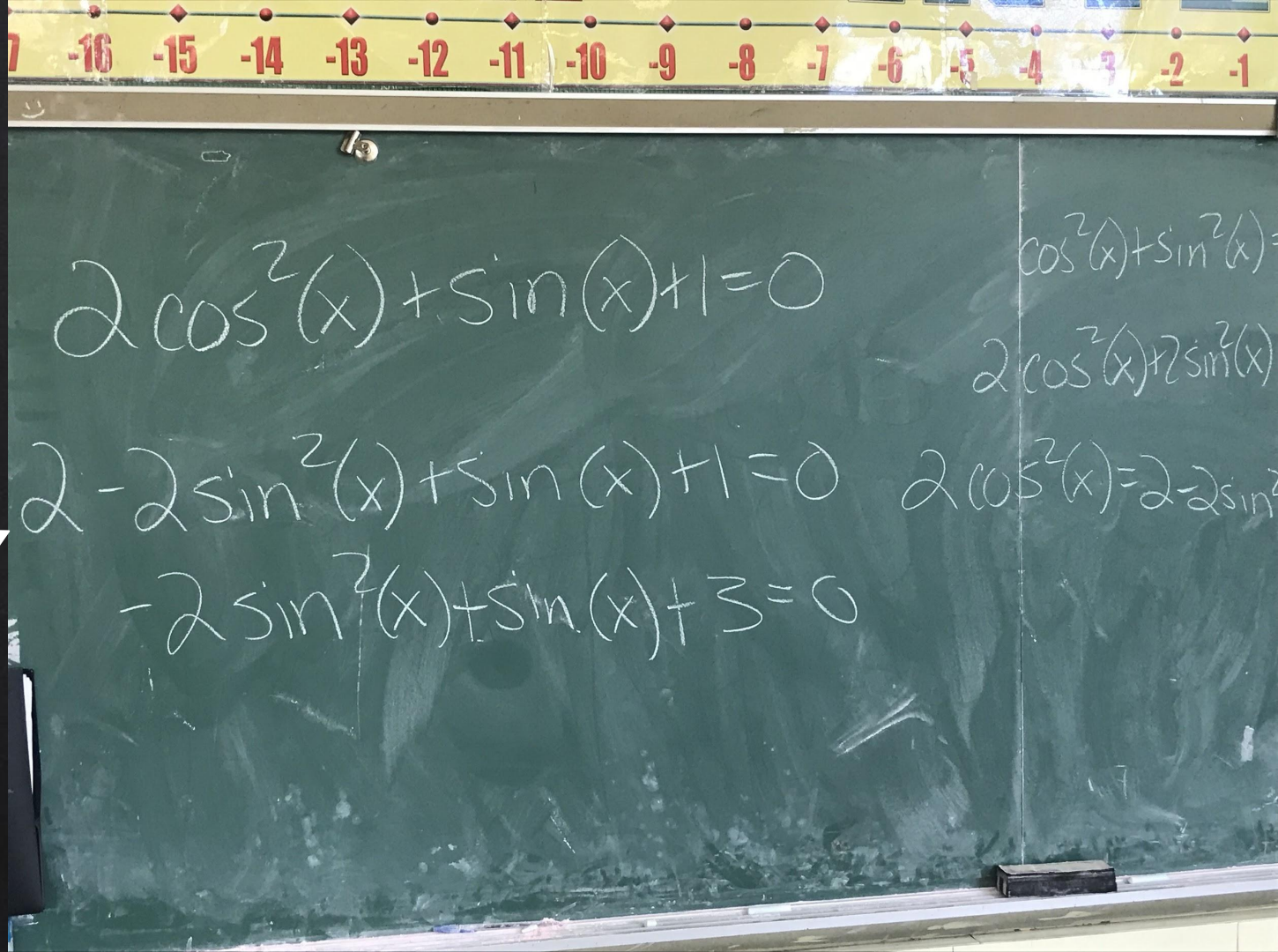
$-2x=-3$

$x=\frac{3}{2}$

$x+1=0$

$x=-1$

LESSON


$2\cos^2(x)+\sin(x)+1=0$
$2-2\sin^2(x)+\sin(x)+1=0$
$-2\sin^2(x)+\sin(x)+3=0$
$\cos^2(x)+\sin^2(x)=$
$2\cos^2(x)+2\sin^2(x)$
$2\cos^2(x)=2-2\sin^2$

$$-2x^2+x+3=0$$

$$(-2x+3)(x+1)=0$$

$$-2x+3=0$$

$$-2x=-3$$

$$x=\frac{3}{2}$$

$$x+1=0$$

$$x=-1$$

$$2\cos^2(x)+\sin(x)+1=0$$

$$2-2\sin^2(x)+\sin(x)+1=0$$

$$-2\sin^2(x)+\sin(x)+3=0$$

Phase 2: Explore a problem

Traditional Bansho

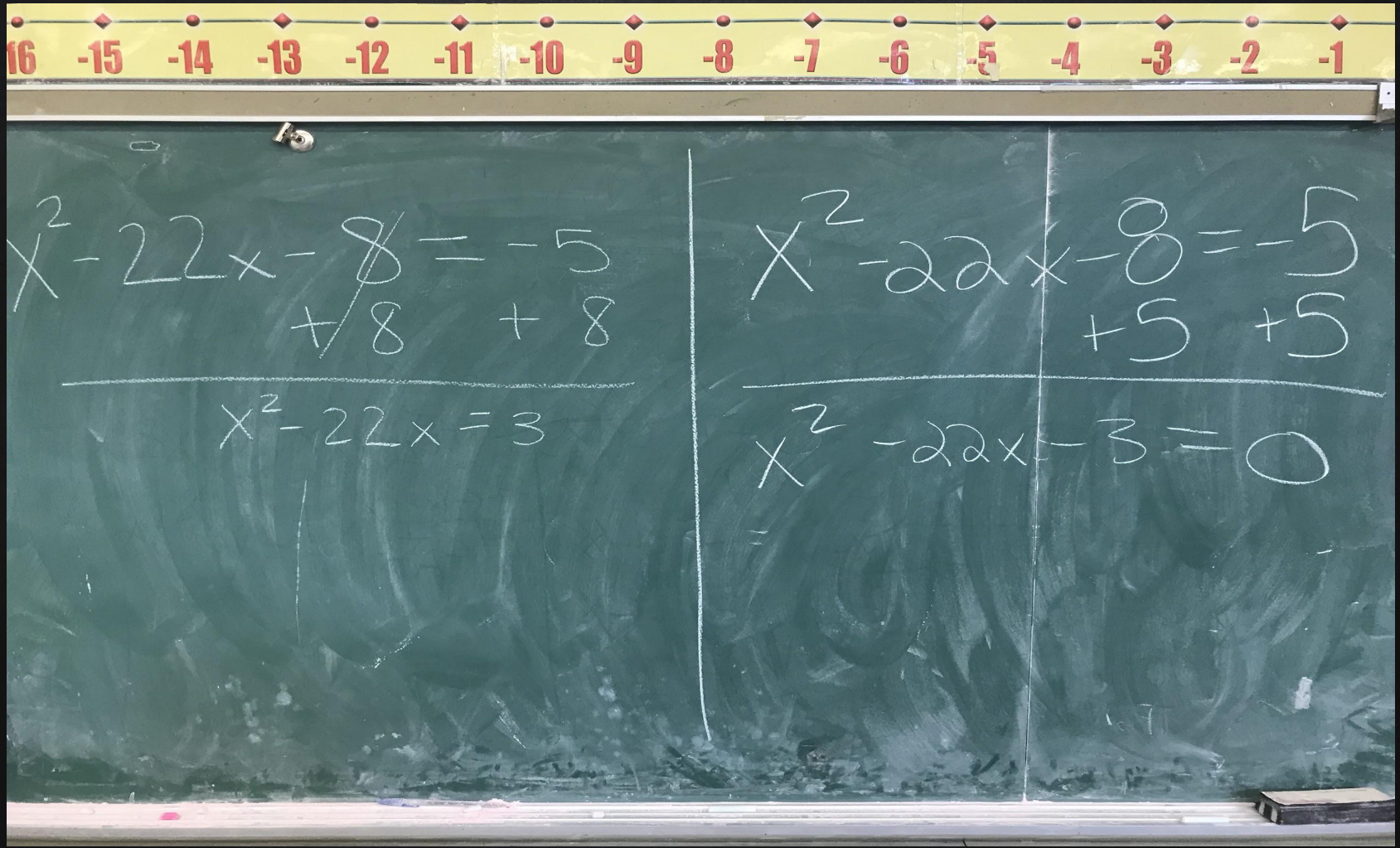
Explore a problem

- Systematically display various student-generated solutions from concrete to semiconcrete to abstract ideas

Bansho Transformed

→ Put up 2–4 solutions

→ Thumbs up/ Thumbs down with a twist


16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
$x^2 - 22x - 8 = -5$
$+8 \quad +8$
$x^2 - 22x = 3$
$x^2 - 22x - 8 = -5$
$+5 \quad +5$
$x^2 - 22x - 3 = 0$

Phase 3: Discuss and Extend

Traditional Bansho

Discuss and extend

- Apply new knowledge
- Display important summarizing ideas
- Conclude lesson and connect to future lessons

Bansho Transformed

- → Do the same idea in this phase
- → Avoid steps. Instead, create a list of ideas to think about for a skill

Let's Do Some Modeling

- For a moment, take your teacher hat off and put on your student hat.

- There will be time for teacher questions at the end

Focus: How do I solve equations?

Brainstarter:

What is 0?

Solve

$$V + 5 + 6v = v - 6 + 8v + 11$$

Any Questions?

Let's Do Some Planning!!

- $-5 - 6(1+ 5k) = -6k + 37$

-Think about the 3 phases

-What goes on the board for each phase?

-How much board space do you have? What has to be up together? When can items be erased?

5 mins 'til we share

Any Questions?

Stay in Touch!

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Bibliography

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