

Using Evidence in Classroom Practice

Anne K. Morris
James Hiebert

Stephen Hwang
Eric Sisofo



Evidence-based Continuous Improvement Systems

- **Feature 1: Shared problems** are clearly articulated and accepted by all members of the system.
- **Feature 2: Visible, changeable products** store the best current solutions to the shared problems and steadily improve by incorporating the growing knowledge of the system.
- **Feature 3: Small tests of small changes.** The products are vetted for quality and usefulness by collecting just enough data about small-scale changes.
- **Feature 4: Multiple sources of innovation.** All members contribute to the construction of the products based on their special expertise.

(Morris & Hiebert, 2009, 2011)

A Model for Improving Teaching (by Using Evidence)

1. Solve problems shared across teachers and classrooms
 - Improvement efforts in a complex system cannot succeed unless the practitioners in the system see the changes as solving *their* problems.
 - Link evidence to achieving learning goals that the teachers value

A Model for Improving Teaching (by Using Evidence)

2. Develop and continuously improve shareable and changeable instructional products
 - Shared, detailed lesson plans that record and accumulate improvements over time
 - Lesson plans survive the turnover of individual teachers
 - Each set of teachers knows that the lesson plans can be changed to record their new improvements

A Model for Improving Teaching (by Using Evidence)

3. Gather small amounts of data to immediately test small changes in teaching
 - Making and testing small changes to instruction provides timely feedback and can show the accumulation of improvements over time
 - Precisely defined, granular learning goals allow teachers to test the effects of small changes in instruction
 - Evidence-use increases when instructors predict effects of instruction on student learning by making and testing changes to instruction.

A Model for Improving Teaching (by Using Evidence)

4. Engage multiple people in the design and testing of small changes and solicit everyone's ideas for doing so
 - No one person knows enough to design the best lessons
 - Teachers new to a lesson can both learn from accumulated knowledge and bring new ideas that can be tested as potential improvements

Can the Model Be Used to Engage K-12 Teachers?

- Current research project: Through a series of phases, we are investigating whether and how the four-feature model can be implemented with **K-12** teachers.

The Beginnings of a Theory of Implementation

- What are the links in the chain that connect a teacher's current environment to a new environment that
 - contains the four features of our model, and
 - supports teachers to gather and use evidence to improve their teaching?

Two Principles

1. Changes are more likely to be made **if they are small.**
(Douthwaite, 2002; Langley et al., 1996; Morris & Hiebert, 2009; Popper, 1934, 1957, 1960)
 - Big changes should be requested through successive phases of small changes.
2. Changes are more likely to be made if the practitioner can **see benefits from making them.**
(Lewin & Grabbe, 1945; Gawande, 2013)
 - Help teachers to see the benefits of evidence collection before asking them to buy into doing more work.

Implementation – Phase I

Research Question 1: Did teachers make the small changes requested: identify problematic lessons, collect the requested data, and provide feedback to help revise the lessons?

Research Question 2: Did they see the benefit of making these small changes?

Research Question 3: What were teachers' major obstacles to adopting evidence-based methods for improvement?

Implementation – Phase I

- 8 teachers and 231 students in 4 schools
- Teachers and researchers would work together to continuously improve mathematics lessons.

Grade Level	Years of Experience
Kindergarten	3
Kindergarten	1
Fourth	9
Fifth	4
Sixth	9
Eighth	7
Eighth	10
Eighth	10

Methods

1. Teachers identified the most problematic lesson in their curriculum.

**Small Change
#1**

Feature 1: Shared Problems

⋮
Multiplying a Fraction by a Whole Number

Multiplying a Fraction by a Fraction less than 1

Multiplying a Fraction by a Fraction greater than 1

Standard Algorithm for Multiplying Fractions

⋮

**We need help
with this lesson!**

Methods

2. Researchers used a detailed lesson plan format to write an initial replacement lesson.

Features 2 & 4: Visible, changeable products; Multiple sources of innovation

New Replacement Lesson

Learning Goals

Activity 1

- Why is this activity in the lesson?
- Detailed description of activity
- Questions teachers should ask
- Anticipated Student Responses

Activity 2

- Why is this activity in the lesson?

Methods

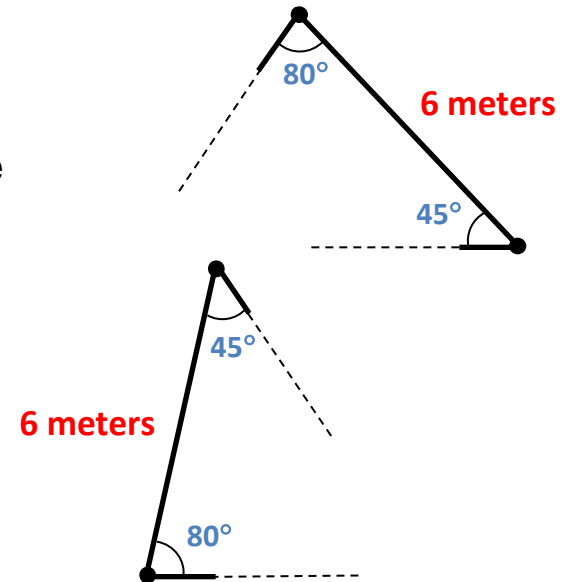
3. Teachers administered exit tickets and gathered additional classroom data.

Feature 3: Small amounts of data

Small Change #2

Exit Tickets

1. Given the following information about this pair of triangles, what additional information would you need to have before you could be absolutely certain that the two triangles are congruent (identical)?
 - a) I also need to know the third angle measurement.
 - b) I also need to know one of the other side lengths.
 - c) I also need to know the third angle measurement and the length of all three sides.
 - d) I need no additional information. I can already be certain that the two triangles are congruent.



Methods

4. Researchers requested written feedback from the teachers to create a version 2 of the lesson plan.

**Small Change
#3**

Features 2, 3, & 4

Feedback Page on Project Website

The goal of this project is to build lessons for you that continually improve based on feedback from every teacher who has taught them. Now that you have taught this lesson, you have information about its strengths and weaknesses that can help create an improved version.

Can you share your feedback and criticisms about the following?

1. Was there any part of the lesson you changed? Why did you make that change?
2. If the students struggled with anything in this lesson, please explain what it was and where in the lesson it happened.
3. How did the students do on the Exit Ticket? What were the most common incorrect answers?
4. Based on your experience teaching this lesson, please make suggestions on how the lesson and assessment problems could be improved in the next version of the lesson.

Please share your comments on this lesson below:

Results

Research Question 1: Did teachers make the small changes requested: identify problematic lessons, collect the requested data, and provide feedback to help revise the lessons?

1. **All 8 teachers** were able to identify a problematic lesson and describe parts of lessons that gave them special difficulty.
2. **All 8 teachers** were able to collect and provide specific information that the researchers could use to produce a second version of the lesson.
3. **6 of the 8 teachers** stated that collecting information **was not** “burdensome”, “difficult”, or “uncomfortable”.
4. **Only 3 of the 8 teachers returned to the website to provide the feedback.**

Results

Why didn't the teachers post their feedback on the project website?

5. **6 of the 8 teachers** suggested it was hard for them to find the time to provide the feedback given all they have to do.
6. **All 8 teachers** made statements indicating that giving feedback or reflecting on a lesson was not a priority and **did not benefit them or solve their immediate problems.**

Results

How did teachers think this part of the process (providing feedback on the lesson) could be improved?

7. **6 of the 8 teachers** suggested either
 - Reducing the time it would take to post the feedback by reducing the specificity and richness of the evidence or
 - Collecting the feedback through individual interviews that would essentially force the teachers to provide feedback

Lessons Learned from Phase I

2 Principles for Implementation

- ✓ 1. Changes are more likely to be made **if they are small.**
- ✓ 2. Changes are more likely to be made if the practitioner can **see benefits from making them.**

Lessons Learned from Phase I

- Teachers **did not** see sharing the evidence they collected as benefitting them.
- The teachers felt that the shared problem was solved. The replacement lesson was better than the problematic lesson. Satisficing is appropriate in their current situation.
- In Phase II, we need to identify shared problems where teachers see sharing collected evidence as benefitting them.
- The teachers identified potential problems that require sharing collected evidence.

A New Principle for Implementation

3

~~2~~ Principles for Implementation



1. Changes are more likely to be made **if they are small.**



2. Changes are more likely to be made if the practitioner can **see benefits from making them.**

3. **Focus on situations where the problems in lessons that teachers are most concerned about solving require sharing collected evidence to solve.**

Feature 1: Shared problems

Questions?

- Anne K. Morris (abmorris@udel.edu)
- James Hiebert (hiebert@udel.edu)
- Stephen Hwang (hwangste@udel.edu)
- Eric Sisofo (sisofoe@udel.edu)

Thank you!