How Data Can Help You
“Move the Needle”

Kyle Peck
Professor Emeritus
Penn State University

September 26 & 27, 2017
Thank you.

How Data Can Help You
“Move the Needle”
Any “data nerds” in the house?

Few people enter the field of education with a passion for data…
Let's play school! I'll pretend to be a teacher analyzing disaggregated student data, and you can pretend to be a student taking a standardized test!
John Hattie
Professor of Education
University of Auckland, NZ
What is a “Meta-Analysis?”

- “The term is a bit grand, but it is precise and apt ... Meta-analysis refers to the analysis of analyses.” Gene Glass

- “a statistical analysis that combines the results of multiple scientific studies.” Wikipedia
John Hattie

- Based on over 50,000 studies and “close to ¼ billion students.”

“The definitive book on sorting out the effectiveness of teaching strategies – a must read for those who want to improve teaching and learning.”

Michael Fullan

- Has used these results to identify the ways teachers and schools can move the needle.
How Does a Meta-Analysis work?

- Studies on a topic are located, based on the treatment, intervention or factor under investigation as well as the dependent variables involved (achievement test scores, for example)

- Studies that are weak from a methodological perspective are eliminated

- The effects in each study are converted to a common measure, called “an effect size,” so that the overall effect of multiple
What is an “Effect Size?”

- There are many variations on how to calculate effect sizes, but in general...

To calculate effect size, you **subtract the means** for two conditions and **divide that difference by the standard deviation** of the scores.

\[
\frac{(\text{Treatment Mean} - \text{Control Mean})}{\text{Standard Deviation}}
\]
Remember standard deviations?
What is an “Effect Size?”

- An effect size of 1 indicates that implementing an intervention caused a gain in the experimental group that is equivalent to:
  - Advancing student achievement by two to three years
  - Improving the rate of learning by 50%, or
  - A correlation between the variable and resulting achievement gains of $r = 0.50$
Do Educational Innovations Work?

- Yes. According to Hattie, “Almost everything works.”
  “... about 95% of all things we do have a positive influence.”

- Instead of asking “What works?” we should be asking
  “What works best?”
Hattie’s “Barometer of Influences”

Medium

- High

Low

- Negative

Teacher effects

Developmental effects

Reverse effects

Zone of desired effects

SOCIAL SKILLS PROGRAMS $d = 0.40$
What teachers might accomplish in a typical year

Amount that might be expected from maturation alone

Harmful or negative effects

It might still make sense to implement an innovation with effect size of less than .4 (if the costs were low or if in combination with other things), but in general we should be seeking effects in this range.

Hattie’s “Barometer of Influences”

SOCIAL SKILLS PROGRAMS $d = 0.40$
So, what matters?
Structural Influences

- Influence
  - Summer school
  - Finances
  - Religious schools
  - Class size
  - Within class grouping
  - Ability grouping
  - Distance education
  - Changing school calendars/timetables
  - De-tracking
  - Charter schools
  - Diversity of students
  - Multi-grade/age classes
  - Open vs. traditional spaces
  - Welfare policies
  - Retention
Student Attributes?

Influence

- Divorced or remarriage
- Personality
- Adopted children
- Diet
- Gender (males-females)
- Diversity of students in the class
- Parental employment
- Iodine deficiency
- Sleep
- Diabetes
- Labeling students
“Deep Programs?”

Influence

- Inquiry based methods
- Values/moral education programs
- Programmed instruction
- Individualized instruction
- Visual/audio-visual methods
- Matching style of learning
- Problem based learning
- Sentence combining programs
- Perceptual-motor programs
- Whole language
- Homework in elementary classes
Technology?

Influence

- Computers in mathematics
- Computers in science
- Computers in small groups
- Computers in distance education
- Web-based learning
**Warning:** Just another distraction

<table>
<thead>
<tr>
<th>Reason</th>
<th>Probability</th>
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<tbody>
<tr>
<td>Not the home or parents</td>
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<td>Not individualized instruction</td>
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<td>Not the technology</td>
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<td>Not accountability</td>
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<td>Not learning styles</td>
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<td>Not the programs</td>
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<td>Not the structure of schools or classes</td>
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<td>Not many attributes of the students</td>
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<tr>
<td>Not summer school, length of school day or school year</td>
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<td>Not repeating classes</td>
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More from John Hattie…

- Most of what we do to try to improve achievement does improve achievement.
- This is a big part of the problem.
- It’s not about whether it works, it’s about how well it works.

We need to focus on the things that matter.
Think of the great teacher(s) in your life.

What made them great?
Two Very Quick Stories...

Hannafin Story

Bolinsky Story
Back to Hattie’s Findings
The power of passion, and teachers’ collective expertise

<p>| | |</p>
<table>
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<tr>
<td>1.</td>
<td>Teachers, working together, as evaluators of their impact</td>
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<tr>
<td>2.</td>
<td>The power of moving from what students know now towards explicit success criteria</td>
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<tr>
<td>3.</td>
<td>Errors and trust are welcomed as opportunities to learn</td>
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<td>4.</td>
<td>Maximize feedback to teachers about their impact</td>
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Hattie Effect Size 2016 Update

The 6 “Super Factors”

1. Teacher estimates of achievement ($d = 1.62$)

2. Collective teacher efficacy ($d = 1.57$)

3. Self-reported grades ($d = 1.33$)

4. Piagetian levels ($d = 1.28$)

5. Conceptual change programs ($d = 1.16$)

6. Response to Intervention ($d = 1.07$)
The 6 “Super Factors”

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### High-level Principles (from *Visible Learning for Teachers* (2012))

I see learning through the eyes of my students

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<th>An Adaptive Learning Expert</th>
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<td>I use learning intentions and success criteria</td>
<td>I create trusting environments</td>
<td>I know how to use the three feedback questions</td>
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<td>I set high expectation targets</td>
<td>I know when and how to differentiate</td>
<td>I monitor and Interpret my learning/teaching</td>
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<td>I foster deliberate practice and concentration</td>
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I help students to become their own teachers
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I help students to become their own teachers

**Figure 1.2 “Know Thy Impact” (!)**
Great teaching is about…

great teaching & learning RELATIONSHIPS.

Great teaching & learning RELATIONSHIPS are based on…

• Clear expectations
• Frequent, high-quality assessments
• Feedback
• Reflection
• Goal setting and motivation to achieve.
How do we develop these attributes in teachers?

- Through a “data use culture”
  (as promoted by this conference and GEMS)
- Through conscious effort at the school to concentrate on teacher Impact.
  (WATCH 1 MINUTE OF JOHN HATTIE VIDEO)
Which brings us back to the purpose of this conference, the effective use of data to “move the needle.”
Ways to use GEMS

- To monitor a single school’s progress over time
- To understand the performance of schools, taking demographic factors into account (benchmarking)
- To identify students at risk and propose interventions to turn things around.
Ways to use GEMS

- To monitor a single school’s progress over time
- To understand the performance of schools, taking demographic factors into account (benchmarking)
- To identify students at risk and propose interventions to turn things around.
GEMS Demo

Goal: To understand the performance of “my” school, taking demographic factors into account (benchmarking)

- Create data file containing the achievement data of interest
- Sort and find schools with similar performance
- Use what you know about school demographics to identify a small set of schools with similar performance that are “like yours”
- Use GEMS “Side by side” comparisons to verify and adjust if needed
- Develop action plan
Data can help you help your students.
YOU
YOU Can have IMPACT!
(beyond what is tested.)
Thank you.
Resources

- [John Hattie’s Ted Talk](#)
- John Hattie’s Book “Visible Learning”
- John Hattie’s [Youtube Video, “Learning Intentions and Success Criteria”](#)
- The Montana Growth and Enhancement of Montana Students “GEMS” Data System
How Data Can Help You
“Move the Needle”

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