

### Purpose.

We demonstrate strategic integration of a program improvement effort into an impact evaluation involving a randomized trial of an educational intervention. The focus was on identifying process bottlenecks with a no-impact finding and yielding formative feedback for improvement. The example illustrates a complementary approach to addressing improvement and impact.

### 1. Make the work problem specific and user centered.

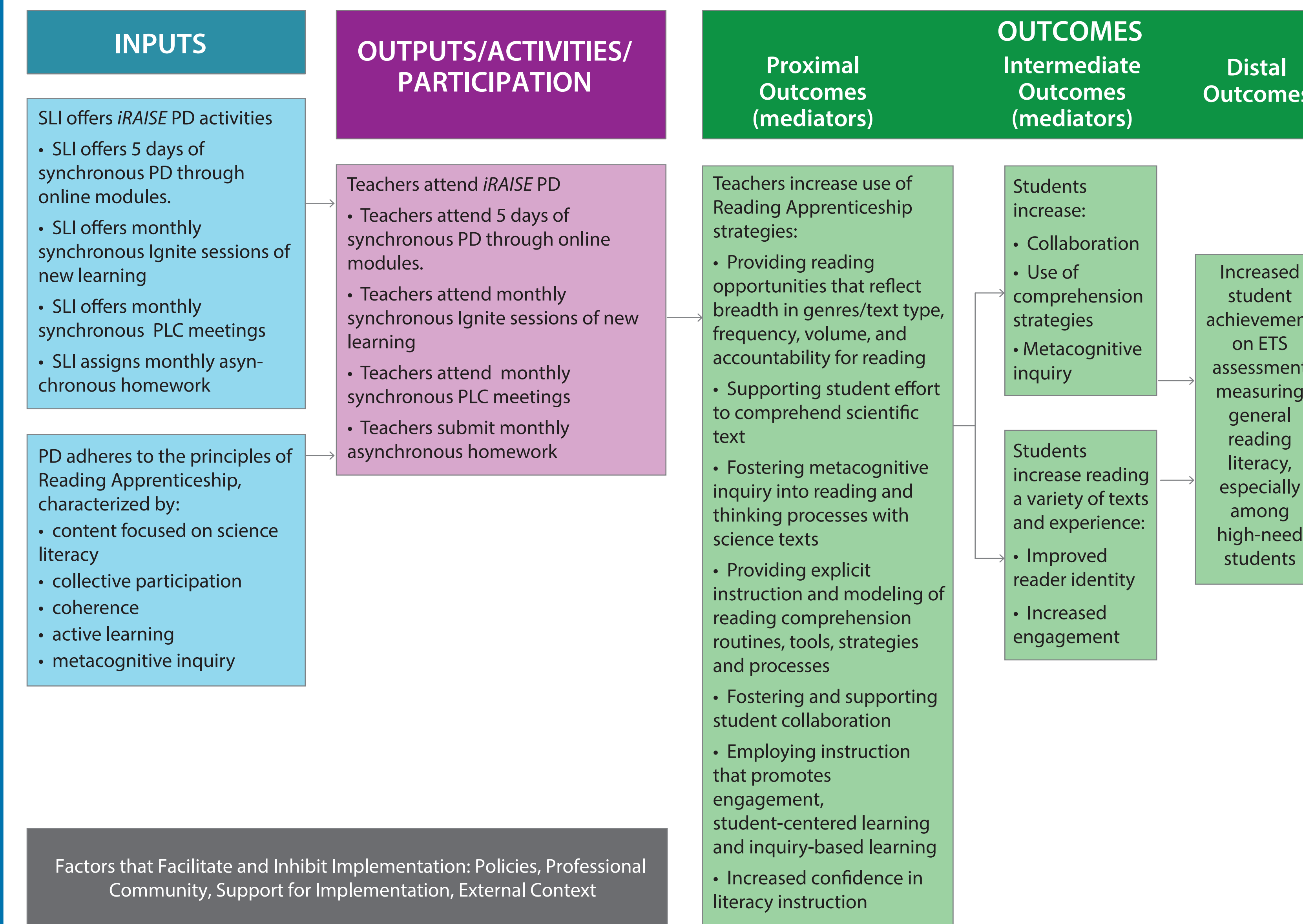
*Problem we are trying to solve:* Improve reading comprehension and literacy skills of science students, and understand conditions for observing positive impact.

#### ----- iRAISE EXAMPLE -----

- 1-year RCT of iRAISE funded through an i3 development grant
- 65-hour face-to-face literacy PD through an online format with iRAISE science teachers
- 82 science teachers in grades 9-12 (randomly assigned to iRAISE or waiting list for following year)
- Impact assessed on reading literacy in science
- Standardized effect size: .002
- p value: .96

**What we found:** No marginal impact; opportunities to learn and provide feedback to improve the program

### 2. System that produces the current outcomes. We considered as originally conceived and as actually implemented.



**What we found:** We contrasted the logic of the program, with its achieved implementation, mediating and moderating processes.

### Weak Implementation ← → Strong Implementation

<p>Focuses on covering content and struggles with social dimension of her class. Gave up in face of "students' apathy". Sees iRAISE as separate entity – students should be "working on it on their own". Shows "minimal perseverance with framework." Implements "at surface". Considers it "hard to get new students on board". Is cautious with thoughtful attention to the few students who are engaging (in an online learning environment); Sees student collaboration as "lacking depth of student thinking and speaking". Expresses concerns with time and grading for completion. Admits "just doing bits for the experience". Does not understand social dimension of RA framework. Responds to student work in a critical way.</p>	<p>Struggles with own reading. Expresses discomfort with certain strategies (metacognitive conversations). Feels students don't have abilities to do challenging work. Tried some strategies, but struggled with the "social dimension of class". Has limited belief in students' abilities. Focuses on covering content. Struggles with buying into iRAISE. Sees program as an "add on" and students should be "working on it on their own". Discontinues use after a certain amount of time.</p>	<p>Maintains barriers to implementation. Lacks confidence to try new things on her own. Uses some core routines but practice falls flat in terms of deepening student thinking. Shows limited depth in personal and social processes utilizing metacognition, which would contribute to knowledge building. Exhibits less than frequent use of the program.</p>	<p>Looks forward to also using the program the following year. Exhibits exemplary persistence even when struggling with some aspects e.g., building the social/personal dimension in activity.</p>	<p>Supported students to read, think, and talk like scientists, but caved in to pressures to cover content from colleagues. Understands iRAISE and relies on colleagues for support.</p>	<p>Understands the framework deeply. Becomes program leader on staff. Connects core routines and personal and social dimensions. Shows evidence of knowledge building that culminates in sense making, and is deeply aware of students' processes: monitoring and documenting their thinking and sharing ideas and knowledge building. Adjusts program strategies based on students' needs.</p>
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### 3. We cannot improve at scale what we cannot measure.

We strategically collected a wider range of data at various stages of the project to allow us to understand better conditions for impact. This included baseline covariates that we expected would be predictive of variation in implementation level and impact, instructional variables posited to mediate impacts on achievement, and variables supporting different formulations of fidelity of implementation (FOI).

Construct	Description	iRAISE	
		Stage 1	Stage 2
1	Variety of Text Types	+	+
2	Fostering Student Independence	+	+
3	Traditional Instructional Strategies	+	+
4	Teachers Instructing Metacognitive Inquiry	+	-
5	Teachers Modeling Metacognitive Inquiry	+	-
6	Students Practicing Metacognitive Inquiry	+	-
7	Teachers Instructing Comprehension Strategies	+	+
8	Teachers Modeling Comprehension Strategies	+	+
9	Students Practicing Comprehension Strategies	+	-
10	Student Collaboration	+	-
11	Student Engagement	+	+
12	Teacher Self-Confidence in Literacy Instruction	+	+

\* We did not convert these estimates into effect sizes, given the outcome distributions were highly skewed, however, given the p values, we have no confidence in there being an impact on these practices.  
Source: Empirical Education staff calculations

#### QUESTIONS POSED AT BASELINE

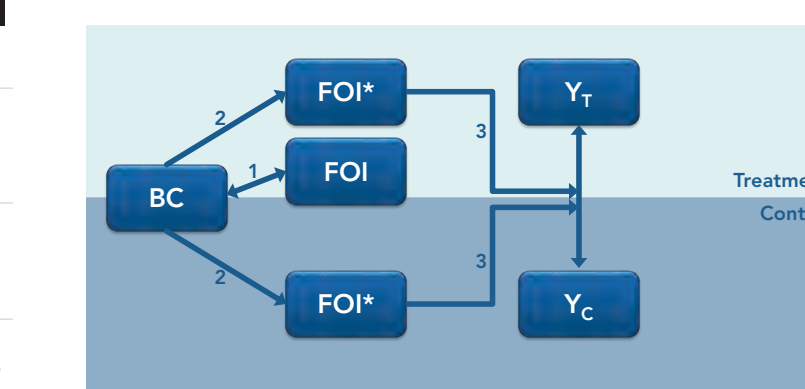
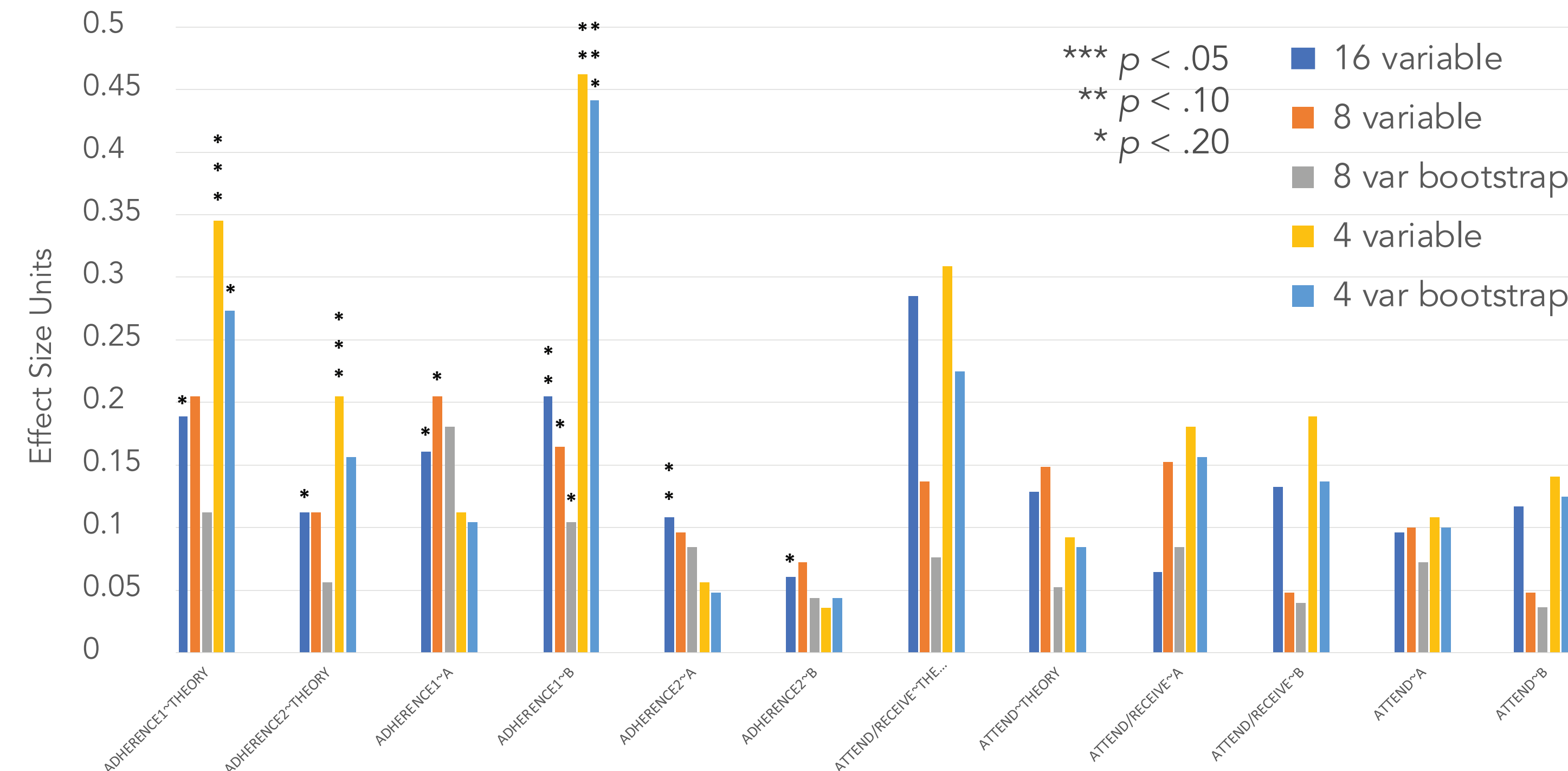
- Levels of confidence in instruction
  - Indicate your level of confidence with the following instructional approaches
  - Provide opportunities for reading a variety of texts of different types/genres
  - Teach students to analyze their own thinking about texts
  - Structure lessons so that students have to do the assigned reading in order to be successful
  - Support students in their attempts to understand disciplinary text (e.g. challenging literature, textbooks, primary documents, scientific articles)
  - Provide explicit instruction around reading comprehension strategies (e.g., setting a reading purpose, previewing text, chunking, visualizing)
  - Model/demonstrate reading comprehension strategies (e.g., setting a reading purpose, previewing text, chunking, visualizing)
  - Support students in working on reading or writing activities in groups (small groups or whole class), (i.e. setting norms, creating safety, providing prompts that promote collaboration, and providing guidance/feedback)
  - Give students roles that make them responsible for making sense of texts (e.g. asking students to lead discussions or make arguments based on their interpretations of texts)
  - Facilitate students' active engagement in learning through the use of inquiry-based instructional methods (i.e., where students learn by questioning and problem solving)
  - Ask students to pose questions and problems about course readings
  - Employ routines or assignments that are open-ended (e.g. group discussion; free choice in reading materials) so that all students feel comfortable participating and can have some measure of success
- Baseline teacher practices
  - uses a variety of text types
  - uses metacognitive inquiry methods in instruction
  - models with metacognitive inquiry methods
  - has students practice metacognitive inquiry strategies
- Beliefs about the literacy-science connection
  - My role in teaching literacy in my science content area is essential for students to succeed in reading
  - My role in teaching literacy in my science content area is essential for students to succeed in science
  - My job is to teach science content, and let the ELA department worry about teaching reading
  - Being an effective reader is an essential precondition for grasping the science content areas that I teach

**What we found:** First, we observed a range in adherence fidelity; that is, not all teachers adhered to program principles. Second, while we observed impacts on dimensions of instruction, these mediating processes were not associated with impact on achievement.

### 4. Variation in performance is the core problem to address.

We built in opportunities to study variation in impact to understand what works, for whom and under what set of conditions—we went beyond the usual moderator analyses. [Example: Analysis of Symmetrically Predicted Endogenous Subgroups (ASPES)]

DIFFERENTIAL IMPACT OF iRAISE ON READING LITERACY WITH A 1-UNIT INCREASE IN FOI



Levels of Teacher FOI were gauged in terms of three dimensions:

1. Attendance (at foundations training and doing homework)
2. Receptiveness (Finding PD helpful and useful)
3. Adherence (fidelity to program principles, attends to student thinking, persistence in problem solving, use of text consistent with program principles)

**What we found:** While we did not observe an overall impact on student achievement, we found evidence of variation in impact depending on level of adherence implementation.

### 5. Anchor practice improvement in disciplined inquiry.

**What we found:** A limitation of conducting PDSA in the context of this randomized trial is that the feedback process was slow. Improvement possibilities were identified with a view to the next implementation, not the current one. This is an area in need of improvement.

**General Conclusions:** There are two areas to focus improvement efforts: (1) understanding how to better follow through on instructional change to support student learning, and (2) finding ways to promote teachers' adherence to core program principles. The challenge for (2) involves motivating sluggish adopters. Overall, more than one version of professional development may be needed.

\* Principle: Engage rapid cycles of Plan, Do, Study, Act (PDSA) to learn fast, fail fast, and improve quickly. Failures are not a problem; failing to learn from them is.