



## RESEARCH REVIEW

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# STRENGTH LIES IN COMBINING CURRICULUM WITH PROFESSIONAL LEARNING

### ► THE STUDY

**Lynch, K., Hill, H.C., Gonzalez, K., & Pollard, C. (2019).** Strengthening STEM instruction in schools: Learning from research. (EdWorkingPaper: 19-142). [www.edworkingpapers.com/ai19-142](http://www.edworkingpapers.com/ai19-142).

In a recent meta-analysis, researchers Lynch, Hill, Gonzalez, and Pollard found that instructional improvement programs — an approach combining professional learning and curriculum or instructional materials — had a positive impact on student outcomes. The impact was greater than either professional development or introducing new materials alone.

Amidst a lot of discussion about whether a focus on instructional materials or professional learning is more effective, this meta-analysis offers a productive step forward by showing that strength lies in the combination of approaches.

A meta-analysis, conducted by pooling the findings of multiple randomized controlled trial or quasi-experimental studies to determine the average effect across multiple studies, can eliminate particularities of individual studies, such as those conducted in unique school settings or with a specific set of instructional materials. Its findings, therefore, carry particular weight, especially when it includes a large number of studies like the one discussed here.

This meta-analysis focused on STEM (science, technology, engineering, and math). It is a timely and important focus, given the well-documented chronic challenges of U.S. students' STEM performance, as well as the need for STEM professional learning to reduce the inequities of students from low socioeconomic backgrounds tending to have less experienced or out-of-field STEM teachers.

The researchers' goals were to examine the average impact of STEM professional learning and curriculum improvement programs, explore whether such interventions are more or less effective in high-poverty settings, and provide recommendations based on updated research evidence.

### METHODS AND FINDINGS

The Lynch et al. meta-analysis examined 95 studies that met key criteria: a rigorous design (randomized controlled trial or quasi-experimental design), published since 1989, and focused on classroom-level STEM instructional improvements through professional development, curriculum materials, or both.

Researchers determined average impact on student achievement in math and science, as well as whether instructional improvement programs with specific features resulted in larger effects on student achievement.

The overarching finding of the meta-analysis is that instructional improvement programs that include both professional development and curriculum materials are more effective than those that include professional development or curriculum alone.



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The researchers found that student outcomes were “significantly larger among programs that focused on how to use curriculum materials, and among programs that focused on improving teachers’ content and pedagogical knowledge and/or how students learned the content, relative to programs that did not have these focus areas.”

In the interventions studied that incorporated only professional development or only new curriculum materials, a typical student in the treatment group could be expected to rank about 6 percentile points higher than a typical student in the control group. But in the interventions that included both professional learning and curriculum materials, a student in the treatment group could be expected to score about 10 percentile points higher than a typical control group student.

Three professional learning formats surfaced as having positive results on student outcomes: same-school collaboration (teachers in a school engaging in professional learning together), implementation meetings (brief opportunities for participating teachers to reconvene during the course of the program for support and troubleshooting), and summer workshops. Interventions in which these features were part of the professional learning designs showed stronger gains on student assessments than interventions that did not have them.

In contrast, interventions in which the professional learning had an online component had a smaller (though still positive) impact than those without. The latter finding is only briefly mentioned in the report but might be worth additional exploration given the current circumstances and increase in online learning situations.

## RECOMMENDATIONS

These student outcomes differences are meaningful in both adding to

the evidence about the impact of professional learning focused on curriculum implementation and in thinking about how a system designs learning experiences for its educators.

The researchers point to three recommendations for practice based on the findings:

- Focus professional development on curriculum materials.
- Focus on improving teachers’ content knowledge and understanding of how students learn.
- Provide teachers opportunities to collaborate and discuss implementation regularly with teachers in their school.

These research-based recommendations can directly inform district and school professional learning decisions and provide clear support for leaders investing in curriculum-based professional learning aligned to the Standards for Professional Learning.

## IMPLICATIONS

Writing about the meta-analysis in a publication for the American Association for the Advancement of Science (Hill & Lynch, 2019), the researchers made an important note about equity that is a reminder of the need for deliberate actions to improve equity actions in professional learning.

“While the programs we examined often took place in moderate- to high-poverty settings, these programs failed to produce more equitable outcomes by improving high-poverty students’ gains at a faster rate,” the authors wrote. “In fact, our analysis suggests a slight trend toward smaller program impacts in high-poverty settings.”

Although it was not in the researchers’ scope to recommend how to address this issue in future interventions, they pointed out the need for further study and systemic action. This is a strong example of what the

**Outcomes standard** of the Standards for Professional Learning calls for in terms of consideration and planning.

In fact, the findings of the study reinforce several of the Standards for Professional Learning. The positive impacts of social supports, peer motivation, and collective efficacy support the **Learning Communities standard**, which spells out why and how collaboration is important for professional learning.

The researchers’ consideration of specific elements of professional development design is consistent with the **Learning Designs standard**, which calls for deliberate attention to how learning experiences are structured for impact.

## BEYOND STEM

Because they show that content and capacity go hand-in-hand, the findings of the meta-analysis have implications not only for STEM but for other areas of teaching and learning. As budgets tighten during the COVID-19 crisis and school closings compel decision-makers to make hard decisions about how to move forward with professional learning, Lynch et al.’s research and recommendations can serve as a guide.

Professional learning spending will come under increased scrutiny — as will the ESSA requirement that programs be evidence-based — so the authors’ recommendations for elements of professional learning that result in a positive impact on classroom instruction and student outcomes can be important for decisions about investments and planning in STEM and beyond.

## REFERENCE

Hill, H.C. & Lynch, K. (2019). *STEM professional development that works*. ARISE. [aaas-arise.org/2019/11/13/stem-professional-development-that-works](https://aaas-arise.org/2019/11/13/stem-professional-development-that-works). ■