



Research Partnership for Professional Learning

A Learning Agenda for
**Improving
Teacher
Professional
Learning
at Scale**

Heather C. Hill
John P. Papay
Nathaniel Schwartz
Sarah Johnson
Emily Freitag
Kate Donohue
Robert Q. Berry III

Susanna Loeb
Malika Anderson
Mya Baker
Bailey Cato Czupryk
Cassandra Coddington
Kristen Ehlman
Alexandra Maus

Laura Meili
Pamela Paek
Carter Romansky
Rebecca Taylor-Perryman
HaMy Vu
Shaye Worthman
Bonnie Williamson-Zerwic

Suggested Citation

Hill, H., Papay, J., Schwartz, N., Johnson, S., Freitag, E., Donohue, K., Berry, R., III, Loeb, S., Anderson, M., Baker, M., Cato Czupryk, B., Coddington, C., Ehlman, K., Maus, A., Meili, L., Paek, P., Romansky, C., Taylor-Perryman, R., Vu, H., Worthman, S., & Williamson-Zerwic, B. (2021). *A learning agenda for improving teacher professional learning at scale*. Research Partnership for Professional Learning.

Acknowledgments

Thank you to our affiliated organizations, team members, advisors, and funders for their thought partnership in creating this learning agenda: Achievement Network (Carter Romansky, Alex Maus), Annenberg Institute at Brown University (Heather Hill, Susanna Loeb, John Papay, Nathaniel Schwartz, Kate Donohue), Instruction Partners (Emily Freitag, Malika Anderson, Bonnie Williamson-Zerwic), Leading Educators (Laura Meili, Rebecca Taylor-Perryman), Teaching Lab (Sarah Johnson, Shaye Worthman), TNTP (Bailey Cato Czupryk, Cassie Coddington), UnboundEd (Kristen Ehlman, Pamela Paek), and Dr. Robert Q. Berry III (University of Virginia). RPPL is supported by Carnegie Corporation of New York, Charles and Lynn Schusterman Family Philanthropies, the Bill and Melinda Gates Foundation, and others.

Executive Summary

Through decades of shifting school reforms, policymakers have consistently called for stronger and more effective teacher learning opportunities as a means to school improvement. These calls are now more pressing than ever, as our nation's efforts to both accelerate student learning in the wake of the pandemic and radically boost educational opportunities and outcomes for historically marginalized students will rely on the success of its teaching workforce. In short, any serious pandemic recovery theory of action will include a focus on ensuring teachers have the knowledge, practices, and skills to accelerate student learning and advance educational equity. However, notwithstanding strong evidence that some professional learning (PL) programs dramatically shift student outcomes, the field has struggled to develop PL opportunities at scale that translate into improved results.

One potential source of these challenges is the current state of PL research. Much of the existing PL research literature tests only whether particular programs work. While we can derive some design principles from comparing common features across effective programs, we cannot derive very many. This means that the PL reaching teachers may not be designed in a way that maximizes its potential for leading and driving change.

Our partnership—the Research Partnership for Professional Learning (RPPL)—responds to this challenge by uniting PL organizations with leading researchers to drive a transformation of PL research and practice in the United States. We aim to create a more equitable system of schooling for all students by deliberately testing multiple design options for PL programs and working to understand their effects on teacher and student learning.

Our model calls for a series of studies that will test central questions about the design of teacher learning opportunities. We will accomplish this objective by: (a) learning **across organizations** that have different PL models and that operate in different contexts; (b) leveraging **research designs** that build causal evidence about the impact of these principles; and (c) developing more **consistent, practical measures** for PL providers to use in these studies. Results will inform organizational decisions and build a broader knowledge base about what works, for whom, and in what context.

Our learning agenda is rooted in a synthesis of the existing research base in teacher PL and adult learning more broadly. Research suggests that PL focused on content, coaching, teacher collaboration, and instructional materials can improve student learning. But beyond that, most PL designers must often undertake their work without a thorough understanding of what works, what doesn't, and why. We seek to build knowledge of PL **design features**, or the elements of PL that best foster teacher learning and, as such, improve student learning and development. We will focus on four areas:

- ⊙ **How to increase teacher motivation for and engagement in PL.** A central tenet of the adult learning literature is that motivation precedes change in practice. To benefit from PL, teachers and leaders must be motivated to invest in it, not only with dollars but also with time and energy. Yet many studies of PL proceed as if teachers' investment and trust are pre-established facts. Shedding light on ways to increase teacher engagement with PL can lead to better outcomes from investments in teacher learning.
- ⊙ **How to design PL opportunities that accelerate skill development, practice changes, and improvements in student learning.** Most PL opportunities seek changes in teachers' knowledge and skills, their classroom practices, and ultimately students' learning. Yet many current approaches to achieving these goals—for instance, targeting teacher mindsets, providing teachers quick-turnaround feedback, or designing more intense PL—remain untested. We will ask whether these and similar approaches result in reaching PL goals.
- ⊙ **How to ensure sustained changes to both teacher and student outcomes over time.** For PL to be truly transformative, changes in practice need to “stick.” We will ask how PL structures, resources, and sustained backing from school leaders can support teacher and school persistence in transformed teaching and learning.
- ⊙ **How to ensure the right conditions are in place for adult learning.** Contexts matter in PL implementation. Programs effective in one context may not be effective in another. Programs may benefit from leadership support, alignment with content standards and curricular materials, strong professional environments, and resources (e.g., time) to engage in this work. Different schools also have teaching workforces with different skills and capacities. We will explore how these local conditions support or constrain improvements in teacher learning and practice.

To address these questions, we will concentrate our study of PL features in three **content areas** of critical importance for improving student outcomes. These are:

- ⊙ **Equitable teaching practices.** Calls for more racially just classrooms have led to an explosion of equity-focused PL for teachers and schools. Descriptive research suggests strong benefits to students' well-being and achievement from equitable teaching practices.
- ⊙ **Classroom climate and environment.** Students learn best when they have a sense of belonging in the classroom, when they find their academic work interesting, and when their relationships with teachers are strong.

- ⊙ **Instructional materials.** Now more than ever, teachers must deliver rich, content-focused, curriculum-based instruction to all students by making wise use of high-quality instructional materials. We will ground our studies in PL experiences designed to help teachers achieve this goal.

Unique to our research agenda is how this work will proceed. Other research on teacher PL occurs mainly around programs created by university-based scholars; in contrast, we propose to leverage the collaboration between researchers with expertise in developing and executing rigorous studies and RPPL organizations that bring real-world delivery models and hundreds of school system partnerships. We expect that our collaborative work will encompass both hypothesis testing and hypothesis generation as new questions and issues emerge over time. **Only by working together and building innovative partnerships will we make the kind of rapid progress that the educators and students of this nation deserve.**

Section 1. Introduction

Each year, school systems across the country spend billions of dollars to support teacher learning. In theory, these investments are well warranted—teachers are the most important school-based factor in advancing student learning and in supporting students’ social-emotional development. As in any industry that relies on talent to drive impact, improving how well the workforce can do the work requires a sizable investment in improving their knowledge, skills, and capacities.

Research shows convincingly that, contrary to popular belief, professional learning (PL) can meaningfully improve teacher practice and student outcomes.¹ However, few PL programs have been shown to have positive impacts at scale. And, we do not have a good evidence base about topics like how to invest teachers in their own learning process, how to most effectively provide teachers feedback, whether shifting teacher mindsets is a necessary precondition to changing teacher practice (or vice versa), and how to leave supports in place that sustain learning. In other words, we know little about which PL design features are most effective. Likewise, we have scarce guidance about how the conditions of teaching and learning in schools affect the answers to these questions.

What is professional learning?

We define *professional learning* as learning opportunities designed to improve teacher classroom practice and effectiveness with students. These opportunities vary by both **content focus** (what teachers are learning) and **design features** (how they are learning it). PL focused on a single area (such as equitable teaching practices) may use a range of different design features. In our learning agenda, we disentangle these two dimensions of teacher PL.

This means that for most districts and PL organizations, planning PL opportunities for teachers involves a risk: The design features baked into a program may not be effective or efficient in moving the needle on teaching and learning. This leads to missed opportunities for teacher and student growth. **Less than half of math and science PL programs included in a recent research synthesis showed positive impacts on teacher knowledge and practice, and only one third showed positive impacts on student outcomes.**² Perhaps not surprisingly, many teachers also report that they are not satisfied with the learning opportunities available to them.³

Our students and teachers deserve better. The Research Partnership for Professional Learning (RPPL) is a collaborative of professional learning organizations, researchers, and funders committed to advancing the collective understanding of how to support teacher professional learning that leads to equitable student outcomes for historically marginalized students. Working together as researchers and PL designers, we aim to build the knowledge base about PL in three ways:

- ⊙ **Refocus the types of questions that PL researchers study.**⁴ Currently, most PL research seeks to identify whether specific programs are effective or not, evaluating them in a “thumbs up or thumbs down” manner. Instead, we believe PL research investments will be more effective if they look within programs to answer more granular questions centered on understanding

how programs work, identifying the specific design features that best lead to teacher learning, to changes in teacher practice, and ultimately to improved student outcomes. We are interested in studies that contrast potential programmatic design features to shed light on their comparative effectiveness.

- ⊙ **Build knowledge across organizations and contexts.** Each PL organization within RPPL has a somewhat different theory of action and model for teacher learning. Some focus more centrally on content, others on teacher mindsets and expectations. Some directly engage teacher teams in PL, while others work through coaches or instructional leaders. Furthermore, they work in a wide range of state and district contexts. Understanding the answers to the same questions across models and across sites will rapidly increase our knowledge about successful practices and how contextual any learnings are.
- ⊙ **Leverage research designs that support causal inference.** Even as the PL research agenda moves away from single-program evaluations, we will continue to leverage research designs that support causal inference. Our studies will use gold-standard randomized experiments to vary specific features in existing programs, building knowledge about what works in a comprehensive manner. We will also develop more consistent, practical measures for PL providers to use in these studies.

In short, our learning agenda seeks to build collective knowledge that can advance the efficacy of PL opportunities in promoting both teacher and student learning.

About RPPL and Our Learning Agenda

The Research Partnership for Professional Learning is a collaborative of professional learning organizations, researchers, and funders committed to advancing the collective understanding of how to support teacher PL that leads to equitable student outcomes for historically marginalized students. RPPL partners include Achievement Network, Instruction Partners, Leading Educators, Teaching Lab, TNTP, and UnboundEd. The research team is led by experts in teacher learning and improvement at the Annenberg Institute at Brown University (AIB), including Drs. Heather Hill, Susanna Loeb, John Papay, and Nathaniel Schwartz, with Dr. Robert Q. Berry III of the University of Virginia advising.

To create this research agenda, RPPL members worked with researchers at AIB to identify key questions at the core of both current PL efforts and research in this field. This included conversations among AIB and RPPL members as well as with experts in teacher PL more broadly—conversations that helped clarify the existing evidence base and identify common questions and dilemmas facing PL designers. These conversations translated into a model for improving PL at scale and a broader agenda to identify what we should learn about teacher PL—specifically, about PL design features that can accelerate teacher and student learning and about PL content that has, until now, gone largely untested.

Section 2. What We Know (and Don't Know) About Teacher PL

Our research agenda seeks to build on what we know about teacher PL. Most basically, **PL can be tremendously meaningful** in helping teachers develop their effectiveness throughout their careers. Over the past decade, dozens of randomized experiments have identified specific PL approaches that lead to large improvements in teacher knowledge and skills and in student outcomes in specific settings.

These studies have also shown convincingly that **there is no one “best” approach** to effective PL. Researchers have found that coaching models, rigorous workshops, peer mentorships, curriculum study, and many other types of PL formats have improved teacher practice and student outcomes. Similarly, these effective programs have engaged teachers in a range of different activities and targeted different teacher behaviors and skills.

However, we also know that it has been **hard to replicate and scale effective programs**. Taking specific models and transitioning them across contexts and conditions is difficult. As proven programs move beyond the initial developers to adoption at scale, issues with implementation fidelity and quality often arise. And context matters: The same program that works well in one local environment may not be as effective with different teachers, students, policies, and resources.⁵ In particular, leadership support for teacher learning can make or break the long-term efficacy of PL.⁶ And there is mounting evidence that the effects of PL vary by student population.⁷

Next, **measurement matters**. Many states, districts, and PL providers assess program success using tools that are not well aligned to the task at hand—they are either too proximal and subjective or too distal (like state standardized tests). The predominant source of evidence is survey data about teacher satisfaction. While informative and important, these data do not yield useful evidence about program effectiveness with respect to changing classrooms or student outcomes.⁸ Measures that seek to assess teacher mindsets and knowledge often do not have demonstrated relationships to practice. And while all programs seek to improve student learning, assessing effectiveness using state standardized tests requires large and generally quite expensive studies because improvements in teacher practice must be large to affect student test scores in measurable ways.

Despite these cautionary lessons, the growing base of high-quality evidence about specific programs has given rise to new lessons for the field. For example, we have reasonably strong evidence to support the following claims, detailed on the next page.



Quality is more important than quantity.

Several recent meta-analyses indicate that teachers' time investment in PL does not predict improvements in student outcomes. This suggests that the quality of PL is more important than quantity—or, more specifically, that quantity only matters if the PL opportunities are sufficiently valuable.⁹



PL around curriculum is a promising approach.

PL focused around helping teachers learn to use new curriculum materials, including “doing” the curriculum with peers and rehearsing instruction, has proven effective.¹⁰ PL that provides teachers with diagnostic information about students and specific guidance about subsequent instruction also seems to work.¹¹



Grounding PL in content matters.

PL grounded in subject-matter content can yield benefits for students.¹² This means that PL providers should discuss whatever topics the PL covers—curriculum, assessment, student learning instruction—in the context of specific disciplinary content.



Teacher collaboration can boost PL program outcomes.

PL can be particularly effective when teachers work with members of their grade-level or subject-area teams, especially when that collaboration is well structured.¹³



Expertise matters.

The ability of PL to develop the knowledge and skills of teachers depends critically on the capabilities and capacities of those leading the PL (outside providers, coaches, or peers).¹⁴



Coherence matters.

PL programs enter into complex and varied district and school environments. If teachers perceive conflicts between the practices promoted by PL and other sources of instructional guidance, they will not take up those PL practices.¹⁵

Scholars have gleaned these insights by synthesizing results from the hundreds of PL program evaluations conducted over the past two decades. We use these syntheses to guide our thinking about what we should study next.

However, transforming the way PL is delivered in schools requires a reorientation of research. The lion's share of experimental PL research over the past two decades has sought to examine whether a single program affects teachers or students. Research syntheses that summarize the results of these findings provide valuable insights, as highlighted above. But each PL program contains a unique blend of content, formats, and activities, so efforts to compare across programs to determine which elements drive program success or failure face inherent challenges. For example, few studies offer detailed information on key variables, like PL routines or leadership support, which means scholars cannot test them. Critically, such studies also cannot make causal statements about the effects of PL features on teaching and learning outcomes, meaning that we cannot definitively say that the evidence about “what works” in PL is correct.¹⁶ We need a realignment to provide practical advice about how to do PL most effectively—that is, we need to understand what PL features designers should bake into their products in order to maximize the probability of success.¹⁷

To move forward, educators need evidence about contemporary PL design features that make programs more effective and about how teachers' contexts affect their learning. We propose to make progress on these points through studies that provide causal evidence. Where causal studies are not possible, we will conduct descriptive studies to provide guidance to policymakers and PL designers and to yield hypotheses for later causal studies.

Section 3: Strengthening PL Design at Scale

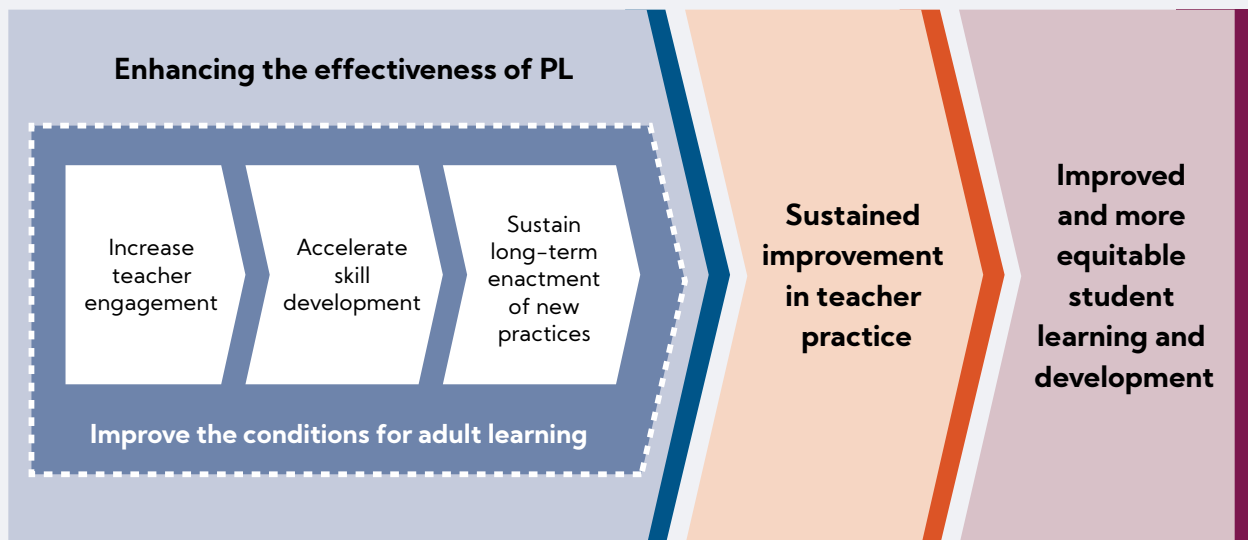
RPPL’s work focuses on pushing forward the field’s understanding of the “how” of effective PL—specifically, identifying PL **design features** that can accelerate teacher learning, independent of the content covered. PL architects make decisions about these features routinely—for instance, by providing feedback in ways likely to engage and motivate teachers or by building in resources and materials that enhance the staying power of new instructional practices. Architects of teacher PL make dozens of such decisions every time they design a new program. Thus, how do we focus our inquiry?

We start from a theory of action that describes how we can make our nation’s substantial investments in PL more effective in promoting changes in teacher practice. We rely on the existing PL literature and insights from scholars of adult learning and development. After all, the question about how to change teacher knowledge, skills, and practices is really one of how to best facilitate adult learning and behavior change.

As illustrated in the theory of action below, the literature suggests that adults must be **engaged and motivated** to make changes in their attitudes or behaviors, and that the salience of the topic can help provide this motivation. It also suggests that adult development best occurs around **specific skills and practices** rather than around more abstract concepts or knowledge. Simply knowing what to do is often not sufficient to change practice; instead, adults need chances to experiment with and receive feedback on new ways of performing old tasks. Adults need opportunities to **sustain their learnings** over time and to move from simple enactment of new practices to **regular, strategic, and mindful enactment** of these practices. Adult learning is also undoubtedly **situated in context**, socially and culturally.

Recognition of these factors at the heart of the theory of action results in a series of specific research topics. Below we discuss the questions pertaining to each factor.

What will it take to improve the effectiveness of teacher professional learning?



Increasing Teacher Engagement

Our first area of focus will identify ways PL leaders can heighten teacher investment in PL opportunities. This is rooted in the understanding that teachers who do not engage with PL cannot learn from it. Within this topic, we see several specific areas for study.

Teacher Agency

Does offering teachers greater say over what they learn and how they learn it affect teacher investment and practice?

Most teacher PL operates within a fixed framework, delivering predesigned content and activities to teachers. Yet adult learning theory holds that teachers must have agency—input into the learning topic and the method for achieving that learning—in order to take up new ideas and practices. Exploring these claims involves experimenting with more teacher choice in PL content and design, then examining whether this greater agency increases teacher engagement and learning.

Personalizing PL

Does personalizing PL improve teacher investment in the learning process?

Just as personalizing instruction can yield gains for students, we wonder whether educator buy-in is enhanced when PL providers assess teachers' needs and then personalize content to suit teachers' needs and contexts. Exploring these claims involves comparing PL that is centrally designed and delivered in a standard fashion to PL that is adapted to specific contexts.

Guided Adaptation

Does providing teachers opportunities to adjust curricula to local needs and conditions promote their commitment to these materials?

We know that teachers seldom implement curriculum materials and programs whole cloth; instead, they pick and choose, supplement, and adapt. Yet many newer curriculum materials are designed for high-fidelity implementation, meaning the benefit to students is maximized when the materials are used as designed. We will investigate whether guiding teachers in adapting curriculum materials can increase teacher uptake of the materials.²⁴

Social Accountability

Do peer or coach accountability structures improve PL engagement and produce subsequent shifts in practice?

Social accountability is based in the psychology of how individuals interact—the desire to fit in and be similar to others, to carry one's own weight, and to gain the respect of peers.²⁵ Some aspects of PL already rely upon social accountability—for instance, when teachers put in extra effort ahead of grade-level team meetings or try something new because they know their coach will soon observe their teaching. We will more formally test whether adding elements of social accountability to existing PL experiences enhances teacher investment and participation.

Accelerating Skill Development

Our second focus area centers on how specific design features of PL can accelerate changes in teacher beliefs, knowledge, and skills. Given our goal of rigorous and equitable classrooms for all students, we will explore how PL can best support teachers in doing this work. Within this topic, we see five key areas for study.

Mindsets

How and when do changes in teacher mindsets translate into changes in teaching practice?

Scholars have long wondered whether changes in teachers' conceptual understandings can drive changes in practice, whether changes in practice precede changes in teachers' conceptual understandings, or whether changes in both occur iteratively, in cycles.²⁶ Unraveling this relationship between cognitive and concrete change is particularly pressing in the area of equitable teaching practices, where many expect that teachers must change significantly in their beliefs about, knowledge of, and expectations for students in order to change practice. This question also resonates within scholarship on standards-based instruction, which asks about the role of teachers' beliefs about content and student learning in the enactment of more rigorous curriculum and instruction. This is a significant and lasting question for scholarship and for PL providers, one that we can answer by examining how and when changed mindsets result in differences in practice.

Reflection & Calibration

Can teachers' understanding of their own practice be improved by calibrated reflection opportunities?

Because teaching is a highly complex, contingent, and thus uncertain undertaking,²⁷ reflection on practice may be an adaptive and sustainable pathway toward building teacher expertise in decision making. For this reason, many contemporary professional development efforts embed reflection as a major element. However, teacher reflection is neither natural nor uniformly practiced.²⁸ In particular, teachers' reflections on their own instruction are often uncalibrated with observers' perceptions, and this lack of calibration can stand in the way of teacher progress. This suggests a line of studies on whether more elaborated routines for reflection, efforts to calibrate teachers to external standards,²⁹ or both can accelerate the teacher learning process.

Feedback

What types of feedback generate the greatest improvements?

Feedback can be a strong spur toward new practice and improved student outcomes.³⁰ Yet policymakers and practitioners have little guidance regarding the specifics of how to deliver feedback—how to mix reinforcement of positive performance, opportunities for teacher reflection, and/or specific, corrective advice. Little guidance also exists around who is best positioned to deliver feedback: principals, coaches, or peers.³¹ We need to better understand how different components and modalities of feedback affect teacher engagement and learning.

Intensity & Dosage

How does teacher time in PL affect efficacy?

While many argue that intensive PL is necessary to achieve changes in practice,³² most recent meta-analyses have not supported this claim,³³ and there are clear examples of light-touch interventions that have outsized impacts.³⁴ We argue for a new approach to studying the effects of longer versus shorter PL, first varying the intensity of PL while holding other aspects of the experience constant to gain causal knowledge in this area, then experimenting with methods for making PL more efficient.

Sequencing

Does the order of PL content affect teachers' ability to enact and retain changes in their instruction?

Scholars tend to see teacher learning as iterative and recursive,³⁵ with growth in one dimension supporting growth in another. This implies that PL might be sequenced to match this iteration and recursion, with a push in one area presaging support in another. We argue for studies that shed light on whether and how planful sequencing can maximize learning in PL settings.

Sustaining Long-Term Enactment of New Practices

The third part of our research agenda focuses on sustaining long-term enactment of key learning from PL. This includes identifying ways to make PL content “sticky” and ways to help teachers continue to develop expertise in new practices. We see three areas of study within this topic.

Making PL “Sticky”

How can resources and routines help teachers sustain new practices?

When teachers do not take up ideas and practices learned in PL, they often report that they had intended to do so but the learnings from professional development felt unconnected to their daily practice. This may help explain why PL that leaves behind resources like curriculum materials or rich assessment tasks or that includes routines to sustain practice changes can help ensure that new instructional practices “stick” and enhance program outcomes.³⁶ We will identify additional leave-behind resources and routines that can further enhance the implementation of new ideas.

Leveraging Incentives

How do incentives in the local environment sustain new practices?

Instructional practice responds to incentives. For instance, we know that teachers tailor content based on projected student performance on state tests³⁷ and work on the practices highlighted in their teacher evaluation rubrics. We need to understand whether teacher learning from PL has more staying power if incentivized by state policy or school leadership, or even informally through the relationships teachers have with their coaches and mentors.

Developing Expertise

How can teachers continue to learn from their curricula, their own instruction, and their students?

Teaching is a complex practice. Good teachers consistently notice what their students are doing and thinking, analyze these student activities in relationship to content, then adapt instruction accordingly. These decision-making skills can only be improved over the long term. Thus, we need to understand how PL can support this work, both in between providers' visits to schools and after they are long gone. Structured adaptations of curriculum materials may provide one route to doing so.³⁸ This line of research will also explore other mechanisms for reaching this goal.

Improving the Conditions for Adult Learning

The fourth area explores how teachers' and leaders' organizational contexts affect PL's ability to improve teacher practice. This includes improving our understanding of how key aspects of the professional environment in schools—such as school leadership, colleagues, time for teachers to engage in learning, evaluation, and coherence—affect PL success. We will explore these questions in two ways: by experimentally varying aspects of the organizational context when possible (e.g., teacher time) and by exploring more descriptively how features of the context moderate the effectiveness of PL design features.

Leadership

Can leaders' support for PL affect teachers' take-up, learning, and persistence?

Descriptive studies strongly suggest that leadership support for PL is a major—and sometimes overriding—factor in teacher take-up and implementation of program goals. Sometimes this means direct leadership support—for instance, leaders who are knowledgeable about the PL and who actively clear a path for its success. Leadership may also contribute to the preconditions for teacher learning, such as by setting strong norms around equitable, rigorous instruction and engaging in inclusive PL planning with their staff. We need to learn more about the ways that school leaders can most effectively build conditions that support teacher learning and the “stickiness” of PL.

How can we structure peer learning to maximize PL impact?

Teachers improve more when they teach in schools with effective colleagues and have opportunities to collaborate with those colleagues.³⁹ The effectiveness of PL structures, such as teacher teams or PL communities, depends on how these teams are led as well as the knowledge and skills of other teachers on these teams.⁴⁰ The mechanisms that drive peer learning—and the structures that best foster learning from peers—are less well understood. We will explore such structures, including ways that peers can help motivate the adoption of new practices⁴¹ and routines for producing productive discussions about instruction. We will also explore whether and how peer learning structures within schools affect PL outcomes.

Colleagues & Collaboration

Teacher Time

How do school schedules influence the effectiveness of PL?

PL clearly takes time. However, districts take vastly different approaches to providing time for it. Some offer PL days at the end of the summer; others intersperse PL throughout the school year; still others use creative school schedules to generate substantial amounts of time each week for teachers to engage in PL. We know that teachers cannot engage in PL if they do not have the time to do so, but we know much less about how different approaches to providing teachers these opportunities shape their learning and student outcomes.

Teacher Evaluation

How does formal feedback intersect with PL?

Ideally, teachers receive regular feedback on the skills and practices that their PL opportunities are seeking to build. In many districts, however, teacher evaluation is infrequent or not rigorous. To maximize the potential of PL, we need better evidence about whether PL opportunities are reinforced—or undermined—by robust teacher evaluation systems.

Instructional Coherence

How do aligned systems support teacher learning?

Coherence throughout the system, including aligned curricula, PL opportunities, and assessments for both students and teachers, is also essential. While policymakers and practitioners often talk about the importance of such alignment, and case study evidence suggests it plays a role in the uptake of new practices learned in PL, few causal studies have documented whether coherent instructional systems support adult learning.

Section 4: A Focus on Equitable Teaching and Learning

RPPL's central focus is to explore how different PL design features can promote effective teacher learning. However, any PL happens around content—the “what” of PL—which can be varied and multifaceted. PL can be about subject matter, student learning, instructional techniques, assessment, curriculum materials, and many other topics. In our work together, we will focus on PL content that addresses persistent inequities in classrooms and that seeks to make teaching and learning more equitable. By concentrating our efforts in this way, we hope to make progress on issues that are central to the field of teacher PL and to the improvement of student learning more broadly. In this section, we highlight three key aspects of this content: (a) more equitable instructional practices; (b) more supportive classroom environments; and (c) better standards-based instruction with high-quality instructional materials.

Equitable Teaching Practices

Schools and classrooms play a role in replicating and perpetuating institutionalized racism through broad structures, like school disciplinary policies and curriculum materials that fail to reflect students' experiences and identities, as well as through the daily actions of educators. Recent attention to these injustices has resulted in an explosion of PL around equitable teaching practices. Scholarship, however, has not kept up. The need for research in this sector is urgent and pressing because such PL is already widespread and because descriptive studies suggest strong benefits to students' well-being and achievement from pedagogies that join these ideas.

What Are Equitable Teaching Practices?

We use the term *equitable teaching practices* to encompass diverse approaches to improving the classroom experiences of historically marginalized students. These include efforts that address teacher racial bias; incorporate antiracist teaching; attempt to raise teacher expectations for historically marginalized students; transform curricula to build on students' interests, prior knowledge, and strengths; help teachers deploy culturally responsive, relevant, healing, and humanizing pedagogies; and leverage pedagogies that help develop students' *critical consciousness*, a tool for navigating and transforming racist structures and policies. These approaches to more equitable classrooms are meaningfully different from one another, implying different changes to instruction and thus, by extension, differences in the PL required to support those changes. Here we name them *equitable teaching practices* to recognize the similarity in the end goal of **more just classrooms and academic success for all students** and also to acknowledge the diversity of approaches in this space.

Supportive Classroom Environments

We know that students learn best when they feel seen and have a sense of belonging in their classrooms; when they are interested and invested in their academic work; and when they enjoy good relationships with their teachers.¹⁸ We also know that student engagement¹⁹ and teacher–student relationship quality²⁰ fall off as students enter late elementary and middle school, and may fall off especially sharply for historically marginalized students.²¹ Existing studies of PL programs that address these topics suggest that improvements in classroom environments and teacher–student relationships may play an outsized role not only in improving student academic achievement but also in reducing racial gaps in discipline.²²

Standards–Based Instruction and High–Quality Instructional Materials

Helping students achieve rich and meaningful learning in core content areas will require many teachers to make significant growth in their own skill sets. Teachers need to foster student thinking and reasoning; use student ideas and contributions to help develop important subject-matter content; and adjust instruction to students’ backgrounds and prior knowledge. They need to maximize the potential of curriculum materials designed to support the delivery of academically challenging content.²³ And teachers need to ensure that students have—and profit from—opportunities to learn from rich, disciplinary-focused instruction. Yet the specific PL experiences that help teachers grow expertise in these standards-based instructional practices remain, to an extent, unmapped. We know that pairing PL with curriculum materials and focusing on teachers’ content knowledge appears to support teachers in this work. Nevertheless, there is more to learn, including finer-grain questions about developing teacher expertise with curriculum materials.

Professional Learning and Educational Leaders

Our research agenda focuses mainly on teacher PL. From this view, educational leaders—district and school staff, including curriculum and instruction supervisors, principals and assistant principals, instructional coaches, and others—form an important part of the context in which the work takes place. Simply put, leadership can accelerate or impede teachers’ adoption of new ideas and practices. Leaders can clear the way for teacher learning or make it more difficult. Leaders are also important factors in whether learning from PL “sticks” in teachers’ practice over the long term. We will explore how leaders operate as important moderators who influence the success of PL efforts.

Leaders also play two additional roles in our research agenda. First, we know that educational leaders often *deliver* teacher PL, particularly in district contexts, making them potential partners in the research we propose. And second, leaders are themselves the *recipients* of PL experiences, meaning aspects of this research agenda—particularly around motivation, personalization, and accountability—can be replicated using leaders as research participants.

Section 5: Building a Knowledge Base

Our long-term learning agenda is designed to generate rigorous research evidence about PL content and design. As such, it both responds to organizational dilemmas facing PL providers in practice and aims to push forward the field of research on PL. This approach has strong parallels to how scholars within design-based implementation research have built a research portfolio that informs practice.⁴²

Planned Variation

To achieve the aims we describe in our agenda, we will need to introduce planned variation in design features within PL opportunities. Ideally, this research agenda will be carried out via **randomized experiments** using proximal measures of teacher commitment, beliefs, and practice and of student learning and development.

We will introduce this planned variation in several ways. Some studies may feature a PL provider enhancing their product with a new element—for instance, a feature to drive teacher investment or an opportunity to participate in a specific kind of feedback experience—and then testing the efficacy of that new element by randomly assigning it to some groups of teachers or schools and leaving others in the “business as usual” condition while the study occurs. Other studies may compare two approaches to a new element—for instance, heightening teacher investment through enhanced social accountability, but trialing peer-group social accountability versus accountability to a PL coach or program facilitator. Still other studies may use oversubscribed PL or phased-in PL to create a natural comparison group in order to examine the effects of new program components on practice.

This new work needs to be **sensitive to contexts**, including the baseline preparation of the teacher labor force, support for teacher growth within schools, and nuanced understandings of the unique strengths of student populations that are diverse in terms of race/ethnicity, English language fluency, and family income. This is particularly important for studies focused on equitable teaching practices because programs that work for one group of students and teachers may not work for another. In particular, we need to develop empirical evidence regarding the differential impact of PL opportunities on teachers who serve students from different ethnic and racial groups. Understanding how the practices that PL programs promote affect Black, Latinx, and Indigenous populations differently is critical, from both ethical and practical standpoints.

Measurement

Executing this research agenda will require advances in data collection and measurement. This entails two lines of work.

First, we will accelerate the field’s **cataloguing of existing measures of teacher beliefs**, knowledge, instructional practices, and student outcomes. Scholars have already produced dozens of instruments designed to measure standards-based instruction, culturally responsive practice,

classroom environments, and teacher beliefs about subject matter, students, and teaching. Decades of work on social-emotional learning has left us with a rich base of measures of student well-being. Existing efforts to identify and collect measures (e.g., EdInstruments.com) have made substantial headway, but there is much more work to be done. Making sure that these measures are catalogued and easily searchable will help ensure the success of this research agenda.

Second, we will **create and adapt a set of practical measures**⁴³—particularly measures of instructional quality—to serve RPPL’s specific research goals. We will identify classroom practices that are common targets of contemporary PL but not covered by existing measures and build indicators that are both easily observable and correlated to student outcomes. We will also determine how best to use these instruments in the context of the experiments we propose above. Where teacher evaluation measures necessarily focus on the accuracy of teacher-level scores, our studies may instead target score accuracy within particular grade levels or schools. Doing so will suggest different and possibly more efficient ways to collect those data.

Both of these lines of work will take significant investment. Though we have a solid foundation of existing measures and analytic techniques to build upon, developing and validating new instruments is time consuming and expensive. However, we cannot identify key PL content and design features without accurate, valid measures of outcomes.

Research Infrastructure

Conducting these studies across organizations provides a tremendous opportunity to rigorously explore how the lessons we learn translate across contexts and PL models. However, doing this work will require a **collaborative research infrastructure** to enable RPPL to be able to learn together, better, and faster.

First, we need to build **internal capacity and routines** that support: (a) efficient articulation of specific research questions that build on existing evidence and tie to organizational priorities; (b) development of the specific treatments that we hope to test; and (c) infrastructure to collect the data described above. We must also rethink the relationships between PL organizations and local school districts that will be the sites of this research, seeking to build learning partnerships from existing PL service arrangements.

This last piece is critical because none of this work is possible without participating teachers, schools, and districts. To successfully advance our agenda, we need each study to include a large enough sample to know that any differences we find are unlikely to be due to chance. **Appropriate sample sizes** vary by study, but most analyses of this kind suggest that researchers need to randomly assign 80 to 100 units (schools, classrooms, or teachers) to detect reasonably sized impacts.

Section 6. A Call to Action

Teachers are learners. Many enter the teaching profession because it offers the opportunity for lifelong study and learning, and all learn substantially once on the job. Yet individual experiences with professional learning often fail to live up to this promise. This learning agenda launches what we hope will be a sustained initiative around the best ways to use research to improve learning opportunities for teachers and for their students.

As a research network, we will use this framework to anchor a series of studies, beginning with the questions that feel most immediately relevant to the learning needs of our member organizations and to their school system partners. To accelerate progress over time, we will simultaneously build a common research infrastructure—the common data-gathering tools, shared agreements, and project management capability—that will allow us to learn faster together.

Over time, we aim to develop a portfolio of linked studies whose results directly translate into greater effectiveness in PL for the organizations in our consortium. As we learn, we will publish synthesis reports and briefs that capture our developing understanding in specific areas of focus. We hope to provide guidance for PL developers, schools, and school systems to help shape learning opportunities that engage and motivate teachers, build knowledge and skills, lead to sustained changes in practice, and advance educational equity for students.

We fully expect that this process will raise new questions and highlight missing elements in our current research agenda, and we will update the work accordingly. We aim for our agenda to become a living document, informed over time by ongoing learning and by new questions from the field. The agenda we describe here represents the first step in an iterative process that will produce additional areas for study even as it resolves some of the first-stage questions. The broader test of the usefulness of a research agenda like this one is whether it can lay the foundation for a program of study that shifts the direction of the field and meaningfully informs practice at scale going forward.

We are highly aware of the challenges in taking on an agenda of such breadth and depth. We hope that this agenda speaks to the concerns and learning questions of organizations beyond RPPL that are working in similar spaces, and we hope to add additional member organizations over time. We see tremendous opportunity in collaborations that allow us to use this agenda as a framework for study that extends to other organizations as well as to other areas that seek to advance teacher learning, such as teacher preparation and induction. We also hope that the lessons we collectively learn about program design will move beyond our member organizations to reach the broader PL universe in schools and systems across the country. **Only by working together and building innovative new partnerships will we make the kind of rapid progress that our field demands and that the educators and students of this nation deserve.**

Endnotes

- 1 Didion, L., Toste, J. R., & Filderman, M. J. (2020). Teacher professional development and student reading achievement: A meta-analytic review of the effects. *Journal of Research on Educational Effectiveness*, 13(1), 29–66. <https://doi.org/10.1080/19345747.2019.1670884>; Gonzalez, K., Lynch, K., & Hill, H. C. (2021) *The Impact of STEM professional development and curriculum improvement efforts on teacher knowledge and practice: A meta-analysis* [Manuscript in preparation]; Kraft, M. A., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, 88(4), 547–588. <https://doi.org/10.3102/0034654318759268>; Lynch, K., Hill, H. C., Gonzalez, K. E., & Pollard, C. (2019). Strengthening the research base that informs STEM instructional improvement efforts: A meta-analysis. *Educational Evaluation and Policy Analysis*, 41(3), 260–293. <https://doi.org/10.3102/0162373719849044>
- 2 Lynch et al. (2019).
- 3 Bill & Melinda Gates Foundation. (2014). *Teachers know best: Teachers' views on professional development*. <https://s3.amazonaws.com/edtech-production/reports/Gates-PDMarketResearch-Dec5.pdf>
- 4 Hill, H. C., Beisiegel, M., & Jacob, R. (2013). Professional development research: Consensus, crossroads, and challenges. *Educational Researcher*, 42(9), 476–487. <https://doi.org/10.3102/0013189X13512674>
- 5 Hill, H. C., Corey, D. L., & Jacob, R. T. (2018). Dividing by zero: Exploring null results in a mathematics professional development program. *Teachers College Record*, 120(6), 1–42; Matsumura, L. C., Garnier, H. E., & Resnick, L. B. (2010). Implementing literacy coaching: The role of school social resources. *Educational Evaluation and Policy Analysis*, 32(2), 249–272. <https://doi.org/10.3102/0162373710363743>; Santagata, R., Kersting, N., Givvin, K. B., & Stigler, J. W. (2011). Problem implementation as a lever for change: An experimental study of the effects of a professional development program on students' mathematics learning. *Journal of Research on Educational Effectiveness*, 4(1), 1–24. <https://doi.org/10.1080/19345747.2010.498562>
- 6 Hill et al. (2018); Matsumura et al. (2010); Santagata et al. (2011).
- 7 Lynch et al. (2019).
- 8 Hill et al. (2013).
- 9 Kraft et al. (2018); Lynch et al. (2019); Patrick, S. K., Grissom, J. A., & Papay, J. P. (2021). *Exploring the professional learning landscape: Evidence from Tennessee* [Manuscript in preparation].
- 10 Kraft et al. (2018); Lynch et al. (2019).
- 11 Faber, J. M., Luyten, H., & Visscher, A. J. (2017). The effects of a digital formative assessment tool on mathematics achievement and student motivation: Results of a randomized experiment. *Computers & Education*, 106, 83–96. <https://doi.org/10.1016/j.compedu.2016.12.001>; Supovitz, J. A., Ebbly, C. B., Remillard, J. T., & Nathenson, R. (2021). Experimental impacts of Learning Trajectory–Oriented Formative Assessment on Student problem-solving accuracy and strategy sophistication. *Journal for Research in Mathematics Education*, 52(4), 444–475.
- 12 National Academies of Sciences, Engineering, and Medicine. (2020). *Changing expectations for the K–12 teacher workforce: Policies, preservice education, professional development, and the workplace*. National Academies Press. <https://doi.org/10.17226/25603>
- 13 Cohen, D. K. (2011). *Teaching and its predicaments*. Harvard University Press; Lynch et al. (2019).
- 14 Jackson, C. K., & Bruegmann, E. (2009). Teaching students and teaching each other: The importance of peer learning for teachers. *American Economic Journal: Applied Economics*, 1(4), 85–108. <https://doi.org/10.1257/app.1.4.85>
- 15 Hill et al. (2018).
- 16 Because meta-analyses do not randomly assign design features to PL programs, they are by nature correlational. Any apparent “effects” of these design features might simply result from the fact that they tend to be concentrated in otherwise more effective programs.
- 17 For a similar argument, see Hill et al. (2013).
- 18 Paunesku, D., & Farrington C. A. (2020). Measure learning environments, not just students, to support learning and development. *Teachers College Record*, 122(14), 1–26.
- 19 Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal*, 37(1), 153–184. <https://doi.org/10.3102%2F00028312037001153>
- 20 Etekal, I., & Shi, Q. (2020). Developmental trajectories of teacher–student relationships and longitudinal associations with children's conduct problems from Grades 1 to 12. *Journal of School Psychology*, 82, 17–35. <https://doi.org/10.1016/j.jsp.2020.07.004>
- 21 Spilt, J. L., & Hughes, J. N. (2015). African American children at risk of increasingly conflicted teacher–student relationships in elementary school. *School Psychology Review*, 44(3), 306–314. <https://doi.org/10.17105/spr-14-0033.1>
- 22 Gregory et al. (2015); Okonofua, J. A., Paunesku, D., & Walton, G. M. (2016). Brief intervention to encourage empathic discipline cuts suspension rates in half among adolescents. *Proceedings of the National Academy of Sciences*, 113(19), 5221–5226. <https://doi.org/10.1073/pnas.1523698113>; Gregory, A., Allen, J. P., Mikami, A. Y., Hafen, C. A., & Pianta, R. C. (2014). Effects of a professional development program on behavioral engagement of students in middle and high school. *Psychology in the Schools*, 51(2), 143–163. <https://doi.org/10.1002/pits.21741>; Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science*, 333(6045), 1034–1037. <https://doi.org/10.1126/science.1207998>; Gregory, A., Hafen, C. A., Ruzek, E., Mikami, A. Y., Allen, J. P., & Pianta, R. C. (2016). Closing the racial discipline gap in classrooms by changing teacher practice. *School Psychology Review*, 45(2), 171–191. <https://doi.org/10.17105/spr45-2.171-191>
- 23 Short, J., & Hirsh, S. (2020). *The elements: Transforming teaching through curriculum-based professional learning*. Carnegie Corporation of New York.
- 24 Kim, J. S., Burkhauser, M. B., Quinn, D. M., Guryan,

- J., Kingston, H. C., & Aleman, K. (2017). Effectiveness of structured teacher adaptations to an evidence-based summer literacy program. *Reading Research Quarterly*, 52(4), 443–468. <https://doi.org/10.1002/rrq.178>
- 25 Bridwell-Mitchell, E. N. (2016). How peer learning in communities of practice enables and inhibits micro-institutional change. *Organization Studies*, 37(2), 161–192. <https://doi.org/10.1177/0170840615593589>; O'Reilly, C. A., & Chatman, J. A. (1996). Culture as social control: Corporations, cults, and commitment. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior: An annual series of analytical essays and critical reviews* (Vol. 18, pp. 157–200). Elsevier Science/JAI Press.
- 26 Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education*, 18(8), 947–967. [https://doi.org/10.1016/S0742-051X\(02\)00053-7](https://doi.org/10.1016/S0742-051X(02)00053-7); Cochran-Smith, M., & Lytle, S. L. (1999). Relationships of knowledge and practice: Teacher learning in communities. *Review of Research in Education*, 24(1), 249–305. <https://doi.org/10.3102/0091732X024001249>; Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher*, 15(5), 5–12. <https://doi.org/10.3102/0013189X015005005>; Helsing, D., Howell, A., Kegan, R., & Lahey, L. (2008). Putting the “development” in professional development: Understanding and overturning educational leaders’ immunities to change. *Harvard Educational Review*, 78(3), 437–465. <https://doi.org/10.17763/haer.78.3.8881759g1qm54660>; Timperley, H. S., & Robinson, V. M. (2001). Achieving school improvement through challenging and changing teachers’ schema. *Journal of Educational Change*, 2(4), 281–300. <https://doi.org/10.1023/A:1014646624263>
- 27 Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
- 28 Valli, L. (1997). Listening to other voices: A description of teacher reflection in the United States. *Peabody Journal of Education*, 72(1), 67–88. https://doi.org/10.1207/s15327930pje7201_4
- 29 Lichtenstein, S., & Fischhoff, B. (1977). Do those who know more also know more about how much they know? *Organizational Behavior and Human Performance*, 20(2), 159–183. [https://doi.org/10.1016/0030-5073\(77\)90001-0](https://doi.org/10.1016/0030-5073(77)90001-0)
- 30 The meta-analysis was authored by Kraft et al. (2018). See also: Dee, T. S., & Wyckoff, J. (2015). Incentives, selection, and teacher performance: Evidence from IMPACT. *Journal of Policy Analysis and Management*, 34(2), 267–297. <https://doi.org/10.1002/pam.21818>; Taylor, E. S., & Tyler, J. H. (2012). The effect of evaluation on teacher performance. *American Economic Review*, 102(7), 3628–3651. <https://doi.org/10.1257/aer.102.7.3628>
- 31 Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of young athletes. *Journal of Sports Science & Medicine*, 7(3), 371–378.
- 32 Borko, H., Jacobs, J., & Koellner, K. (2010). Contemporary approaches to teacher professional development. In P. Peterson, E. Baker, & B. McGaw (Eds.), *International encyclopedia of education* (Vol. 7, pp. 548–556). Elsevier; Desimone, L. M. (2009). Improving impact studies of teachers’ professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181–200. <https://doi.org/10.3102/0013189X08331140>; Hawley, W., & Valli, L. (1999). The essentials of effective professional development: A new consensus. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the learning profession: Handbook of policy and practice* (pp. 127–150). Jossey-Bass.
- 33 Didion et al. (2020); Kraft et al. (2018); Lynch et al. (2019).
- 34 Lang, L. B., Schoen, R. R., LaVenita, M., & Oberlin, M. (2014, March 6–8). *Mathematics Formative Assessment System—Common Core State Standards: A randomized field trial in kindergarten and first grade* [Conference presentation]. Spring 2014 Society for Research on Educational Effectiveness Conference, Washington, DC, United States; Okonofua et al. (2016); Papay, J. P., Taylor, E. S., Tyler, J. H., & Laski, M. E. (2020). Learning job skills from colleagues at work: Evidence from a field experiment using teacher performance data. *American Economic Journal: Economic Policy*, 12(1), 359–388. <https://doi.org/10.1257/pol.20170709>
- 35 Clarke & Hollingsworth (2002); Goldsmith, L., Doerr, H., & Lewis, C. (2014). Mathematics teachers’ learning: A conceptual framework and synthesis of research. *Journal of Mathematics Teacher Education*, 17(1), 5–36. <https://doi.org/10.1007/s10857-013-9245-4>
- 36 Faber et al. (2017); Lynch et al. (2019); van der Scheer, E. A., & Visscher, A. J. (2017). Effects of a data-based decision-making intervention for teachers on students’ mathematical achievement. *Journal of Teacher Education*, 69(3), 307–320. <https://doi.org/10.1177/0022487117704170>
- 37 Booher-Jennings, J. (2005). Below the bubble: “Educational triage” and the Texas accountability system. *American Educational Research Journal*, 42(2), 231–268. <https://doi.org/10.3102/00028312042002231>
- 38 Kim et al. (2017).
- 39 Jackson & Brueggman (2009); Papay et al. (2020); Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. (2015). Teacher collaboration in instructional teams and student achievement. *American Educational Research Journal*, 52(3), 475–514. <https://doi.org/10.3102/0002831215585562>
- 40 Charner-Laird, M., Ng, M., Johnson, S. M., Kraft, M. A., Papay, J. P., & Reinhorn, S. K. (2017). Gauging goodness of fit: Teachers’ assessments of their instructional teams. *American Journal of Education*, 123(4), 383–340. <https://doi.org/10.1086/692663>; Little, J. W. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. *American Educational Research Journal*, 19(3), 325–340. <https://doi.org/10.3102/00028312019003325>
- 41 Bridwell-Mitchell (2016).
- 42 Fishman, B. J., Penuel, W. R., Allen, A.-R., Cheng, B. H., & Sabelli, N. (2013). Design-based implementation research: An emerging model for transforming the relationship of research and practice. *Yearbook of the National Society for the Study of Education*, 112(2), 136–156.
- 43 Yeager, D., Bryk, A., Muhuck, H., & Morales, L. (2013). *Practical measurement*. https://www.carnegiefoundation.org/wp-content/uploads/2013/12/Practical_Measurement.pdf



Research Partnership for Professional Learning

rpplpartnership.org © [@rpplpartnership](https://www.instagram.com/rpplpartnership)