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Teaching Children Well

New Evidence-Based Approaches to Teacher Professional Development and Training

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Introduction and summary

We have a problem. Increasing teacher and teaching effectiveness is arguably the paramount challenge facing public elementary and secondary education, and we have too few proven-effective ways of getting this done. Federal funding is pouring into initiatives that emphasize measurement and improvement of teacher performance, including the Obama administration's signature education-reform initiatives like the Race to the Top program for states, the implementation of data systems that track student achievement, and funds dedicated to investments in innovative models of educational improvements in districts. Yet there is no stockpile of effective teacher professional development and training approaches from which states and districts can choose.

Further, the evidence suggests that most teacher professional development has little if any impact, anyway. The gaps between the stated aims of federal and state policy, the needs of the teacher workforce, and proven solutions that improve teacher and teaching effectiveness are a serious impediment to any effort to improve student achievement. In the clutter and clamor of claims and tools for improving teachers' impacts, it is critical that state and district superintendents, principals, school boards, and reform leaders grasp the importance of their choices and direct their attention to evidence-supported models.

It is a travesty that despite districts spending thousands of dollars per teacher each year on professional development, these dollars are most often spent on models that are *known to be ineffective.* These are predominantly one-time workshops that focus mostly on awareness or general knowledge rather than specific skills, or models that have little basis in what is known about effective instruction, curriculum, or classroom interactions. No wonder there is so little evidence of impact. Federal and state policymakers should take note—unless evidence standards and rigorous review are used to channel money well, most of the current investment in teacher professional development is unlikely to have its intended effect. With student achievement at an all-time low, particularly in comparison with other nations, with education such a critical piece of economic development, and with

state and local financial resources strained to the breaking point, it is imperative that education leaders use existing money wisely and efficiently.

We all agree teachers are the critical leverage point for improving a host of desired student-learning outcomes—achievement test scores, critical thinking and problem solving, teamwork, and life skills. So it seems only sensible to invest in teachers' skills and knowledge, an argument the public also endorses. But unless those investments are targeted for and deliver proven results for students—real learning gains and skills that make them competitive in the workplace—opportunities both for the improvement of the public education system and for the millions of children it serves will be squandered.

The aim of this report is to illustrate features of new evidence-supported approaches to professional development that have promise for closing not only the evidence gap, but the achievement gap as well. The focus is on one web-based, scalable approach to professional development—MyTeachingPartner, or MTP—that illustrates how evidence-driven professional development can be designed and used to improve teacher effectiveness and student learning. MTP uses a standardized method of online, individualized coaching and a library of highly focused video clips showing effective teachers in action that are tightly coupled with a standardized metric for observing teacher practice in the classroom, called the Classroom Assessment Scoring System, or CLASS.

CLASS and MTP are examples of recently developed models of teacher assessment and professional development funded by grants from a range of federal sources. They include models for observing teachers' instruction in mathematics lessons that are useful in modeling feedback about instruction in the upper grades. There are now professional-development tools that show promise for improving instruction and children's math skills in preschool.[1] In early literacy, there are now videos to provide teachers feedback with demonstrable gains for students' skills as well as statewide models that connect individualized feedback, coursework, and assessment of students' school-readiness skills in a program of teacher professional development.[2] And with the recent work of the Gates Foundation-funded Measures of Effective Teaching project—spurred by policies that require assessment of teachers' performance, observations of teachers' instruction, and the use of video examples of effective practice—all of these approaches will take on a much larger role in districts' professional development approaches.

Together, CLASS and MTP reflect an emerging new wave of teacher-performance assessment and improvement systems that are embedded in and focused on the actual classroom practices of teachers (and not some distal awareness or background knowledge); that focus on skill development; and that closely link assessment with improvement.[3]

CLASS and MTP are not the only systems that reflect this new approach. The intent in this more detailed presentation of CLASS-MTP is to illustrate features of professional development that are linked to impact on teacher practice and student outcomes. Although the focus of the CLASS-MTP model is on teacher-child interaction, common features of effective professional development are also evident when the focus is on increasing teacher knowledge or on implementation of specific curricula.

Common among all these models of teacher professional development is a highly focused target for teacher behavior or knowledge that has a demonstrable link to student achievement. This behavior and knowledge can then be the target of professional-development activities for teachers and can be directly assessed for its impact on these very behaviors or knowledge. In this way, effective professional development, whether knowledge-, skill-, or curriculum-focused, reflects a very tight coupling, or alignment, between the activities in which teachers engage to improve their knowledge and skill and the actual student achievement and social behaviors that are the ultimate goals of professional development. In the sections that follow, these features are illustrated in considerable detail with regard to one approach that focuses on teacher-student interaction as the outcome.

This report provides background information on the broader challenges of building effective professional development for teachers, the theory of action that undergirds the CLASS-MTP system, and a description of the CLASS-MTP tools and evidence base. The report closes with a discussion of the policy and practice challenges of implementing effective systems of teacher professional development on a district or statewide level based on the evidence gleaned and lessons learned from this work.

Among the policy questions addressed are:

- What are the design and implementation features of effective professional development for teachers?
- What are the standards for evidence that can be applied to professional development models?

- Can proven-effective models also be scalable and cost effective?
- What are the state and district challenges to adopt or select proven-effective models?

Policy and decision-making recommendations include:

- Explicit requirements for criteria related to the actual processes by which specific professional-development activities are intended to improve teacher performance and student achievement.

- Evidence of impact for any professional-development model should be present in order to be eligible for use of public funds.

- Development and use of guides for selecting professional development for district and state leaders that specify explicit criteria for selection of effective professional development.

- Tighter monitoring of the use of public funds for the purposes of providing professional development for teachers.

- Requirements by states and federal agencies that direct, valid assessments of teacher performance be included as part of teacher preparation and certification systems. Direct assessments actually sample real teaching behaviors as they are experienced by students (observations or student surveys) while valid assessments have demonstrable links to student achievement and other outcomes.

In the pages that follow, we demonstrate why that time-honored practice, the one-day teacher workshop, should die a well-deserved death, and that piling up professional-development course credits and advanced degrees has virtually no impact on student achievement. We show that one of the most important factors in achieving academic progress is a students' consistent exposure to positive, cognitively demanding student-teacher interactions, and that video snippets and one-on-one coaching can inspire and transform a teacher's daily performance. It sounds simple, and it is.

Background and challenges for teacher professional development models

There are two overarching tasks that a scalable system of effective professional development must accomplish. First, the training and support experiences offered to teachers must be proven effective for improving practice and student learning. Second, to implement a proven-effective model at a statewide or districtwide scale, it must be replicable and embedded in systems of incentives, management, and evaluation that enable high levels of participation and fidelity. Without either of these two conditions—a proven-effective model and a system for scaling—ineffective, one-time experiences that have little hope of impact will remain the norm.

Most school leaders know they need to move away from one-time workshops—the approach they have used for decades. Experience tells them that professional development should be sustained, intensive, and focused on content and practice. But where is the supply of proven-effective programs? Where would a school leader turn to identify programs that work?

A recent review of more than 1,300 studies of the impact of teacher professional development on K-12 student outcomes found only nine studies that met standards for "evidence without reservations" from the What Works Clearinghouse, the federal standard for effective-education programs.[4] These nine professional-development programs consistently showed moderate effects on student achievement, and all involved elementary school teachers. Surprisingly, one of the other most commonly deployed approaches to teacher professional development, accumulating course credits or advancing in terms of degree status (for example, from bachelor's to master's), has virtually no impact on student outcomes or teacher practice. The cupboard, so to speak, is bare.

There are well-controlled studies, however, that have identified features of professional development that do relate to improved teacher practice and student learning. These features include:

- Specific and up-to-date knowledge of students' skill targets and progressions
- Direct support in more effective teacher-student interactions that promote student engagement and learning
- Direct support in effectively implementing curricula
- Explicit coupling of student and teacher performance-outcome assessments (student or teacher) with the professional development activities to which teachers are exposed

Each of these features can be represented in various combinations or focuses, and are agnostic with regard to content—that is, they reflect effective professional development for math as much as for civics.

In short, the features of effective professional development are highly targeted on relevant knowledge and practice, and there is close alignment between assessment (of teacher practice or child outcomes) and professional-development supports intended to produce those practices and outcomes. Experimental and highly controlled studies suggest that when such targeted, aligned supports are available to teachers, student-skill gains can be considerable—on average, 10 percentile points on standardized achievement tests and as much as 15 percentile points for disadvantaged students.[5]

The starting point for effective professional-development design is a theory that explicitly identifies and describes the mechanism through which the professional development would have its intended effect (for example, why should this specific teacher support work?), and a direct linkage with a system for assessing teacher practice (for example, what does good practice look like?) that explicitly aligns the professional development with classroom practice. Professional development approaches (such as courses, workshops, coaching, and professional learning communities—groups of teachers that gather to analyze and discuss their practice) need a clear and strong articulation of why that specific experience should change teachers' practice or student learning (the mechanism, or how, of change or improvement).

Courses, workshops, and coaching must directly produce the skills that can be measured as best practices (such as through an existing teacher-observation system), and the student outcomes (in other words, achievement) that are the intended result. If such mechanisms and intended outcomes are explicitly stated, then it becomes possible to evaluate various forms of professional development against such claims. In the vast majority of extant professional development, the

lack of evidence for or against impacts is in large part due to the absence, vagueness, or inadequacy of the rationale for why they should work in the first place.[6]

Yet even for approaches that do specifically articulate how and why they might work, and demonstrate some reasonable impacts on intended outcomes in controlled studies, the challenge is scaling up: How can effective programs be delivered to large numbers of teachers, either in a district or state? Because even for professional-development approaches that work with a few dozen teachers or a couple of schools, there is little evidence that they can be implemented in a standardized manner across teachers so that many thousands can improve their work systematically at district or state levels.

Over the past decade, our team at the Center for Advanced Study of Teaching and Learning, or CASTL, at the University of Virginia has worked on a model of professional development to improve teacher-student interactions and in turn increase student learning and development. This program of research involved standardized descriptions and measures of teachers' practices that we have used in tens of thousands of classrooms and experimental studies of different approaches to professional development designed to improve teacher practices and interactions.

We have designed and conducted this work with an interest in a scalable solution to supporting teachers in classrooms. Standardized observation of teachers' classroom interactions is the leverage point, based on the logic that if one could observe (across many classrooms) practices of teachers proven to contribute to children's learning gains, then those observed behaviors should be the "target" of professional development. That is, our approach to alignment of assessment and professional development has been to identify and measure what teachers do that matters, and design and test professional development that produces those behaviors.[7]

The design and evaluation of professional development has been focused on a standardized observational assessment of teacher-student interactions developed by our CASTL team—the Classroom Assessment Scoring System, or CLASS— which predicts student learning and social gains. In many thousands of classrooms across grade levels and content areas, higher CLASS ratings predict greater student learning, which suggests that CLASS-related behaviors matter.[8] MyTeachingPartner, or MTP, is a system of coaching and video examples of best practices that produce those CLASS behaviors (and higher CLASS ratings) and student gains.[9] In our design scheme, this coupling of observation with effective

professional development satisfies the first task in building a scalable system of effective supports for teachers—a model that works.

In evaluating professional development, for too long the standard of evidence has been some indicator of teacher satisfaction or self-report of learning, usually gathered using a questionnaire. And too often the published literature includes "evaluations" of professional development that rely on teachers' self-reported gains or experiences of satisfaction. These evaluations fall woefully short of identifying links to teacher practices or student outcomes and fail to include any adequate control or comparison groups that would inform inferences about whether the professional development actually caused improvement.

Direct assessments of teachers' knowledge and skills, and evaluation designs that include random assignment experiments or controlled studies of large-scale implementation, as a 2007 study indicates, are virtually absent.[10] So when leaders and decision makers look for "evidence-based models," they are left to flail in the gap between claims for impact and the needs of their workforce, with the public demanding improvement and accountability. As will be evident in what follows, and is present in models of professional development that raise student achievement through a focus on content knowledge or curriculum implementation,[11] the direct assessment of teacher outcomes (for example, knowledge or skills) is one of the more critical features.

The next sections of the paper present the theory behind the CLASS-MTP model and a more detailed description of the approach itself. The overall aim is to illustrate an approach to professional development in which outcomes (teacher behaviors, student learning) are tightly coupled with inputs to teachers (coaching, video analysis, text) in an aligned system of support. This design approach, in which outcomes are tightly coupled with inputs, has been shown effective in our team's work but also in approaches to professional development that are focused on content knowledge or curriculum.

A professional development focus on teachers' classroom interactions with students

In large-scale testing programs, it is stunningly clear that teachers are the greatest source of what students learn and gain as a function of attending school. Yet teacher characteristics such as degrees, experience, qualifications, and test performance do not predict student achievement very well, if at all. If teachers indeed are so important, what parts of what they do matter?

Classrooms are powerful settings. Students' interactions and relationships with teachers can either produce or inhibit achievement as well as behavioral and emotional health. Teachers' interactions with students stimulate critical thinking and convey new knowledge, organize attention and student effort, and motivate, engage and support. It is not surprising that measures of teacher-child interactions account for much of teachers' impacts on educational outcomes. A cluster of experimental and well-designed descriptive studies show that teacher-child interactions account for gains of up to a year's progress on standardized tests, with even greater effects accruing to more disadvantaged children.[12] In fact, findings are almost uniform in demonstrating significant and meaningful benefits to children when teacher-child interactions are supportive, organized, and cognitively stimulating.

Unfortunately, the odds are stacked against children getting this kind of educational experience. When a thousand children were followed and observed in their early childhood and elementary classrooms, only 15 percent of them were found to have been exposed to high-quality teacher interactions in multiple grade levels.[13] On average, across several thousands of students and K-12 classrooms, children and youth are exposed to fairly modest levels of social and emotional supports from teachers and rather low levels of instructional quality—levels inconsistent with gap-closing classrooms and robust achievement gains. From a different perspective, observations in more than 5,000 elementary school classrooms nationwide show that only about 25 percent of classrooms demonstrate the level and quality of teacher-child interactions consistent with skill gains for elementary students.[14]

And in middle and high school, adolescents routinely describe feeling disengaged in the classroom and alienated from school, a gap between teacher and learner that

clearly contributes to dropping out and underperformance. Yet engagement and intrinsic motivation become pivotal in adolescence, as students at this age have the means to not only withdraw energy from educational pursuits but to drop out altogether. Engagement in school begins to decline by fifth grade and by entry into high school it is so pronounced that half of high school students report that they do not take their school or their studies seriously.[15] But despite the generally dismal picture, nearly every teenager can describe, with enthusiasm and passion, a relationship with a teacher that they felt was meaningful and important to them, often with considerable evidence to back up those claims.[16] The most pressing questions are, how can such teachers and teaching be replicated on a very large scale, and what is the role of professional development in achieving such results?

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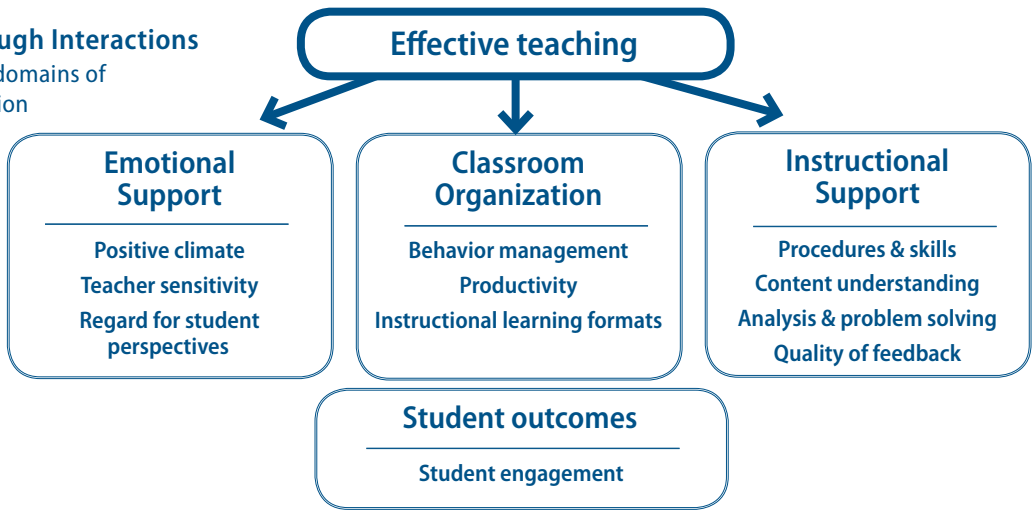
Our team at CASTL developed the Teaching Through Interactions, or TTI, framework over the past decade to organize and describe the wide range of teacher-student interactions associated with academic and social development. This conceptual framework focuses on teacher behavior and what students actually experience in three broad domains of teacher-student interaction: emotional support, classroom organization, and instructional support. Within each broad domain are specific dimensions of teacher-child interaction that further specify the forms of teacher behavior that matter. (see Figure 1) Importantly, we posit that these areas of interaction are important for students from preschool age through high school—a hypothesis that has received considerable support in several studies.[17]

FIGURE 1

Teaching Through Interactions

The three broad domains of effective instruction



Source: Robert C. Pianta

As shown in Figure 1, the broad domain of emotional supports is defined in terms of three dimensions: positive classroom climate, teacher sensitivity, and regard for student perspectives. Each of these dimensions is then specifically defined by a set of categories of behavior that yield observable teacher behaviors and interactions. For example, classroom climate includes observable behaviors such as the frequency and quality of teachers' emotional communications with students (specified in terms of vocal tone and positive verbal feedback) as well as the degree to which students interact positively with one another. (see Table 1 for further detail)

TABLE 1

Teaching Through Interactions Framework Dimensions

Observable categories of teacher-student communication

Domain	Dimension	Description
Emotional support	**Classroom climate**	Reflects the overall emotional tone of the classroom and the connection between teachers and students. Considers the warmth and respect displayed in teachers' and students' interactions with one another, as well as the degree to which they display enjoyment and enthusiasm during learning activities.
	Teacher sensitivity	Encompasses teachers' responsiveness to students' needs and awareness of students' level of academic and emotional functioning. The highly sensitive teacher helps students see adults as a resource and creates an environment in which students feel safe and free to explore and learn.
	Regard for student perspectives	The degree to which the teacher's interactions with students and classroom activities place an emphasis on students' interests, motivations, and points of view, rather than being very teacher-driven. This may be demonstrated by teachers' flexibility within activities and respect for students' autonomy to participate in and initiate activities.
Classroom organization	**Behavior management**	Encompasses teachers' ability to use effective methods to prevent and redirect misbehavior, by presenting clear behavioral expectations and minimizing time spent on behavioral issues.
	Productivity	Considers how well teachers manage instructional time and routines so that students have the maximum number of opportunity to learn. Not related to the quality of instruction, but rather teachers' efficiency.
	Instructional learning formats	The degree to which teachers maximize students' engagement and ability to learn by providing interesting activities, instruction, centers, and materials. Considers the manner in which the teacher facilitates activities so that students have opportunities to experience, perceive, explore, and use materials.
Instructional support	**Concept development**	The degree to which instructional discussions and activities promote students' higher-order thinking skills.
	Quality of feedback	Considers teachers' provision of feedback focused on expanding learning and understanding (formative evaluation), not correctness or the end product (summative evaluation).
	Language modeling	The quality and amount of teachers' use of language-stimulation and language-facilitation techniques during individual, small-group, and large-group interactions with children. Components of high-quality language modeling include self and parallel talk, open-ended questions, repetition, expansion/extension, and use of advanced language.

Source: Robert C. Pianta

Classroom observations provide the most direct way to measure the interactions outlined in the Teaching Through Interactions framework. Therefore, the primary way in which the TTI framework has been applied is through the standardized observation protocol[18] of CLASS. CLASS is a standardized observation and assessment system with versions for prekindergarten, elementary, and secondary classrooms that yields quantitative ratings (on a one-to-seven scale) for each of the dimensions of teacher-student interactions in the TTI framework. Analysis of CLASS ratings across many thousands of classrooms confirms that the three broad domains of interaction—emotional support, organizational support, and instructional support—are reasonably well-fitting descriptors of teacher-student interactions across grade levels.

Assigning quantitative ratings to something as complicated as teacher-student interaction in a classroom requires a well-trained eye watching for enough time to make a judgment. To use the CLASS reliably, for live or video observations, a set of three to four 20-minute cycles of classroom observation is recommended. And observers must undergo a training protocol to become calibrated with "gold-standard" coders.

This requirement for reliability—for an observer to demonstrate agreement with a standard and for the instrument itself to be sufficiently specified to support such agreement—is a fundamental property of any assessment tool and a critical component of observation. Most of the widely used approaches to observation, including district-developed principal observations as well as some commonly used "rubrics," fail to describe their reliability and typically do not require users to demonstrate such agreement with a standard. And as districts often do not standardize their approaches to observation, do not use reliable metrics, do not provide adequate training and support to observers to observe reliably, then ratings obtained from such procedures are fraught with unknown and likely large amounts of errors, and conclusions drawn from such scores or ratings may be in error as well.

In studies that have used the CLASS system and followed these standard protocols for training and observation, there is consistent evidence that CLASS ratings capture features of teachers' behavior that are consistent from day to day, across times of the year, or the content area the teacher is teaching.[19] In other words, ratings assigned to a teacher for "Quality of Feedback" in October and April will be quite consistent. Or ratings for Ms. Smith's interactions when she is teaching language arts will be similar to those when she is teaching history.

Furthermore, the quality of teacher-student interaction assessed by CLASS predicts students' social and academic development. In more than 700 preschool and kindergarten classrooms in an 11-state study, higher levels of instructional support predicted children's language, literacy, and math gains, while emotional support predicted social skills, with effect sizes ranging from small to moderate, roughly accounting for changes of between 5 and 15 percentile points on standardized tests.[20] In studies involving several thousand kindergarten through fifth-grade classes, higher ratings on instructional and emotional support accounted for greater gains on standardized assessments of academic achievement and better social adjustment, even adjusting for teacher-, program-, and family-selection factors.

In middle and high school classrooms, a combination of all three domains of teacher-student interaction (emotional, organizational, and instructional) scores accounted for improvements in student engagement and noticeable gains in students' scores on the high-stakes state standards test. In fact, the difference between gains for students enrolled in the highest- and lowest-rated classrooms was about 25 percentile points.[21] Interactions between teachers and students matter; they are not the only things that matter in education, but they matter, and therefore could be a target for professional development.

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In sum, the TTI framework and CLASS observational assessment are valuable tools for understanding and measuring teacher-child interactions. The framework and assessment tool not only define effective teaching but also quantify it, from high to low. Observational data gathered using the CLASS framework provide valuable information for a number of purposes, including accountability-driven assessments of teacher quality, facilitation of professional development, and development of theory about how classrooms influence students in positive or negative ways. Teachers routinely report the value of the CLASS system as a "road map" for how to improve their teaching, or say that CLASS validates and provides a structure for their own explanations, interpretations, and analysis of their practice.

What we have learned, we think, is the value for teachers of having an explicit and common language and lens for their practice. Having developed a definition and measure for effective teaching, we then set out to use these tools directly, overtly, and explicitly to design and evaluate a set of professional-development resources.

Improving teacher-student interactions: MyTeachingPartner

The MyTeachingPartner, or MTP, system of professional-development supports, which our team at CASTL developed in the late 1990s, combines the features of emerging and promising professional development presented in the paper's first section with the focus on teacher-student interaction in the second to provide teachers with professional-development inputs that include:

- Extensive opportunities to *observe* effective teacher-student interaction through analysis and viewing of multiple video examples
- *Skills training* in identifying effective and ineffective instructional, linguistic, and social responses to students' cues, and identifying the behavioral sequences connecting teacher responses to students' engagement and skills
- Repeated *opportunities for individualized feedback on* and *analysis of* one's own interactions with students

When the MTP system of professional-development supports is linked to CLASS observations and definitions of effective practice, a direct path can be traced from inputs to teachers (professional development) to teacher inputs to children (teacher-student interactions) to children's skill gains. Thus we have closely attended to the need to identify a mechanism (the how and why it works) for these approaches to professional development. The suite of MTP professional-development supports contains three specific resources linked to the inputs above:

- A video library of annotated examples of best practice
- Web-mediated individualized coaching
- A college course focused on the CLASS system

All three rely on the CLASS system as the primary way to observe and define effective practice. This section of the paper describes each of these approaches to professional development and the results related to improving teachers' effectiveness and children's learning.

Importantly, the MTP system of professional development is not focused on teachers' content knowledge, and these resources are not content- or grade-level specific. This is because the system is conceptualized to operate on features of teacher-child interactions that are valuable and applicable across content areas (an assumption supported by the evidence to date) and grades. For the purposes of scalability in school or district, the importance of all teachers having a common lens for effective instruction was considered a priority in the design of the CLASS and TTI framework.

The MTP video library

The MTP video library—more than 400 one- to two-minute video clips of teachers' effective interactions with students from pre-K to high school—gives teachers an opportunity to observe other teachers' effective interactions as they implement a wide range of instructional activities in various contexts. These examples are from schools all across the country and represent a wide range of children, teachers, and educational approaches. They also include examples of instruction in a variety of content areas and with children who represent diverse language, home, and ethnic backgrounds.

Each clip is accompanied by a detailed and specific description of the behavior that explains why it is effective in fostering student learning and development. The videos are organized (and searchable) by CLASS dimensions, and each one includes an explicit, behavioral description of what is happening in the footage that reflects a high-quality teacher-child interaction. Teachers are often isolated within their own classrooms and rarely have the opportunity to see authentic, real-time examples of effective interactions and teaching. The idea behind the MTP video library was to provide opportunities for teachers to learn more about what types of interactions were important for student learning (knowing) and understand exactly what these interactions look like when enacted by others (seeing).

MTP coaching

MTP coaching involves observation-based analysis and feedback enacted through a regular cycle of web-mediated interaction that takes place both in real time exchanges between the teacher and coach and opportunities for the teacher and coach to interact without both having to be online at the same time. (see Figure 2).

Every two weeks over the course of the academic year, using a simple flipcam setup on a tripod in their classroom, teachers videotape their own instruction in literacy, language, and social skills and send this footage to their coach.

The consultant edits the tape into three segments that focus on a specific CLASS dimension (for example, concept development) and on:

- Identification of instances of effective behavior
- Analysis of alternatives
- Instruction

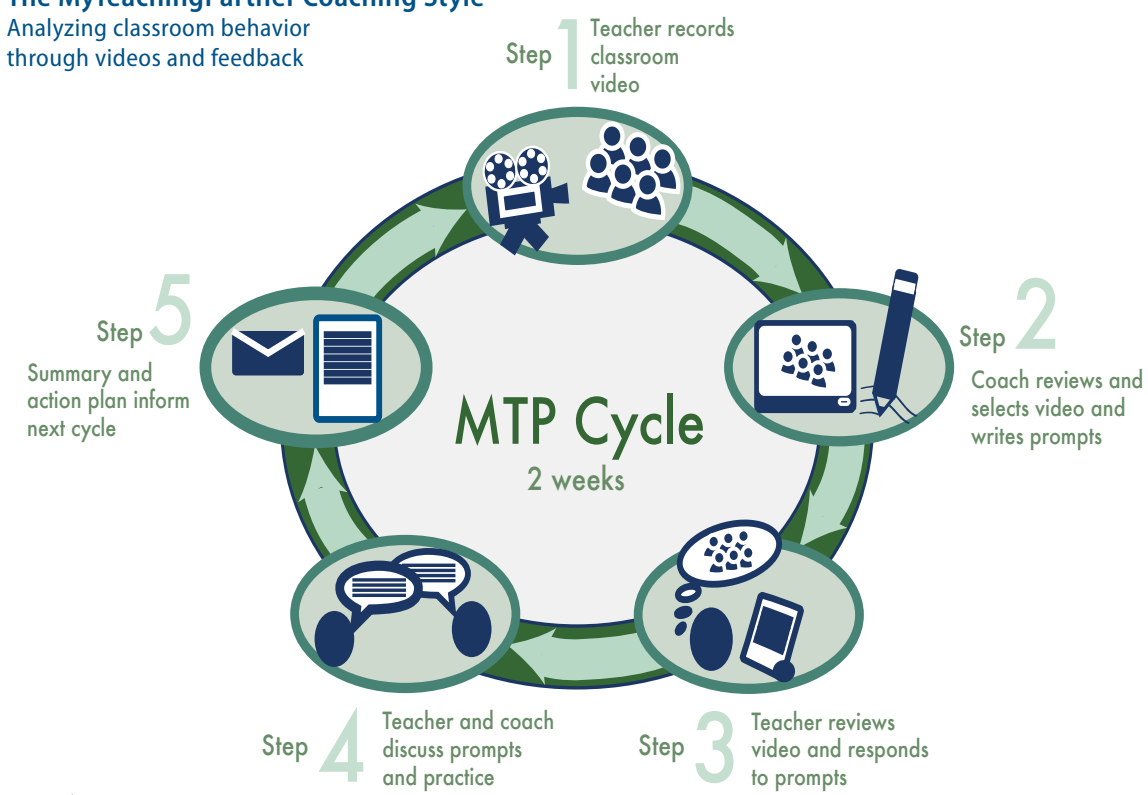
The segments and feedback (called "prompts") are posted to a secure website where teachers view the segments and comments and then respond to the prompts.

The prompts focus attention on specific aspects of teacher-child interaction, such as "What did you do here to help 'J' pay attention, and what did he do in response?" and include links to clips of effective practice from the video library.

FIGURE 2

The MyTeachingPartner Coaching Style

Analyzing classroom behavior through videos and feedback



Source: Robert C. Pianta

Both the response to coach feedback online and the conversations during conferences (these can be phone calls, or Skype-type teleconferences) are set up to encourage teachers' analysis of and reflection on their own interactions. Namely, teachers are challenged to analyze how their own actions are linked to certain student cues and responses, and vice versa. The coach also prompts the teacher to take the next step and plan and create future learning opportunities that will replicate successful interactions, or try out new ways of engaging children in learning through interactions.

This MTP coaching cycle is spread over two weeks and repeated throughout the school year, gradually deepening the reflective analysis around interactions that are more difficult to detect and enact. All together, these loops of videotaping, feedback, and conferencing encourage teachers to observe, enact, and understand the connections between their behavior in the classroom and student learning. MTP coaching increases teachers' knowledge to define—and skills to observe—interactions with students, and their awareness of their impacts on student motivation, teacher-student relationships, and student learning.

Once developed, we tested these MTP professional-development resources in a randomized controlled trial with more than 240 state-funded pre-K teachers. All teachers had access to the MTP video library, and some had access to MTP coaching as well. Compared with the video-only teachers, teachers assigned to coaching made significant gains in reading and responding to students' cues, using a variety of formats to actively engage children in instruction, and intentionally stimulating language development.

These impacts were roughly on the order of one scale point on the CLASS-rating system—for example, moving from a rating of "3" to "4" in one academic year. And, in classrooms where 100 percent of the children were from economically disadvantaged families, there were remarkable differences in teachers' rates of change in sensitivity and responsiveness, and facilitating engagement and enthusiasm in learning. Teachers receiving coaching increased the quality of their interactions roughly 1.5 rating points on the CLASS scale. In addition, comparisons of children's achievement, learning, and social skills indicated that children in MTP-coached classrooms made greater gains in receptive vocabulary, task orientation, and prosocial assertiveness, scoring approximately 4 to 5 percentile points higher than children in the other conditions on standardized tests.

Clearly, the evidence was in favor of the coaching condition. There were hints in follow-up analyses, however, to suggest that teachers who had access only to

video clips and made regular use of them were observed to be more sensitive and responsive to children's needs, more proactive and effective at managing behavior, and more skilled at maximizing children's learning time. In short, for some teachers just watching examples of effective teaching on the video library made a difference in improving their practices. And those teachers who spent more time watching video examples of best practices and reading the accompanying detailed, CLASS-focused descriptions online also had children who experienced greater gains in social development during the pre-K year. Teachers who spent more time watching and analyzing their own classroom video footage online as part of coaching also had children who experienced greater gains in vocabulary development during the pre-K year, with gains equal to approximately 5 percentile points.

Collectively, these findings suggest that the act of watching oneself and others interact with children in a classroom in and of itself may contribute to changes in instruction and children's learning. Additionally, focus groups with teachers at the end of the project indicated that many of the teachers, particularly those receiving coaching, felt that they could have taken better advantage of reflection work with their coach if they had a greater understanding of what constituted effective teacher-child interactions at the beginning of the year. They needed more knowledge about these practices and more time to see what they looked like in classrooms.

We recently scaled-up the MTP coaching model to 450 pre-K teachers in 15 sites served by local consultants[22] trained and supported by our team (all using standardized procedures). When evaluated in a randomized controlled trial, the benefits of MTP coaching were confirmed. Teachers who received MTP coaching improved in nearly every feature of interaction assessed by CLASS, particularly the dimensions of instructional support, with effects averaging approximately one point on the CLASS dimensions. This study not only replicated the value of MTP coaching for teachers, but demonstrated that the model of coaching can be replicated and extended through standardized training and support protocols. Importantly, although a one-point magnitude difference on the CLASS one-to-seven rating scale may seem small, recall that prior research demonstrated that a one-point difference in the quality of teachers' interactions, particularly in the instructional domain, was associated with increased achievement outcomes for children.

We then sought to examine the applicability and replication of MTP for secondary teachers and classrooms.[23] When we used and evaluated MTP coaching in a randomized controlled study of teachers in middle and high school classrooms across four academic content areas, the results provided some of the best evidence

to date that professional development targeting student-teacher interaction can alter not only teacher behavior but also produce student-achievement gains on high-stakes tests. The MTP-Secondary coaching program produced observable changes in teacher behavior that had been previously linked to student achievement and led to gains in student achievement in the *following* year.

These effects were meaningful for teachers, students, and schools. On average, gains were equivalent to increasing the achievement status of every student in a class taught by a teacher who had been in MTP-Secondary from the 50th to the 59th percentile, and to preventing one student from otherwise failing the end of year state assessment . These gains were the same across content areas as well. The average gains per student across content domains, if accrued across all students in a grade or school, could easily push a school above annual-progress thresholds.

The results are also striking because MTP coaching appears cost-effective as we begin to evaluate impact across years and students relative to time and expense. MTP teachers participated in a one-day in-service session prior to the coaching year, and on average engaged in nine coaching cycles, requiring approximately 30 minutes each. In terms of total teacher time, MTP coaching required about 20 hours per teacher across two full years (one year of coaching, two years of completing assessments).

The full cost was $3,500 per teacher for coaching and $200 for video equipment over this period. One can imagine that the teacher-coach cost might well offset or be covered in-kind by existing teacher training/supervision programs in schools. Even assuming that MTP coaching costs were fully realized, they still compare favorably to the annual $3,000 to $9,000 typically spent on teacher in-service training. Looked at another way, for a cost of less than $165 per participating student, MTP coaching produced a boost of 9 percentile points in achievement and on average would prevent one course failure in each classroom in which it was implemented. The finding that the effects carry over to a second year, during which consultation was not offered, raises the possibility that the effects will be more durable, further increasing the potential cost effectiveness of the program.

Notably, in spite of the obvious importance of secondary school success for students, and evidence of the current struggles of secondary schools, MTP coaching appears to be one of the only professional-development programs to demonstrate efficacy in improving teacher effectiveness and student achievement when evaluated in a randomized controlled trial. And in the secondary school evaluation

study, follow-up analyses suggested that the impacts on student learning were indeed due to the specific qualities of student-teacher interaction that were the MTP coaching focus, as we had also found in the pre-K study.

The MTP Course

The third professional development resource for teachers is the MTP Course, "Support of Language and Literacy Development Through Effective Teacher-Child Interactions and Relationships." This three-credit college course focuses on improving teachers' knowledge of effective interactions, their skills in identifying effective interactions, and applying those skills to their own classrooms.[24] Like the other MTP professional development resources, it was initially developed for and evaluated in pre-K classrooms by our CASTL team as part of the Department of Education-funded National Center for Research on Early Childhood Education.

The course targets two major clusters of belief, knowledge and skill—the first focuses on effective teacher-child interactions and the second specifically on teaching of literacy and language in early-childhood classrooms. The course uses the TTI framework for background knowledge, and the CLASS system to make explicit links between behavioral actions and intended consequences for children. For example, when learning about quality of feedback, teachers are encouraged to watch and analyze videos that highlighted the ways in which specific teacher actions lead to children spending more or less time thinking about and analyzing a problem. The course also targets teachers' skills in detecting effective teacher-child interactions though video analysis. We hypothesize that it is not sufficient for teachers to be able to gain knowledge about effective interactions; they need actual skills involving identification of effective interactions with a high degree of specificity in order to be most likely to transfer the coursework into real-life changes in their instructional practice. Therefore, a primary emphasis in the course is analysis of videotapes from real classrooms to develop skills of identifying effective (and ineffective) interactions, and articulating specific behavioral evidence to support these judgments.

This course was delivered in 14 three-hour sessions through collaborations with local colleges and universities in 10 sites across the country. There were between 5 and 15 teachers in each course section. Fifteen instructors were provided with standardized manuals that included PowerPoint presentations, videos, and written assignments for each course section. Instructors attended a weeklong training

session and were provided with ongoing support by our staff, including weekly phone calls from course developers. Videotape coding of course sections indicated that instructors were teaching the course as we had trained them to do, using the materials and session guides according to the plan. Not only were we able to study the impacts of the course in a controlled experiment, we also evaluated the extent to which these impacts were achievable across a wide range of settings and institutions; thus, this was also a study of scaling-up.

Compared with teachers in the control condition, those in the course condition reported more intentional teaching beliefs and demonstrated greater knowledge of, and skills in, detecting effective teacher-child interactions.[25] Teachers in the course condition also reported stronger beliefs about the importance of teaching children early literacy and language skills, and demonstrated greater knowledge about these skills. Those who took the course demonstrated more effective emotional and instructional practices in interactions with children.

The magnitude of impacts of the course on teachers' observed classroom practices was between one-half and one scale point on the CLASS metric. Importantly, teachers' skills in detecting effective interactions partially accounted for the effects of the course on teachers' actual practices. What has been even more encouraging is that we see continued changes in knowledge and in quality of teacher-student interactions in the year following exposure to the course, suggesting some degree of stable improvement.

In sum, results from the evaluation indicate the MTP course produces significant changes in teachers' knowledge of skill targets for children's learning outcomes, knowledge of teacher-child interactions, skills in identifying interactive cues and behaviors, and improvements in instructional practices.

Overall, the MTP system of professional development—a course, video library, and web-based coaching through which specific professional-development activities for teachers focus directly on a measure of teacher-student interaction that relates to student achievement—appears not only beneficial for changing teacher-student interactions and improving student learning and development from pre-K to grade 12, but also appears replicable and scalable.[26] The next section of this paper outlines some of the implications of these results for systems of accountability, evaluation, and human-capital management and development.

Effective teacher professional development: Implications for teacher preparation, credentialing, and scale-up

This section explores broader implications of this promising approach to professional development. To the extent that the MTP resources for teachers actually produce gains in teachers' skills that produce better results for learners there are three key avenues for further exploration: teacher preparation, teacher certification, and teacher-evaluation systems.

First, it seems critical to build this type of competency-based opportunity for professional preparation "back" into the "pre-service" sector. That is, if effective professional development has been identified and linked to assessments of teacher competence, then it seems reasonable to suggest that those professional-development models and associated assessments could serve as focal opportunities and metrics in teacher preparation. As just one illustration, could the MTP course be used in teacher preparation, and could it be used widely across many programs? Could it be expanded or extended to upper grades? What factors would facilitate adoption by teacher-preparation programs of a course that is both scalable and proven to improve teacher practice?

Second, the existence of proven-effective models for professional development and quantitative metrics for effective practice could be linked to states' credentialing and certification systems. Teachers could receive credentials or certification to practice on the basis of their participation in effective professional development *and* demonstration of competence. That is, could one imagine that teacher credentials would in part be awarded when teachers were observed to demonstrate levels of effective practice that exceeded a certain threshold on a validated observational measure?

Moreover, if a particular form of professional development were proven effective for improving teacher and student performance (for example, MTP coaching), would it be possible for teachers participating in such professional-development opportunities to be credentialed based on accumulation of demonstrated competencies?

In software engineering, career ladders are based on a series of certification tests of various competencies in programming languages, such as Java script and HTML, which have been identified as key markers for performance in the profession. These certification tests function as a de facto credentialing system, as companies hire on the basis of test performance/certifications. Is it not conceivable that a similar system of valid competency tests and associated professional development and training opportunities could operate in teacher preparation and certification?

To re-emphasize a point made earlier, such performance tests and preparation experiences must pass high thresholds for evidence of reliability (low levels of error), validity (they really produce results), and scalability. Although teacher certification and preparation is not structured like software engineering yet, can we imagine and design toward a future in which a progression of increasingly complicated and sophisticated professional skills and competence has been specified and is the focus of training, evaluation, and certification?

One can imagine these professional-development and observational-assessment systems being integrated into larger human-capital management systems, or connected to incentives such as merit pay. With the emphasis on assessment of teacher performance and the importance of developing systems that produce effective teaching, the availability and use of standardized assessments of teacher performance and aligned, effective professional development is critical for the success of these systems with regard to improvement of student learning.

A major implication of this work is that teachers' effective practices in classrooms can be reliably observed using standardized protocols, predict student learning gains (even on state standards tests), and can be scaled up in very large systems (for example, Head Start's 50,000 classrooms) using live observers and train-the-trainer models of web-based instruction and video scoring. Thus it is possible to meet the demands of Race to the Top and other recent initiatives to better assess and evaluate teacher performance using observation as one of the metrics.

Such feasibility means that measures of effective practice can be inserted into accountability and monitoring frameworks, expanded into performance-improvement and program-development models in schools or districts, and linked to effective professional development designed to improve the very behaviors on which teachers will be monitored, evaluated, and assessed. This potential for a linked, or coupled, system of monitoring, assessment, and improvement based on actual competencies could then be connected to a set of performance plans, rewards, and

perhaps even certification structures that in the end tie back to actual competence in the classroom—rather than seat time or exposure, as is now the case.

As just one example of the importance of standardized-observational assessments of teacher-child interactions, consider the fact that in teacher-preparation programs, well over 95 percent of the nation's teachers-in-training are observed during their student-teaching placements, ostensibly to gauge their skill level with regard to competencies deemed desirable or even necessary by their higher education program or state-licensure systems. Then consider that in fewer than 15 percent of these observations is there evidence for the reliability of the instrument, much less validity.[27] Once they move into roles as teachers, the evidence is that virtually no teachers are observed using a validated tool. Furthermore, all teachers in training receive supervision of their practice, with little to no evidence that these supervision models actually improve these teacher-candidates' practices.

Thus, despite the fact that interactions in a setting intended to promote positive development are the criterion around which competence will be judged for this group of professionals, there is no agreed-upon operationalized standard by which performance can be judged reliably and validly, and no proven-effective model for improving practice. Importantly, every state, district, and teacher-preparation program has standards for teachers' behavior in the classroom—management of classroom behavior, providing students with feedback about their learning—but in 85 percent or more of the occasions on which a teacher is observed with regard to these standards, there is no agreed-upon operational definition of how teachers should behave in the classroom and what distinguishes adequate from inadequate performance. There are even fewer examples of professional-development models that are effective for improving the very performance standards that various entities deem so important and essential.

Principals and supervisors engage in widespread use of observations in classrooms, from drive-by drop-ins to more extended analysis of teachers' behaviors. Nearly all consumers and producers of education agree that observation of teaching is an important part of evaluation and of professional development. Toward this end, observation is noted as a foundational component of multiple-indicator rubrics for gauging teacher quality that have sprung up in the latest round of standards-based education reform efforts, such as Race to the Top. But the vast majority of observations conducted in U.S. schools are not standardized, the scores obtained are not reliable, and they don't predict students' learning gains. This lack of a common set of indicators, evidence of reliability across observers,

or common procedures—to say nothing of the lack of evidence for validity—all undermine the extent to which they support inferences that could be useful either in policy or in work with individual teachers.

A common question regarding the impacts of MTP concerns cost—particularly the expense of coaching, which we address here. In so doing, it is important, however, to consider costs not only just for coaching per se, but also in the context of the other, less-costly but effective components of the MTP suite of professional-development resources (course and video library). Moreover, costs are perhaps better understood when proven-effective professional-development strategies are integrated within human-capital management systems. Such systems might include:

- A universally applied initial screening/monitoring assessment (CLASS observations)
- An equally universally-applied low-cost professional-development support system (video library subscriptions)
- A decision tree for triaging teachers into more intensive supports (coaching or a course) based on need and performance data

Thus a coordinated, aligned system of assessments and supports of varying intensity can allow for calibration of costs in relation to need, so that higher-cost resources are applied only when needed.

And cost has to be estimated in relation to existing expenses devoted to similar activities (observation, coaching, courses). The costs of a teacher-coach might well be already covered, for example, as many schools employ coaches, instructional-support personnel, and mentors for early career teachers at considerable expense. Thus, the labor expenses are not the problem; it is that these professionals typically are not implementing a standard or effective model.

Similarly, nearly every teacher-preparation program in the country already pays for instructors to teach courses in how to interact effectively with children. Yet there is no evidence those courses have an impact on relevant knowledge or skill. Again, the labor for implementation is already accounted for in existing budgets; what's missing is a set of effective models to implement.

In fact, because the current cost per teacher for professional development, estimated to be between $3,000 and $9,000 annually, produces little to no impact on practice or student learning, the real task is to shift existing funds to high-fidelity implementation of proven-effective programs. This cost-shifting strategy is borne out by the pre-K scale-up study of MTP coaching using local personnel as coaches. Although teachers could access MTP coaching through web-based interactions with coaches located remotely in which all costs are "new," it is now clear that local coaches can be trained to deliver MTP coaching with similar, if not greater, impacts on practice.

These results open the potential for existing personnel involved in supervision or coaching (school districts already employ many of these individuals at considerable expense) to be trained to use an MTP coaching model (or other proven-effective model) in the context of their existing roles. Thus existing resources can be readily redeployed to implement proven-effective professional-development models at considerably lower costs.

Conclusion

There is widespread acknowledgement that the production of effective teaching and teachers is perhaps the critical component of education reform and innovation for improvement of student learning. This aim requires a serious investment of time, rigor, and evaluation to produce professional-development programs that actually work. This paper has described the conceptual, operational, and evidentiary basis of one such model, the CLASS-based MyTeachingPartner suite of professional-development resources. In so doing, the paper presents a proof of concept and an illustration of the features of a model with some evidence of success.

The consideration of costs for proven-effective professional development must be made in light of policies and incentives for delivery of proven-effective models. In this regard, states could be far more active in requiring evidence of impacts from professional-development providers, higher education settings, and product vendors before any of their resources could be posted on an "approved" list. In fact, states could be far more prescriptive in giving directions to localities, where much of the choice regarding the allocation of professional-development funds resides. If states want localities to retain control over expenditures, then they must ramp up considerably the supports and training available to local decision-makers so that they choose wisely from effective programs. Just requiring localities to spend money on "research-based" or "evidence-based" programs is not enough in a world in which most anything can be labeled as such.

There are other models for which evidence of impacts is also available. These models share several common elements: a strong conceptual framework that provides the basis for expecting impacts; clear alignment and linkages that connect input to teachers, to inputs from teachers to children, to children's learning; and strong metrics and standardized protocols that support standardization and high fidelity of implementation. Although costly on their own, these models are no more costly (and in fact less so) than the wasteful spending now occurring on most professional development. And with emerging policy frameworks that provide structural and systemic supports for scale-up, the central question

is how to shift resources and practices from the current, ineffective models to those with promise and evidence, while at the same time investing in developing a much greater supply of proven-effective models. The emerging track record of the CLASS-MTP model, in which scalable observational assessment is linked to proven-effective approaches to improve practice and student learning, suggests considerable promise for progress.

Four policy-relevant recommendations follow.

Explicit requirements for criteria related to mechanism and evidence of impact should be present in any professional-development model eligible for use of public funds

Public dollars for the improvement of teaching are precious and scarce, and should be used well. It should be required that vendors of professional development be highly explicit about the mechanisms of impact (how and why it works) and evidence of impacts (from well-controlled studies) for their materials and procedures to be purchased using public funds.

Guides for selecting professional development for district and state leaders specifying explicit criteria for selection of effective methods should be developed and used

District and state leaders are overwhelmed with information and pressured by constituents for results. This is not a situation conducive to good decision making, particularly when coupled with vague or poorly described (and sometimes misleading) information provided by developers. Decision-makers need tools to implement policy well—in this case, a set of explicit guides, if not even lists, of professional-development features or models that can drive their decision-making toward the selection and implementation of models that are more likely to be effective.

Tighter monitoring of the use of public funds for the purposes of providing professional development for teachers should be mandated

Districts and states should be required to more explicitly justify (a priori) their use of public funds for the purposes of teacher professional development.

States and federal agencies should require that direct, valid assessments of teacher performance be included as part of teacher preparation and certification systems

Standards for teacher performance are not enough. States, districts, and teacher-preparation programs should be required to use direct assessments of teacher knowledge and skill that have demonstrated empirical links to objective indicators of student learning, development, and achievement. Requiring that teachers demonstrate valid knowledge and skill in order to receive certification will drive preparation programs to produce those skills. In the absence of performance measures linked to certification, not even the "best" or most "rigorous" list of standards will produce change.

About the author

Robert Pianta, Ph.D., is the dean of the Curry School of Education, the Novartis U.S. Foundation professor of education, and a professor of psychology at the University of Virginia, where he also directs the University of Virginia Center for Advanced Study of Teaching and Learning. His research and policy interests focus on the measurement and production of effective teaching in classrooms from preschool to high school. Pianta has published more than 300 scholarly papers and is lead author on several influential books related to early childhood and elementary education. He is the senior author and developer of the Classroom Assessment Scoring System, a method for assessing teacher/classroom quality being used in many district-, state- and national-level applications.

Pianta's assessments of teacher effectiveness are the national standard for Head Start classrooms and are included in the Gates Foundation's "Measures of Effective Teaching" study. Pianta is principal investigator and director of the Institute of Education Sciences' National Center for Research on Early Childhood Education; is principal investigator of MyTeachingPartner, an NICHD-funded clinical trial evaluation of web-based coaching and video training for pre-K teachers; and co-PI on MyTeachingPartner-Secondary, an extension of this approach in middle school and high school classrooms.

Pianta was a principal investigator on the NICHD Study of Early Child Care and Youth Development, a 10-site longitudinal study of child development from birth to age 21, and on the National Center for Early Development and Learning's 11-state study of pre-kindergarten program impacts. Pianta is co-director of the University of Virginia's Interdisciplinary Pre-Doctoral and Post-Doctoral Training Programs in Education Sciences and past editor of the *Journal of School Psychology*. He consults with numerous foundations as well as state and federal initiatives.

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