Narrowing the Research-to-Practice Gap in Effective Professional Development in a State Preschool Program: Describing the Process and Findings from a Research-Practice Partnership

Ann Partee [a], Amanda Williford [a], Jason Downer [a], Jenna Conway [b], & Erin Carroll [b]

[a] *Center for Advanced Study of Teaching and Learning, University of Virginia*
[b] *Division of Early Childhood Care and Education, Virginia Department of Education*

Acknowledgments

The data for this manuscript come from the Advancing Effective Interactions and Instruction (AEII) initiative and in partnership with the Virginia Department of Education (VDOE). We are grateful to the division leaders who engaged with AEII in professional development consultations. Additionally, we would like to thank and acknowledge Ann Lhospital, Megan Stuhlman, Grace Funk, Allison Leach, Caitlin Powell, and Caroline Chamberlain for their significant contributions to this work. This work was generously supported through a Society for Research in Child Development (SRCD) State Policy Fellowship and by the Institute of Education Sciences, U.S. Department of Education, through Grant #R305B140026 to the Rectors and Visitors of the University of Virginia. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Published online in *Early Childhood Research Quarterly*, October 2023

Abstract

This study describes the implementation and findings from a consultation process designed to enhance the professional development (PD) offered to teachers working in Virginia's state-funded preschool program. A PD Rubric was developed to translate research on effective PD (i.e., PD practices linked to positive changes in teacher practice and/or child outcomes), systematically assess the extent to which "business as usual" PD across 122 school divisions aligns to evidence-based practices, and guide individualized PD consultation calls with preschool leaders. Findings indicated that the area of PD with the greatest room for improvement was providing PD that supports teachers to refine their teaching skills, as opposed to only gain knowledge. Early childhood leaders reported that the PD consultation process was valuable, particularly talking with their consultant. Findings from this study provide insight into how to bridge research and practice around supporting the delivery of effective PD for preschool teachers at scale.

Keywords: Preschool; Professional development; Research-practice partnership; Descriptive analysis; Statewide implementation

Narrowing the Research-to-Practice Gap in Effective Professional Development in a State Preschool Program: Describing the Process and Findings from a Research-Practice Partnership

Preschool programs intend to provide children with foundational knowledge, skills, and behaviors that will set them up for success in kindergarten and beyond (Barnett et al., 2018; Phillips et al., 2017; Yoshikawa et al., 2016). Central to realizing this goal is ensuring that preschool programs engage children in developmentally appropriate activities that encourage conceptual understanding, analytical reasoning, and complex language use (Anderson & Phillips, 2017; Pianta et al., 2020), while being responsive to their social and emotional needs and fostering a positive classroom climate (Broekhuizen et al., 2016). Putting into practice these "key ingredients" of effective preschool programs is challenging, even for school-based preschool teachers who often have more workplace resources and greater educational qualifications compared to the broader early childhood workforce (Friedman-Krauss et al., 2019; Whitebook et al., 2018). Effective professional development (PD) helps to equip preschool teachers with the knowledge and skills they need to provide ongoing, high-quality experiences that will ultimately impact children's learning and development (Institute of Medicine & National Research Council, 2015).

Much research has centered on developing and evaluating PD models to improve teacher practice in early childhood contexts. Recent meta-analyses of these PD evaluations show positive effects on teacher-child interactions and, to a lesser extent, children's outcomes (Egert et al., 2018; Markussen-Brown et al., 2017; Werner et al., 2016). These evaluations typically test intensive, researcher-developed PD models; while helpful for pinpointing specific features that make the PD models effective, this body of work is disconnected from the implementation of "business as usual" PD. Information on the effectiveness of "business as usual" PD for early

childhood teachers is far more limited in the literature, but the data that are available suggest that the PD early childhood teachers typically receive does not align to the types of PD that are tested and found to be effective in small researcher-driven evaluations. In one study, results of a survey of 831 PD providers across four states showed that almost all providers (93.5%) reported that the PD they provided to early care and education professionals primarily took the form of a course or workshop (Cox et al., 2015). This type of one-off PD has no evidence of benefiting teachers or children (Weiland et al., 2018), having been described as a "train-and-hope" model (Winton et al., 2015). The result is a research-to-practice gap in which "what we know" about effective PD is greater than "what we do" in daily practice (Hamre et al., 2017; Winton et al., 2016).

This study describes a real-world example of pairing what we know (i.e., evidence-based PD practices) with what we do to enhance teacher practice through a PD measurement and feedback process rolled out statewide in Virginia's state-funded preschool program, the Virginia Preschool Initiative (VPI). Within the context of a larger research-practice partnership (RPP) focused on quality improvement, our research-practice team worked collaboratively to design a process to systematically assess the extent to which current PD offerings align to evidence-based PD practices in school divisions (Virginia's term for district, used hereafter) participating in VPI and then support VPI leaders to apply this knowledge toward the provision of more effective PD for preschool teachers. The study adds to our understanding of how the field can begin to narrow the research-to-practice gap by supporting preschool leaders to design and deliver at scale the types of PD experiences that research indicates are most likely to improve teachers' practice and thus children's outcomes.

A Research-Practice Partnership in Virginia

VPI is Virginia's state-funded preschool program that serves roughly 18,000 four-year-olds (at the time of the study) who have been identified as at-risk for low academic achievement due to factors such as family income or homelessness. Over the past few years, Virginia has made a deliberate effort to improve the quality of its publicly funded early childhood programs, including VPI. We briefly provide background context related to the state's increasing focus on quality and the origins of the RPP between researchers at the University of Virginia's Center for Advanced Study of Teaching and Learning (CASTL) and early childhood education (ECE) leaders at the Virginia Department of Education (VDOE).

In 2018, VDOE released *A Plan to Ensure High-Quality Instruction in All Virginia Preschool Initiative Classrooms* (VDOE, 2018) which describes three levers for improving quality: using an evidence-based curriculum, assessing teacher-child interaction quality, and providing teachers with individualized PD. VDOE began partnering with CASTL to implement and evaluate quality improvement initiatives aligned to these levers. The current study is situated within the third lever—providing teachers with individualized PD. At the time of the RPP, the only requirement from the state was that divisions must offer lead and assistant teachers 15 hours of PD per year, but the form and focus of PD was decided by each division. Divisions provided the state with a brief overview of their PD plan, but detailed information was not collected and the provision of PD and its alignment to evidence-based practices were not well-understood statewide.

From VDOE's perspective, the primary goal of this aspect of the partnership with CASTL was to support VPI leaders across the state to deliver effective PD to VPI teachers. The strategy that VDOE and our research team took to achieve this goal was to translate the core elements of effective PD (i.e., PD practices that have validated links to positive changes in

teacher practice and/or child outcomes) into a practitioner-friendly framework and support school division leadership to enhance these core elements of effective PD. Importantly, VDOE wanted the consultation to be data-driven, or individualized to divisions' PD needs, to model for divisions the process of using data to make decisions and inform continuous quality improvement efforts. Thus, during the 2019-2020 school year, our research-practice team worked to design and implement a PD measurement and feedback process that assessed the extent to which divisions' PD for VPI teachers aligned to evidence-based core elements and then used that information to guide individualized consultation sessions between VPI leaders and consultants at CASTL. By engaging in this process, our intention was that VPI leaders would (1) understand what effective PD looks like, (2) receive feedback on the extent to which their division's PD offerings were aligned to elements of effective PD, and (3) co-develop a plan, with their consultant, to better align their PD (i.e., what they do) to evidence-based practices (i.e., what we know), focusing on the areas identified as demonstrating the greatest need. The PD measurement and feedback process was grounded in the literature on effective PD elements and informed by implementation science, discussed next.

Implementing Effective PD At Scale

To narrow the research-to-practice gap around implementing effective PD at scale, we drew from implementation science and the science of effective PD. Implementation science concerns the transfer of evidence-based practices from the laboratory (tightly controlled conditions) into the field (real-world conditions) (Durlak & DuPre, 2008; Fixsen et al., 2005) and involves a diverse set of concepts for studying this process, including replication, fidelity, scalability, sustainability, and diffusion/knowledge translation (Franks & Schroeder, 2013). Given our partnership's goal to enhance the effectiveness of PD broadly across a state preschool

program, it was not feasible to scale up a particular PD model, which often target specific content areas and/or are linked to curricula, as others have done in PD studies at scale (e.g., Piasta et al., 2017; Rojas et al., 2020; Weiland et al., 2018). Rather, our partnership efforts focused on knowledge translation, or the process of making research knowledge more usable for practitioners seeking to implement evidence-based practices (Grimshaw et al., 2012), such that VPI leaders would be able to better understand the core elements of effective PD, regardless of content area, and then apply that knowledge to improve their PD offerings. Because the VPI program is primarily administered through school divisions, we chose to implement the PD consultation process at the school division level. VPI leaders are responsible for designing and delivering PD to school-based preschool teachers and are thus the "unit of implementation" (Horner et al., 2017) for scaling-up evidence-based practices. Finally, aligned with strategies from implementation science and best practices for continuous quality improvement, we structured the PD consultation process to employ data use and feedback, so that divisions could focus their improvement efforts on the elements of PD that showed the greatest local needs (Halle, 2020; Metz et al., 2015).

Employing knowledge translation as a strategy for narrowing the PD research-to-practice gap was possible due to the extensive research that has been conducted on effective PD programs and extant syntheses of what effective PD—at the broadest level—entails. Recent reviews of PD in early childhood conclude that PD is most likely to improve teachers' practice and children's learning and development when certain elements are present (Darling-Hammond et al., 2017; Desimone, 2009; Hamre et al., 2017; Winton et al., 2016; Zaslow et al., 2010). These elements include using data to guide PD delivery (e.g., content and dosage) and evaluate its effectiveness, focusing on a manageable number of specific objectives, targeting PD to teachers' classroom

practice, and providing personalized feedback, all within a coherent system that aligns PD with other programmatic activities and is accessible for lead and assistant teachers across different program types. These core elements, discussed in greater detail in the following paragraphs, served as anchors for translating research knowledge into a practitioner-friendly tool that would facilitate improving the effectiveness of PD being implemented statewide.

Data-Driven

Administrators and school leaders need information on which to base their decisions regarding teachers' PD (Derrick-Mills, 2015; Mead & Mitchel, 2016), including which teacher practices to target and with what intensity, how to tailor PD so it meets teachers' individualized needs, and how to determine whether the PD enhances teachers' practice and children's learning (Lieberman et al., 2018). Child assessments and observations of classroom practice can reveal useful information for answering these questions (Farran et al., 2017; Hamre et al., 2017). For example, data can indicate what types of practices are most challenging for a teacher and the point at which a teacher displays consistent improvements to these practices. While one-time workshops are not sufficiently intense for changing teachers' practice, the amount of PD that is sufficient is less clear and depends on factors such as the teachers' prior knowledge and skills and the complexity of the PD objective (Gerde et al., 2014; Zaslow et al., 2010). Using data to inform the content and intensity of teachers' PD also helps narrow its focus, which is another element of effective PD.

Specific, Articulated Objectives

Effective PD targets a manageable number of clearly articulated objectives to improve teacher practices (Winton et al., 2016; Zaslow et al., 2010). Ultimately, teachers should engage in effective interactions and instruction across all content and curricular domains, but teachers

cannot be expected to improve in all areas at once (Downer et al., 2012). Restricting objectives to a small number, based on most pressing needs identified in data, allows teachers to dedicate the necessary time and space to gain new knowledge and transfer that knowledge into observable change (Schachter et al., 2019). PD objectives should not only be reasonable in scope, they should also articulate the specific knowledge and skills to be gained from PD (e.g., Barton et al., 2016). When the goals of PD are clearly articulated through precise objectives, versus a more ambiguous focus on general improvement, teachers have a better understanding of the desired outcome and are therefore more likely to change their practice (Hamre et al., 2017; McLeod et al., 2019).

Practice-Focused and Feedback and Analysis Loops

Teachers need PD formats that allow them to link new conceptual knowledge to concrete skills and behaviors enacted in the classroom (Darling-Hammond et al., 2017; Desimone, 2009). Role-playing specific behaviors, reviewing videos that exemplify a concept or skill, and analyzing a practice with a coach are examples of PD activities that can change teachers' practice (Early et al., 2017). These activities contrast with more typical PD activities, such as workshops or trainings, in which teachers play a largely passive role in receiving information, with limited opportunities for application to the classroom setting (Cox et al., 2015). Observing teachers and providing them with feedback that is specific to their own classroom practice is a particularly effective strategy for improving teaching and learning outcomes (Brunsek et al., 2020; Desimone & Pak, 2017; Egert et al., 2018; O'Keefe, 2017; Pianta et al., 2017; Reinke et al., 2014; Weiland et al., 2018).

Coherence

Effective PD is coherent, meaning that it is aligned to and supports a program's "instructional model," or the overall approach to teaching and learning, including curriculum, child assessments, and vision for quality teaching (Garet et al., 2001; LiBettti & Mead, 2019; Yoshikawa et al., 2013). This intentional alignment ensures that PD does not operate apart from a program's core educational activities (e.g., curriculum implementation, child assessment), but rather purposefully incorporates these activities so teachers have a clear understanding of a program's goals and how their PD supports them to reach those goals. Coherent PD does not happen by chance; it relies on skilled leaders to articulate a vision and intentionally plan PD that advances the program's instructional model (Whalen et al., 2016).

Access for All Teachers

For PD to provide teachers with the knowledge and skills to enhance their practice, teachers must be able to access it. Reflecting the importance of providing PD to all teachers, in 2016 the National Institute for Early Education Research (NIEER) updated their PD quality benchmark from 15 hours of in-serve PD for lead teachers only to 15 hours of PD per year, individualized PD plans, and classroom-embedded support for all lead and assistant teachers (Friedman-Krauss et al., 2019). It is not uncommon, though, for states to require in-service PD for only lead teachers or to include assistant teachers in some but not all PD offerings. Furthermore, research suggests that collaboration among early childhood educators across sectors (e.g., Head Start, state-funded preschool) can provide teachers with social capital and new resources that benefit their practice (Mowrey & King, 2019). Thus, ensuring that lead and assistant teachers engage in all aspects of PD and have opportunities to collaborate with colleagues across sectors is an important element of effective PD.

Present Study

The present study describes the implementation of a continuous improvement process toward more effective PD provision for preschool teachers. We offer this study as a real-world example of efforts to narrow the research-to-practice gap around effective PD implementation in the context of a RPP targeting quality improvement in a state preschool program. While the field has generated much knowledge around the core elements of effective PD for preschool teachers, the uptake of effective PD practices at scale has lagged, resulting in school divisions expending valuable resources (i.e., time and money) on PD that very likely lacks evidence of impact (Winton et al., 2016). To move forward, innovative models are needed to bridge the science of effective PD with the implementation of PD at scale.

We address three research questions that provide insight into the PD consultation process: (1) What did implementation of the PD consultation process look like across VPI divisions? (2) What information about PD in VPI was provided to the state as a result of this process? (3) How useful did VPI leaders find the PD consultation process? To answer these questions, we draw from implementation data, data from coding divisions' PD plans, survey results, and overall reflections on conducting this work in the 2019-2020 school year.

Method

Sample

The sample for this study included the 122 school divisions in Virginia participating in VPI, the state-funded preschool program. VDOE required divisions to participate in the PD consultation process with researchers at CASTL. We use the term VPI leaders to broadly refer to division employees who engaged in the PD consultation process, though the specific roles and titles varied across divisions (e.g., Supervisor of Early Childhood Programs, Preschool Instructional Specialist, VPI Coordinator, Principal). Divisions vary widely in their total

population of children under age 5, the proportion of children under age 5 living in poverty, and the size of their VPI program (i.e., number of classrooms and schools/centers that house VPI). For example, divisions ranged from anywhere between one classroom in one school/center to 80 classrooms and 48 schools/centers. Additionally, the proportion of children under five who live in poverty varies substantially, ranging from less than 10% to over 60%, with the highest poverty rates concentrated in southern and southwestern areas of the state. Table 1 summarizes this descriptive information across VPI divisions. Five CASTL consultants supported VPI leaders throughout the PD consultation process, including coding divisions' PD plans and meeting with VPI leaders to review feedback and plan for improvements (discussed in more detail in the "Procedures" section). All consultants held advanced degrees in education (two held doctorates, three held master's degrees) and had extensive experience (e.g., 5-10 years) coaching early childhood teachers and leaders to implement evidence-based practices.

Procedures

This study was approved by the University's Institutional Review Board (IRB) and the VDOE. The PD consultation process consisted of three steps, as shown in Figure 1: (1) VPI leaders reported their division's current PD practices by answering questions on a form (i.e., PD Questionnaire), (2) CASTL consultants rated the extent to which divisions' PD, as described in the Questionnaire, aligned with evidence-based practices using a rubric (i.e., PD Rubric), and (3) consultants shared with divisions their score, notable strengths, and areas for improvement for each element on the PD Rubric before verbally discussing the feedback and planning next steps for improvement over videoconference. At the end of the PD consultation process, VPI leaders completed a feedback survey that asked them to report on the usefulness of the consultation, the

likelihood that they would make changes to their PD as a result of the consultation, and their satisfaction with specific aspects of the consultation.

The first author led efforts to develop the PD Rubric and PD Questionnaire, in close collaboration with CASTL researchers and consultants and VDOE leaders. The PD Rubric, described in more detail in the "Measures" section, focuses on six PD elements that research indicates are key to successful PD. These six elements are data-driven; specific, articulated objectives; practice-focused; feedback and analysis loops; coherence; and access for all teachers. To develop the rubric, the first author reviewed the literature on evidence-based PD and drafted descriptions of the PD elements across four levels of effectiveness (*Not Yet*, *Emerging*, *Effective*, and *Exemplary*). Though the development process was informed by the literature, professional judgment was also required from the joint research-practice team to translate research for a practice-based tool. Once a first draft was complete, an iterative process was used to refine the PD Rubric, such that drafts of the rubric were shared with a core group of researchers at CASTL who have expertise in early childhood PD and partners at VDOE. The lead author then developed the PD Questionnaire, a 6-page form including a combination of open-response questions and structured tables designed to obtain information from VPI leaders regarding their PD plans. The questionnaire contained one or two questions related to each of the six elements on the PD Rubric. The PD Rubric and PD Questionnaire are available in an online supplement.

Data Collection

In early Fall 2019, CASTL and VDOE hosted a webinar for VPI leaders to explain how the PD consultation process would unfold in the 2019-2020 school year. During this webinar, the first author and CASTL consultants introduced the PD Questionnaire and Rubric. We provided brief explanations of the six PD elements as well as the type of information we aimed to collect

via the Questionnaire. The PD Rubric was provided to VPI leaders at the end of the webinar, so the scoring criteria were completely transparent. The 122 divisions were split into four, rolling groups with consultants completing the PD assessment and feedback consultation work over a 5-month period. The deadline to submit the PD Questionnaire for the four groups was mid-October, late-November, early-January, and early-February, respectively.

Assessing Core Elements of Effective PD

After CASTL received a division's PD Questionnaire, the questionnaire was independently coded by two coders. One of these coders was the division's consultant; the second was a coder who did not interface with VPI leaders. Each second coder was randomly assigned to code roughly half of the PD Questionnaires, such that both double-coders coded across the five consultants. The two coders independently rated the PD Questionnaire and then held a 30-45-minute meeting during which the two coders shared their independent codes and reached agreement on consensus codes. Once consensus codes were reached, the three sets of codes (i.e., the consultant's codes, the double-coder's codes, and the consensus codes) along with select information about divisions' PD plans were inputted into Qualtrics. To promote reliable and accurate coding, the lead author created a codebook that outlined more detailed coding guidance than was possible to include in the PD Rubric. All consultants and second coders met regularly (typically every week) to discuss coding challenges and to continually iterate on the codebook.

Measures

Core Elements of Effective PD

The PD Rubric was designed to assess the extent to which VPI divisions' PD aligned to core elements of effective PD. The rubric assesses six elements of effective PD using a four-

point Likert-type scale (*Not Yet*, *Emerging*, *Effective*, and *Exemplary*), with higher scores reflecting better alignment to evidence-based PD practices. *Not Yet* indicates very little to no evidence that the division's PD aligns to best practices for the core element and thus the PD is not likely to be effective at improving teachers' practice. *Emerging* indicates that the division's PD somewhat aligns to best practices for the core element, but the PD practices lack the scope, precision, and/or frequency to be effective at improving teachers' practice. *Effective* indicates sufficient evidence that the division's PD aligns to best practices for the core element (i.e., with enough scope, precision, and/or frequency) to benefit teachers' practice. *Exemplary* indicates much evidence that the division's PD is aligned to best practices for the core element, maximizing the impact of PD on teachers' practice. The first element—data driven—is comprised of two indicators: data use, which reflects divisions' use of data to inform and/or evaluate PD, and data-related resources, which reflects the extent to which divisions have mechanisms (i.e., meeting structures, tools) in place that facilitate continual data collection and analysis across the school year. The second element—specific, articulated objectives—assesses both the quantity and precision of the PD objectives. The third element—practice-focused—assesses the proportion of PD that provides teachers with opportunities to build skills (i.e., practice-focused) as opposed to PD in which teachers learn new knowledge or discuss practice generally (i.e., passive PD). The fourth element—feedback and analysis loops—assesses the number of times teachers have opportunity to implement a new practice, receive feedback on their practice, and analyze their practice with a colleague. The fifth element—coherence—assesses the degree to which PD incorporates a focus on curricula, child assessments, and information obtained from teacher observations, to promote a clear and focused vision for PD that is aligned with key programmatic activities. The sixth element—access for all teachers—

assesses the extent to which lead teachers and instructional aides across different program types (e.g., VPI, Head Start, Early Childhood Special Education) receive the same PD experiences. While the focus of CASTL's consultations primarily pertained to enhancing PD in VPI, the state is moving toward a more unified governance structure for early childhood programs and therefore VDOE wanted to learn how accessible PD is to teachers who are not funded by VPI but may work in VPI settings or with VPI teachers (Tout et al., 2013).

Division-Reported Feedback on Consultation Process

Upon completing all steps in the PD consultation process, VPI leaders completed a short feedback survey about their perceptions of the PD Rubric and Questionnaire and the utility in engaging in the PD consultation process. Example items include "My team will change our division's PD practices as a result of the PD consultation process," "The PD Questionnaire was easy to complete," and "My consultant's written feedback on the PD Feedback and Planning form was helpful." Responses were provided on a five-point Likert scale (1 = completely disagree to 5 = completely agree). If a respondent selected either "disagree" or "completely disagree," they were shown a follow-up, open-ended question asking how to improve the aspect of consultation with which they reported being dissatisfied. All respondents were also asked two open-ended responses: "What was most helpful about the PD consultation process?" and "What suggestions would you give to improve the PD consultation process?".

CASTL Consultation Notes

Consultants recorded qualitative notes via a Google form following all videoconferences with VPI leaders. The specific topics reported in this study include the average length of the call, the roles of the VPI leaders participating in the call, the extent to which VPI leaders were open to feedback, and major themes or feedback communicated by the VPI leaders.

Data Analysis

Inter-rater reliability for all eight PD Rubric items (e.g., data-use; data-related resources; data-driven; specific, articulated objectives; practice-focused; feedback and analysis loops; coherence; and access for all teachers) was assessed through weighted Kappas using SPSS. The weighted Kappa considers degree of agreement, as opposed to absolute agreement, when calculating reliability from an ordinal scale (Cohen, 1968). As the PD Rubric uses a 4-point ordinal scale, the weighted Kappa is the appropriate reliability statistic. Weighted Kappa coefficients are reported in the "Results" section of this article.

We computed descriptive statistics for quantitative data in Stata version 16. Means, standard deviations, and ranges were computed for information on the divisions participating in VPI, the PD Rubric scores, and VPI leaders' feedback on the PD consultation process. We also calculated the proportion of divisions that fell into each of the four levels of effectiveness described on the PD Rubric and visualized this data using a stacked bar graph. VPI leaders' open-ended responses from the feedback survey were read and coded by a team member who was external to the consultation process (i.e., this team member did not communicate with leaders and was not involved in either coding PD Questionnaires or giving feedback to divisions). After reading all responses, a set of themes was identified, and the response was coded 1 if the theme was present. Responses could be coded for multiple themes. We then calculated the total number of responses for which each theme was present. Finally, consultants' notes from the videoconferences were reviewed and analyzed to summarize certain fields (e.g., the average length of the videoconference) and select information gathered from divisions' PD Questionnaires was summarized (e.g., percent of divisions whose PD focused on teacher-child interactions).

Results

The goal of the PD consultation process was to narrow the research-to-practice gap by (1) systematically assessing the extent to which "business-as-usual" PD offerings in VPI aligned to evidence-based PD practices and (2) providing individualized, data-driven consultation sessions in which CASTL consultants supported VPI leaders to improve one or more aspects of their division's PD for VPI teachers. Below is a summary of findings, organized around our three research questions that aim to provide insight into this goal.

What Did Implementation of the PD Consultation Process Look Like Across VPI Divisions?

At the broadest level, we were able to implement the PD consultation process statewide. Over the course of the 2019-2020 school year, CASTL received and coded 121 (99% of divisions) PD Questionnaires and, using scores generated from the PD Rubric, provided individualized feedback to VPI leaders over videoconference regarding their division's PD strengths and areas with room for improvement. One division did not complete the PD consultation process during the 2019-2020 school year due to staffing challenges. We discuss implementation of the PD consultation process as it relates to its two major activities: assessing divisions' alignment to core elements of effective PD and providing individualized, data-driven feedback to VPI leaders.

Assessing Core Elements of Effective PD

Using the PD Rubric as an overall framework for the PD consultation process worked well, because it was broad enough to apply to all divisions, yet provided specificity around key elements of PD that have the strongest evidence for improving teachers' practice. However, we learned early on that divisions approached the PD consultation process with varying levels of

capacity, which had implications for consultants' ability to reliably assess divisions' PD practices. Consultants noted that some VPI leaders said the PD Questionnaire was challenging to complete, because they either did not understand the PD Rubric elements, did not have sufficient time to fill it out, or could not easily describe their PD in the way we were asking. For example, some VPI leaders from larger school divisions that had many disparate schools/centers implementing VPI, each with their own PD, found it difficult to provide a high-level description of PD to capture the typical experience of a teacher in the division. As a result, some divisions' responses on the PD Questionnaire were vague or not easily aggregated. Coders continually iterated on the scoring codebook, adding more specific examples of responses and their corresponding score as they were encountered in the coding process, however, our coding challenges are evident in the coding reliability statistics.

Weighted Kappas were calculated using data from all divisions whose PD Questionnaires were double-coded (n = 108). Thirteen divisions were not included in reliability calculations due to their PD Questionnaires being among the first to be coded. After a series of initial coding changes were made, these 13 questionnaires were re-coded, either by one consultant or a consultant and a second coder working together, to reflect the final coding decisions. Weighted Kappas for each item were: data-use (.56), data-related resources (.66), data-driven (.62), specific, articulated objectives (.41), practice-focused (.75), feedback and analysis loops (.84), coherence (.51), and access for all teachers (.76). Due to poor to moderate coding reliability, we used consensus scores that were agreed upon by the consultant and second coder in all consultation work with divisions and allowed for adjustment codes to be made if the consultant gained relevant information that would change a score during their videoconference with VPI leaders. Although we did not plan on using adjustment codes when conceptualizing the PD

consultation process, it became clear that clarifying information was often shared on the division-consultant videoconference and that we needed a process to reconcile discrepancies when an original score was not accurate based on new information gained during this call. Divisions could either re-submit their PD Questionnaire, in the case of more substantive edits, or the consultant could update the score for an element(s), if the change was straightforward. In 43% of divisions, at least one PD element score was adjusted on or after the videoconference using this process. About 95% of adjustment codes resulted in an increased score, and the greatest number of adjustment codes were made for the practice-focused element.

Individualized, Data-Driven Consultations

Consultants met via videoconference with VPI leaders in the 121 divisions that completed the PD Questionnaire. During the call, the consultant provided feedback to VPI leaders, including the division's PD Rubric scores, and together they chose one or two areas of need that the division would prioritize for improvement efforts. For divisions that struggled to complete the PD Questionnaire, the consultant spent time on the videoconference explaining the PD elements and making connections between the elements and the division's PD as described by VPI leaders on the call. As previously mentioned, to ensure the PD Rubric scores were valid, the consultant and division could elect to adjust consensus scores (i.e., scores agreed upon by consultant and second coder) if relevant information was obtained during the videoconference. Some divisions had two videoconferences with their consultant, particularly if the division made substantial revisions to their PD Questionnaire after the first videoconference.

The videoconferences lasted seventy-five minutes and were attended by two VPI leaders on average. VPI leaders who attended the videoconference typically served as a VPI or early childhood coordinator; in a few cases, assistant principals or assistant superintendents attended

the videoconference. Consultants noted that most VPI leaders were receptive to the consultation and feedback provided around their PD. In about 74% of videoconferences, consultants perceived that VPI leaders were open to feedback. In about 22% of videoconferences, consultants perceived some reluctance to receiving feedback, more so at the beginning of the call. In about 4% of videoconferences, consultants perceived that VPI leaders were not open to receiving feedback. Common reasons for less openness to feedback included divisions being overwhelmed by many competing priorities and feeling like they had limited capacity to make improvements to PD. Seven divisions' lack of openness to feedback was specifically related to perceptions that one or more of their PD Rubric scores were not representative of their PD; in three of these divisions, consultants noted that they were able to resolve this through the adjustment code process.

What Information About PD Was Provided to the State as a Result of this Process?

Data from the PD Rubric were provided to VDOE to paint an overarching picture of the extent to which VPI teachers' PD was aligned to evidence-based PD practices. Table 2 displays means and standard deviations for each element of PD, using the final set of codes (i.e., consensus codes or adjustment codes, when applicable). The extent to which PD practices were evidence-based, as reported by VPI leaders and coded by a consultant and research team, varied across the state. For each PD element, the full range of possible scores on the PD Rubric was observed (1 = *Not Yet*, 2 = *Emerging*, 3 = *Effective*, and 4 = *Exemplary*). Figure 2 visually shows this distribution, providing the proportion of divisions that fell into each of the four levels of effectiveness described on the PD Rubric. Below we briefly summarize our findings for each element of PD.

Data-Driven

The data-driven element was reported overall as well as broken into its two indicators of data-use and data-related resources. Regarding divisions' use of data to plan and evaluate PD, 36% of divisions scored *Exemplary*, meaning that divisions reported using data from at least two distinct sources (e.g., curriculum fidelity data and child assessment data) in all four ways described on the PD Rubric. The majority of divisions (85%) reported using data from the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008), an observational measure of the quality of teacher-child interactions, to plan and/or evaluate their PD offerings. The proportion of divisions scoring *Exemplary* or *Effective* in the data-use category contrasts with findings on divisions' access to data-related resources that facilitate efficient use of data. Overall, only 9% of divisions met the criteria for scoring *Exemplary* on the data-related resources indicator. This discrepancy suggests that while over a third of divisions reported using data in sophisticated ways, these efforts are neither systematized nor efficient.

Specific, Articulated Objectives

The majority of divisions (66%) scored *Emerging* on specific, articulated objectives, meaning that the PD objectives were either too vast in number or most of the objectives were too vague to concretely identify what the teacher would know and/or do differently as a result of the PD. A very small proportion of divisions (4%) scored *Not Yet* on this element as the criteria for scoring at that level was a low bar (i.e., division had no PD objectives or the objectives were not related to early childhood teachers). PD objectives most frequently focused on improving teacher-child interactions (75% of divisions) and curriculum implementation (63% of divisions). Targeting content areas through PD was less frequently reported, with 36% of divisions focusing on social-emotional learning or self-regulation, 25% of divisions focusing on language and literacy instruction, and 14% of divisions focusing on math instruction. Even fewer divisions

reported delivering PD that helped teachers support children with disabilities (12% of divisions) or dual language learners (4% of divisions).

Practice-Focused

According to the PD Rubric data, the practice-focused element showed the most room for growth statewide. In 27% of divisions, between 75-100% of PD opportunities for teachers were passive (i.e., *Not Yet*), such as workshops and trainings in which they receive new knowledge, rather than activities in which they took a more active role such as analyzing videos of themselves or others teaching, reflecting on their own classroom practice, and receiving feedback on their practice. In 42% of divisions, between 50-74% of PD opportunities across the year were passive (i.e., *Emerging*). In 24% of divisions, between 25-49% of PD opportunities were passive (i.e., *Effective*). In only 7% of divisions, less than 25% of PD opportunities were passive (i.e., *Exemplary*).

Feedback and Analysis Loops

The feedback and analysis loops element was a relative strength on the PD Rubric. Most VPI leaders reported providing at least one feedback and analysis loop to teachers, but the number of feedback loops varied across divisions. For instance, 34% of divisions reported that teachers received feedback on and analyzed their practice 2-3 times/year (i.e., *Emerging*), 38% of divisions reported that feedback and analysis loops occurred 4-8 times/year (i.e., *Effective*), and 24% of divisions reported that teachers received more than eight feedback and analysis loops across the year (i.e., *Exemplary*). A small percentage of divisions (4%) reported that teachers received none or only one feedback and analysis loop/year (i.e., *Not Yet*).

Coherence

In 34% of divisions, the PD was tied in some way to curricula, child assessments, and classroom observation and there was evidence of integration across at least two of these components (i.e., *Exemplary*). For example, to show evidence of integration across child assessments and curricula, a division may use formative assessment data to identify content areas that need additional support. Teachers then receive PD to improve their curriculum implementation around these areas of need identified by the assessment data. In 26% of divisions, PD was tied to two of the three components and those two components were integrated, or the PD was tied to all three components but there was not any evidence of integration across components (i.e., *Effective*). Finally, in 20% of divisions, none or only one of the three components was tied to PD offerings (i.e., *Not Yet*).

Access For All Teachers

Access for all teachers was the highest-scoring element of the PD Rubric. The majority of divisions (55%) provided PD to all teachers (lead and instructional aides) across all programming that was present at the site such as VPI, Head Start, Title 1, early childhood special education (i.e., *Exemplary*), and 3% of divisions provided PD to only VPI funded-lead teachers while excluding instructional aides or other programming that was present (i.e., *Not Yet*). The remaining 42% of divisions fell in between, either excluding instructional aides (12% of divisions; *Emerging*) or excluding at least one program type that was present (30% of divisions; *Effective*).

How Useful Did VPI Leaders Find the PD Consultation Process?

A total of 125 VPI leaders from 109 divisions provided feedback on the PD consultation experience by completing a short feedback survey at the end of the process. Table 3 provides the results from this survey. Overall, VPI leaders found the PD consultation process valuable.

Ninety-four percent of leaders reported that they agreed or completely agreed that the PD consultation process was valuable, while 4% were neutral, and 2% disagreed that it was valuable. When asked about specific components of the PD consultation process, VPI leaders were very satisfied with the videoconference and written feedback provided by their consultant. Eighty-six percent of leaders either agreed or completely agreed that receiving written feedback on their PD plan was helpful, while 7% were neutral, and 2% disagreed that the written feedback was helpful. Similarly, 89% of leaders either agreed or completely agreed that talking to their consultant via videoconference was helpful, while 5% were neutral, and 1% disagreed that the videoconference was helpful. VPI leaders were somewhat less satisfied with the PD Rubric and PD Questionnaire. About 50% of leaders said they agreed or completely agreed that the PD Questionnaire was easy to complete, about 22% were neutral, 26% disagreed, and 2% completely disagreed. When asked what would make the PD Questionnaire easier to complete, leaders most commonly reported that they did not understand what information they were being asked to provide, they wanted to see a completed example, or that the PD Questionnaire was too long, detailed, and time-consuming to complete. About 73% of leaders agreed or completely agreed that the PD Rubric was easy to understand, 16% were neutral, and 7% either disagreed or completely disagreed. Seventy-four percent of leaders agreed or completely agreed that they would change their division's PD practices as a result of the PD consultation process, 23% were neutral, and 2% disagreed that they would change their PD practices.

Respondents confirmed through an open-ended question that they found talking with their consultant to be the most helpful aspect of the PD consultation process. Out of 125 responses collected, 68 leaders mentioned the discussions with their consultant as being most helpful. Other responses mentioned that the format in which feedback was provided was very

straightforward and actionable. In another open-ended question asking leaders for suggestions on how to improve the PD consultation process, 74 leaders either left the question blank or said they would not change anything about the process. Other responses included reducing the amount of time required to engage in the process, condensing the PD Questionnaire or obtaining the same information in an interview format, and offering more frequent phone calls with consultants.

Discussion

This study describes a year-long process to narrow the research-to-practice gap in early childhood PD as part of a larger RPP centered on improving classroom quality in VPI, Virginia's state-funded preschool program. Our team translated research on the elements of effective PD into a practitioner-friendly framework. Then, over the course of one year, we provided individualized consultation support to 121 of the 122 school divisions participating in VPI to enhance the 1-2 elements of PD that showed the greatest local needs as identified by the PD Rubric. We also reported high-level trends in PD practices across VPI divisions, bringing to light what was largely invisible in the past. We discuss our findings on what "business as usual" PD looks like for VPI teachers, provide implications based on our experience implementing this process and the associated findings, and note limitations and future directions.

"Business as Usual" PD in VPI Programs

To our knowledge, this study is the first to quantify the extent to which "business-as-usual" PD is aligned to evidence-based PD practices across a state-funded preschool program. Despite accumulating much evidence on what elements of PD are most effective at promoting teachers' practice and children's outcomes (Darling-Hammond et al., 2017; Zaslow et al., 2010), the PD literature offers little information about the effectiveness of PD that early childhood teachers typically receive. Our findings help to fill this gap in the literature.

Overall, the extent to which VPI teachers' PD aligned to evidence-based practices varied across the state, but there were notable takeaways. Most PD opportunities for VPI teachers are passive, or emphasize knowledge acquisition rather than knowledge application. In over a quarter of divisions, 75-100% of VPI teachers' PD opportunities are *not* explicitly focused on building skills to improve their practice. Although consistent with prior reports in the literature on the prevalence of passive PD (Cox et al., 2015; Winton et al., 2016), this finding is concerning because teachers are spending a good deal of time participating in activities that are unlikely to enhance their practice or promote children's learning (Zaslow et al., 2010), which are the main purposes of PD (Institute of Medicine & National Research Council, 2015; Snyder et al., 2011). The reliance on passive PD formats is likely driven in part by cost and scheduling, as school divisions commonly offer PD days when children are not in attendance. These PD days open a large block of time when leaders can schedule trainings for teachers. Practice-focused PD requires that time be allocated differently. To successfully apply new practices, skills, and techniques in the classroom, teachers need smaller amounts of time distributed at more frequent intervals. VPI teachers did, on average, receive multiple feedback and analysis loops throughout the year, with 38% of divisions reaching the *Effective* level on the PD Rubric. While feedback and analysis loops is a type of practice-focused PD, the time dedicated to feedback and analysis loops represented a relatively small proportion of VPI teachers' total PD time.

The extent to which VPI leaders provide data-driven PD was both a strength and growth area statewide. Across divisions, leaders reported that they use multiple types of data (e.g., classroom quality data, implementation fidelity, child assessments) to inform their PD selections. Indeed, across the early childhood field, more emphasis is being placed on data use for continuous improvement (Farran et al., 2017; Halle et al., 2021; Olson & LePage, 2022), and

collecting and using data on children's school readiness has been a focus in Virginia for nearly a decade (Williford et al., 2014). Over 60% of divisions scored at least *Effective* for data use. In contrast, 34% of divisions scored at least *Effective* for data-related resources, indicating that divisions lacked data tools to help leaders understand and use data to maximize the effectiveness of their PD offerings. These findings are consistent with reports on Head Start grantees' use of data for continuous improvement more broadly. Like VPI divisions, Head Start grantees collect a large amount of data (Derrick-Mills, 2015) but inadequate data tools, staff time, and analytic skills are barriers to using data most effectively (Mead & Mitchel, 2016).

Our findings on the effectiveness of VPI teachers' PD objectives and coherence of PD are novel. Prior work has reported on the content of early childhood teachers' PD (Cox et al., 2015), but these findings does not shed light on the quality of teachers' PD objectives. To be effective, PD needs to focus on objectives that are precise and limited to a few key areas of focus (Schachter et al., 2019). Our findings showed that most divisions' PD objectives were too vague, extensive, and/or varied for teachers to sustain focus on a few areas over an extended period. Finally, coherence—or the intentional alignment of curricula, assessments, and classroom observations to PD—has not been systematically measured or reported in the field. This element of PD showed the greatest variability across the state, suggesting that VPI leaders vary in their capacity to plan PD that is aligned with the program's instructional model.

Implications for Policymakers and Practitioners

Our experience implementing the PD consultation process and the associated findings on "business as usual" PD in Virginia's state-funded preschool program offer implications for practitioners and policymakers. This study shed new light on the research-to-practice gap in effective PD for early childhood teachers across a state preschool program. State policymakers

should take inventory of the policies and requirements related to PD across early childhood sectors and prioritize ensuring that PD is effective and high-quality over more cursory benchmarks such as total PD hours (Hamre et al., 2017). To do this, we argue that it is insufficient to develop compliance-based quality benchmarks; policymakers must embed this work in systems for continuous improvement that support preschool leaders to enhance the quality of their PD offerings for teachers.

This work is undoubtedly challenging, as we experienced, but critical for investments in preschool to pay off. We offer an example and lessons learned for how policymakers can partner with researchers to implement innovative strategies to enhance PD effectiveness on a large scale. In our experience, translating research on effective PD into a digestible framework (i.e., the PD Rubric) worked well, as nearly 75% of leaders reported that the PD Rubric was easy to understand. The PD Rubric served multiple purposes: conceptualizing elements of effective PD, measuring current practice, and improving elements of PD that show the greatest needs. With a description of each PD element across four levels of effectiveness, VPI leaders could see where they on the rubric and why as well as understand what steps they could take to move to the next level. The goal was that divisions would be able to take manageable steps forward to implement more evidence-based PD practices in the area(s) of greatest need for that division, not end the year with *Exemplary* ratings on all six elements. Policymakers could consider ways to integrate a similar feedback and improvement process related to PD in their state quality rating and improvement systems (QRIS). Finally, these findings can also help policymakers identify areas of needed investment. For example, state policymakers could invest in resources that support divisions to use data, so it is not left up to each division to start from scratch.

Practitioners charged with overseeing the design and delivery of PD for preschool teachers should reduce the amount of time teachers spend in "one-and-done" workshops that are not individualized to teachers' needs, connected to their practice, or explicitly tied to specific objectives. Time that already exists could be re-purposed to more intentionally support teachers to reflect on key practices that are relevant to their classroom (Cunningham et al., 2015). As practitioners consider ways to integrate more practice-focused PD like coaching into their plans, it is important that these plans be made purposefully. Coaching is being implemented more frequently in preschool programs (Harding et al., 2019), due to evidence of its positive impact on teachers and children. However, not all coaching models are effective (O'Keefe, 2017). Our findings suggest that it is possible for teachers to receive multiple coaching opportunities in a year but most of their PD time still be passive in nature. For coaching to be effective, it should be implemented frequently, have clearly articulated objectives that are related to curriculum and other programmatic content, and be data-driven.

Limitations and Future Directions

The PD consultation process had several limitations. As mentioned earlier, assessing the information that divisions provided on their PD plans through the PD Questionnaire was challenging due to ambiguous responses. The inter-rater reliability among coders was modest, leading to the unanticipated consensus coding and adjustment scoring process. In hindsight, we could have done more initially to train VPI leaders on the PD elements before they completed the PD Questionnaire, but at the time we were concerned that providing too much support upfront would skew the responses that divisions provided. To elicit clearer responses, some questions could be re-phrased to be more specific and/or consultants could gather information about PD practices through a conversation, as some VPI leaders suggested, rather than asking leaders to

respond in writing to the PD Questionnaire. Further, the questionnaire could be completed for a particular school or site, rather than division, since some larger divisions found it challenging to describe their PD across many schools or centers. Notably, this approach would require coding significantly more PD Questionnaires which raises issues of feasibility. Second, the PD Rubric did not differentiate divisions' PD objectives very well. Well over half of divisions (66%) scored *Emerging* for specific, articulated objectives. The *Not Yet* level was a very low bar and hardly applied to any divisions (only 4%). Revising the criteria for specific, articulated objectives, particularly for the *Not Yet* and *Emerging* levels, would be worthwhile. Third, given the already intensive nature of the PD consultation process, we could not independently confirm the accuracy of divisions' responses to the PD Questionnaire, by reviewing specific documents as an example. The PD consultation process was designed to serve as an improvement process, not as an accountability check, so we relied on divisions to be candid in describing their PD plans and emphasized the improvement orientation to the work. While we are confident in the steps we took to capture an accurate picture of PD, this approach does mean that the PD Rubric data are based on division-reported PD practices, which somewhat limits the objectivity of the data. Given the above limitations, the findings on PD effectiveness should be interpreted with some degree of caution. Finally, we were not able to document how divisions changed their PD practices because of the PD consultation process or the downstream influence these changes may have had on teachers' experience of PD. Future studies can advance this work by refining the PD Questionnaire and PD Rubric to address the limitations faced in the current study. Further, future studies could use a multi-method approach so that the data are not all self-reported. For example, researchers could code observations of PD sessions, review documents that describe PD plans,

and talk to teachers about their PD experiences. Finally, future studies could assess divisions' PD practices again in future years and examine associations to changes in teacher' practice.

Conclusion

Although PD can be an effective lever for ensuring that preschool programs deliver the type of high-quality programming that is necessary for children to gain foundational knowledge and skills, the early childhood field faces challenges in implementing evidence-based PD practices at scale. The purpose of this study was to describe how a RPP was used to develop a PD consultation process with the goal of narrowing the research-to-practice gap by understanding and enhancing the effectiveness of PD offered to preschool teachers in VPI, Virginia's state-funded preschool program. Using a newly developed consultation tool, the PD Rubric, our team provided individualized consultation services to leaders in 121 school divisions and provided a rare picture of "business-as-usual" PD statewide. Findings from the PD consultation process indicated that the extent to which preschool teachers' PD aligned to evidence-based practices is variable across the state and that VPI leaders need the most support around using data tools to inform their PD offerings and providing teachers with opportunities to reflect on and enhance their classroom practice. These findings can advance the field by providing an example of how to bridge research-to-practice that may be replicated in other settings or by spurring new developments in data tools and PD resources that will help teachers hone their practice. By ensuring that preschool teachers' PD experiences are aligned with evidence-based practices, we will move closer to the goal of preparing all children who attend preschool for success in kindergarten and beyond.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.1016/j.ecresq.2023.09.004

Table 1

Descriptive Information for Divisions Participating in VPI (N = 122 divisions)

	Mean	Standard Deviation	Range
Total population of children under age 5 [a]	4,174	8,793	89 – 75,927
Proportion of children under age 5 in poverty [a]	.21	.12	.01 – .68
Total number of VPI classrooms [b]	10	14	1 – 80
Total number of schools/centers with VPI classrooms [b]	5	6	1 – 48

Sources: [a] US Census Bureau, American Community Survey (2014-2018 5-year estimates)
[b] VDOE reporting and CASTL tracking in 2019-2020

Table 2

Mean Scores and Standard Deviations for PD Rubric Elements (n = 121 divisions)

	Mean	Standard Deviation	Range
Data driven [a]	2.30	.88	1 – 4
Data use	2.80	1.10	1 – 4
Data-related resources	2.17	.92	1 – 4
Specific, articulated objectives	2.28	.58	1 – 4
Practice-focused	2.10	.88	1 – 4
Feedback and analysis loops	2.82	.85	1 – 4
Coherence	2.73	1.14	1 – 4
Access for all teachers	3.38	.80	1 – 4

Notes.
[a] The data driven element was comprised of two sub-indicators: data use and data-related resources

Table 3

VPI Leaders' Feedback on PD Consultation Process

	Mean	Standard Deviation	Range
The PD Consultation process was valuable	4.35	.64	2 – 5
My team will change our division's PD practices as a result of the PD Consultation process	3.91	.69	2 – 5
The PD Questionnaire was easy to complete	3.29	1.01	1 – 5
The PD Rubric (6 elements of effective PD) was easy to understand	3.85	.79	1 – 5
My consultant's written feedback (on the PD Feedback and Planning form) was helpful	4.27	.67	2 – 5
Talking to my consultant about the feedback was helpful	4.46	.67	2 – 5

Notes.
Results are based off 125 responses from 109 divisions. Some divisions submitted multiple responses completed by different people involved in the consultation process.
1 = completely disagree; 5 = completely agree

Figure 1

PD Consultation Process

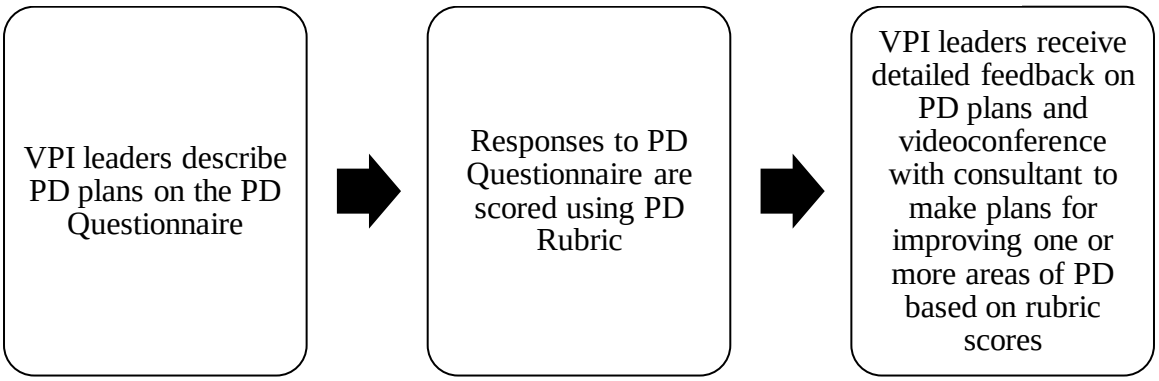
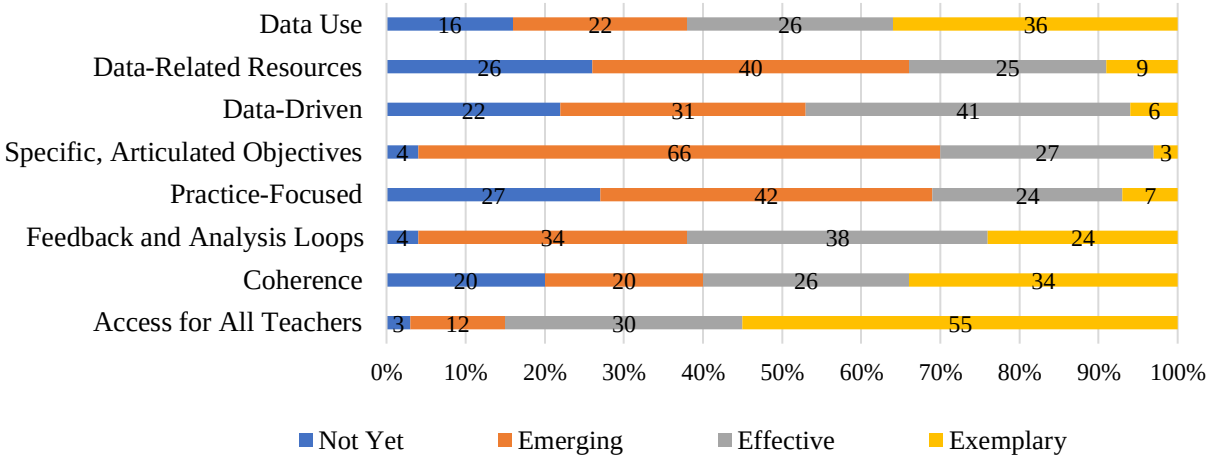


Figure 2

Percent of Divisions Across PD Rubric Levels



Elements of Effective Professional Development: Rubric

	Not Yet	Emerging	Effective	Exemplary
1. Data-driven  *A data-driven approach to PD ensures that the content is relevant, amount is sufficient, and ultimately that the PD is effective.*	• Data are used: o not at all, or o to plan the broad focus area(s) of PD only, or o in other ways but not to plan the broad focus area(s) of PD • No resources exist such that data collection, analysis, and data-driven decision-making are impossible	• Data are used to plan the broad focus area(s) of PD and **one** of the following: o determine appropriate amount of ongoing PD, tailor the focus of PD to meet teachers' needs, or track intended outcomes • Insufficient resources exist such that data collection, analysis, and data-driven decision-making are limited or inefficient	• Data are used to plan the broad focus area(s) of PD and **two** of the following (or all if from one data source): o determine appropriate amount of ongoing PD, tailor focus of PD to meet teachers' needs, or track intended outcomes • Sufficient resources exist such that data collection, analysis, and data-driven decision-making are feasible and efficient	• Data from two distinct sources are used to plan the broad focus area(s) of PD and **all** of the following: o determine appropriate amount of ongoing PD, tailor focus of PD to meet teachers' needs, and track intended outcomes • Sophisticated resources exist such that data collection, analysis, and data-driven decision-making are systematic and highly efficient
2. Specific, articulated objectives  *Specific, articulated objectives clearly delineate what teachers should gain from PD. Objectives should be limited to a few key areas so teachers are repeatedly exposed to PD content and have sufficient time to develop new knowledge and skills.*	• PD objectives are absent or very vague • Alternatively, PD objectives are not related to early childhood	• PD objectives suggest some knowledge or skills to be gained but lack precision • Alternatively, PD objectives are precise but are too extensive and/or varied (e.g., 6-10 objectives/area or >3 areas) to sustain focus on a few key areas	• PD objectives delineate the precise knowledge and skills to be gained • PD objectives are a reasonable quantity and sufficiently connected (e.g., 3-5 objectives in 1-3 areas) to sustain focus on a few key areas	• PD objectives meet "effective" and are ALSO drawn from a framework that clearly defines expectations for quality teaching (e.g., rubric)
3. Practice-focused  *Practice-focused PD intentionally builds teachers' skills to improve their practice. It can but does not have to include feedback and analysis loops.*	• Across all PD, teachers spend 75-100% of their time passively receiving information and/or generally discussing practice and 0-24% of their time intentionally building skills to improve practice	• Across all PD, teachers spend 50-74% of their time passively receiving information and/or generally discussing practice and 25-49% of their time intentionally building skills to improve practice	• Across all PD, teachers spend 25-49% of their time passively receiving information and/or generally discussing practice and 50-74% of their time intentionally building skills to improve practice	• Across all PD, teachers spend 0-24% of their time passively receiving information and/or generally discussing practice and 75-100% of their time intentionally building skills to improve practice

Elements of Effective Professional Development: Rubric

4. Feedback and analysis loops  *Feedback and analysis loops provide teachers with the opportunity to implement a new practice, receive feedback on their practice, and analyze their practice with a colleague.*	• Teachers never or rarely receive feedback on their practice and analyze their practice with a colleague (e.g., 0-1 time/year)	• Teachers infrequently receive feedback on their practice and analyze their practice with a colleague (e.g., 2-3 times/year)	• Teachers somewhat frequently receive feedback on and analyze their practice with a colleague (e.g., 4-8 times/year)	• Teachers frequently receive feedback on their practice and analyze their practice with a colleague (e.g., more than 8 times/year)
5. Coherence  *Coherence is defined as an intentional approach to integrating curricula (what teachers teach), assessments (e.g., child outcomes), and classroom observation (e.g., CLASS® scores) with the PD that teachers receive as well as removing miscellaneous or un-related materials.*	• Curricula, assessments, and classroom observation are disjointed and not at all aligned/integrated with PD. There is no clear rationale that describes how each component informs and supports PD	• Curricula, assessments, and classroom observation are superficially aligned/integrated with PD. This is generally not intentional such that there are significant gaps in the rationale (i.e., illogical or incomplete) that describes how each component informs and supports PD	• Curricula, assessments, and classroom observation are somewhat intentionally aligned/integrated with PD. There are some gaps in the rationale (i.e., illogical or incomplete) that describes how each component informs and supports PD	• Curricula, assessments, and classroom observation are very intentionally aligned/integrated with PD. A logical and comprehensive rationale describes how each component informs and supports PD
6. Access for all teachers  *Access refers to the extent to which PD is provided to all full-time teachers across various types of preschool programming.*	• PD is provided only to VPI-funded lead teachers	• PD is provided to all lead teachers across most programming but not instructional aides	• PD is provided to all lead teachers across all programming but not instructional aides • Alternatively, PD is provided to all teachers (lead and instructional aides) across most programming	• PD is provided to all teachers (lead and instructional aides) across all programming

Professional Development Questionnaire

1. Data-driven

Describe your plans for using data in each of the following ways. Indicate which data sources will be used in each area (data sources can be used for multiple purposes). Data could be from curriculum fidelity checklists, CLASS®, child assessments, and/or teacher practice assessments. If no plans are in place, write "none."

Data are used to:	Specific data: sources:	Describe plans:
Plan the broad focus area(s) of PD:		
Determine appropriate amount of ongoing PD:		
Tailor the focus and amount of PD to meet teachers' needs (individual or small group):		
Track intended outcomes for formative (e.g., re-evaluate and adapt PD as needed) and/or summative (determine effectiveness of PD) purposes:		

Describe any resources that you will have in place to facilitate data collection, analysis, and/or data-driven decision making around PD. Resources could be staffing (e.g. data analysts), staff trainings related to data use, or routines/expectations for using data to continuously drive improvement. If none exist, write "none."

Data-related resource:	Description of how resource will be used:

2. Specific, articulated objectives

List all of the broad areas of focus and the specific PD objectives within those areas of focus that you anticipate covering in PD next year. Broad areas of focus include the content area, and specific objectives provide more detail about what teachers will gain from the PD. If none exist, write "none."

Broad area of focus:	**Specific PD objectives:** **(can list multiple objectives under the broad area of focus)**

Describe how you derived the areas of focus and specific PD objectives (e.g., framework, rubric, etc.). This question is NOT about using data to plan the focus of PD. It is about whether there is a clear description of quality teaching that guides teachers' professional growth. If none exist, write "none."

3. Practice-focused

Below is a list of common activities that occur during PD. Provide a breakdown of the average number of hours teachers will spend in each activity and the total number of hours of PD in the 2019-2020 school year. If the activity does occur, write a brief note indicating what the activity is (e.g., Conscious Discipline workshop). If the activity does not occur, write "0 hours."

Common PD Activities:	**Number of hours in activity:**	**What is the Activity?**
Group workshop/training/seminar in which teachers listen to a presenter and answer/discuss questions to gain new knowledge:		
Coursework (in-person or online) in which teachers read relevant articles/texts and answer/discuss questions to gain new knowledge:		
Professional learning communities in which teachers analyze data and/or discuss practice generally (e.g., planning upcoming units):		
Professional learning communities in which teachers share about a practice they implemented and analyze that practice with the group (i.e., no role play, video review, or observation occurs):		
Professional learning communities in which teachers role play and/or review video of themselves or others teaching:		
Observation followed by feedback and analysis loops related to one's own practice (i.e., classroom observation, coaching):		
Other (describe):		
Total number of hours of PD:		

4. Feedback and analysis loops

List how many times on average teachers will be observed and receive feedback on and analyze their practice with a colleague during the 2019-2020 school year. A colleague could include an administrator/principal, instructional coach, or teacher. For each activity, describe who will conduct observations or meet with teachers to analyze practice as well as the expected time duration (e.g., principal will observe all lead teachers once for 30 minutes). If no observations or feedback and analysis loops will occur, write "0."

Placement on the rubric will be determined by the frequency with which teachers receive feedback on and analyze their practice with a colleague.

Activity:	**Average number of times next school year:**	**Who will be involved?**	**Expected time duration:**
Be observed by a colleague (e.g., either live observation or video review)**:**			
Receive feedback on and analyze their practice with a colleague (e.g., following an observation, a colleague reflects on a recently-implemented practice, brainstorms solutions to a problem, and/or plans improvements to practice with the teacher)**:**			

5. Coherence

In addition to PD, curricula, child assessments, and classroom observation contribute to high-quality teaching and learning. To be most effective, these components should be integrated/aligned with PD so that they work together rather than in isolation. Additionally, content that is un-related to these components should be removed from PD.

Describe the ways in which each component is intentionally integrated/aligned with your PD (i.e., how each component informs and supports your PD).

	Integration/Alignment with PD:
Curricula:	
Child Assessments:	
Classroom Observation:	

Describe the procedures you have in place for deciding what content is covered during PD. In other words, how will coherence be maintained and reinforced for teachers, so un-related or miscellaneous content, instructional tools, or materials do not compete for teachers' time and energy during PD? If none exist, write "none."

6. Access for all teachers

To what extent does the PD plan as described in the questions above apply to all full-time preschool teachers (lead and instructional aides) across various preschool programming (Title I, Head Start, SPED)? Check "Yes," "No," "Don't Know," or "Not Applicable." If some parts of the PD plan apply, but others do not, you may check "Yes" and "No" and briefly note which aspects do and do not apply for a particular group of teachers.

Does this plan apply to…	**Yes**	**No**	**Don't Know**	**Not Applicable**
VPI-funded lead teachers:				
VPI-funded instructional aides:				
Head Start and/or Title I-funded lead teachers:				
Head Start and/or Title I-funded instructional aides:				
SPED lead teachers:				
SPED instructional aides:				
Other (describe):				

7. Other

If you would like to provide any other information about your division's PD plans for the 2019-2010 school year, please provide it in the space below.

References

Anderson, S., & and Phillips, D. (2017). Is pre-K classroom quality associated with kindergarten and middle-school academic skills? *Developmental Psychology, 53*, 1063–1078. https://doi.org/10.1037/dev0000312

Barnett, W. S., Jung, K., Friedman-Krauss, A., Frede, E. C., Nores, M., Hustedt, J. T., Howes, C., & Daniel-Chols, M. (2018). State prekindergarten effects on early learning at kindergarten entry: An analysis of eight state programs. *AERA Open*, *4*(2), 1–16. https://doi.org/10.1177/2332858418766291

Barton, E. E., Fuller, E. A., & Schnitz, A. (2016). The use of email to coach preservice early childhood teachers. *Topics in Early Childhood Special Education*, *36*, 78–90. https://doi.org/10.1177/0271121415612728

Broekhuizen, M. L., Mokrova, I. L., Burchinal, M. R., Garrett-Peters, P. T., & The Family Life Project Key Investigators. (2016). Classroom quality at pre-kindergarten and kindergarten and children's social skills and behavior problems. *Early Childhood Research Quarterly*, *36*, 212–222. https://doi.org/10.1016/j.ecresq.2016.01.005

Brunsek, A., Perlman, M., McMullen, E., Falenchuk, O., Fletcher, B., Nocita, G., Kamkar, N., & Shah, P. S. (2020). A meta-analysis and systemic review of the associations between professional development of early childhood educators and children's outcomes. *Early Childhood Research Quarterly*, *53*, 217–248. https://doi.org/10.1016/j.ecresq.2020.03.003

Cohen, J. (1968). Weighted kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*, 213–220. https://doi.org/10.1037/h0026256

Cox, M. E., Hollingsworth, H., & Buysse, V. (2015). Exploring the professional development landscape: Summary from four states. *Early Childhood Research Quarterly*, *32*, 116–126. https://doi.org/10.1016/j.ecresq.2015.03.002

Cunningham, A. E., Etter, K., Platas, L., Wheeler, S., & Campbell, K. (2015). Professional development in emergent literacy: A design experiment of Teacher Study Groups. *Early Childhood Research Quarterly*, *31*, 62–77. https://doi.org/10.1016/j.ecresq.2014.12.002

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/Effective_Teacher_Professional_Development_REPORT.pdf

Derrick-Mills, T. (2015). *Understanding data use for continuous quality improvement in Head Start: Preliminary findings*. OPRE Report #2015-33. Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. https://www.acf.hhs.gov/sites/default/files/documents/opre/brief_cqi_in_head_start_finaldraftcleanv2_508.pdf

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

Desimone, L. M., & Pak, K. (2017). Instructional coaching as high-quality professional development. *Theory Into Practice*, *56*, 3–12. https://doi.org/10.1080/00405841.2016.1241947

Downer, J. T., Jamil, F., Maier, M. F., & Pianta, R. C. (2012). Implications of information processing theory for professional development of early educators. In C. Howes, B. K. Hamre, & R. C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes* (pp. 131-155). Brookes.

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology*, *41*, 327–350. https://doi.org/10.1007/s10464-008-9165-0

Early, D. M., Maxwell, K. L., Ponder, B. D., & Pan, Y. (2017). Improving teacher-child interactions: A randomized controlled trial of Making the Most of Classroom Interactions and My Teaching Partner professional development models. *Early Childhood Research Quarterly*, *38*, 57–70. https://doi.org/10.1016/j.ecresq.2016.08.005

Egert, F., Fukkink, R. G., & Eckhardt, A. G. (2018). Impact of in-service professional development programs for early childhood teachers on quality ratings and child outcomes: A meta-analysis. *Review of Educational Research*, *88*(3), 401–433. https://doi.org/10.3102/0034654317751918

Farran, D. C., Meador, D., Christopher, C., Nesbitt, K. T., & Bilbrey, L. E. (2017). Data-driven improvement in prekindergarten classrooms: Report from a partnership in an urban district. *Child Development*, *88*(5), 1466–1479. https://doi.org/10.1111/cdev.12906

Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation research: A synthesis of the literature* (FMHI Publication No. 231). University of South Florida, Louis de la Parte Florida Mental Health Institute, the National Implementation Research Network.

https://nirn.fpg.unc.edu/sites/nirn.fpg.unc.edu/files/resources/NIRN-MonographFull-01-2005.pdf

Franks, R. P., & Schroeder, J. (2013). Implementation science: What do we know and where do we go from here? In T. Halle, A. Metz, & I. Martinez-Beck (Eds.). *Applying Implementation Science in Early Childhood Programs and Systems* (p. 5–19). Paul H. Brookes Publishing.

Friedman-Krauss, A., Barnett, W. S., Garver, K. A., Hodges, K. S., Weisenfeld, G. G., & DiCrecchio, N. (2019). *The state of preschool 2018: State preschool yearbook*. The National Institute for Early Education Research. https://nieer.org/wp-content/uploads/2019/08/YB2018_Full-ReportR3wAppendices.pdf

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal*, *38*(4), 915–945.

Gerde, H. K., Duke, N. K., Moses, A. M., Spybrook, J., & Shedd, M. K. (2014). How much for whom? Lessons from an efficacy study of modest professional development for child care providers. *Early Education and Development*, *25*, 421–441. https://doi.org/10.1080/10409289.2013.788424

Grimshaw, J. M., Eccles, M. P., Lavis, J. N., Hill, S. J., & Squires, J. E. (2012). Knowledge translation of research findings. *Implementation Science*, *7*, 50. https://doi.org/10.1186/1748-5908-7-50

Halle, T. G. (2020). How implementation science and improvement science can work together to improve early care and education. In Foundation for Child Development, *Getting it Right: Using Implementation Research to Improve Outcomes in Early Care and*

Education (pp. 223–258). Foundation for Child Development. https://www.fcd-us.org/assets/2020/06/GettingitRight_UsingImplementationResearchtoImproveOutcomesinECE_2020.pdf

Halle, T., Cleveland, J., Bamdad, T., Nagle, K., Tout, K., Douglass, A., Agosti, J., & Doyle, S. (2021). *Promoting a culture of continuous learning in early care and education settings*. OPRE Report #2021-208. Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. https://www.acf.hhs.gov/sites/default/files/documents/opre/promoting-ccl-report-nov-2021.pdf

Hamre, B. K., Partee, A., & Mulcahy, C. (2017). Enhancing the impact of professional development in the context of preschool expansion. *AERA Open*, *3*, 1-16. https://doi.org/10.1177/2332858417733686

Harding, J. F., Connors, M. C., Friedman-Krauss, A., Aikens, N., Malone, L., & Tarullo, L., (2019). Head Start teachers' professional development, well-being, attitudes, and practices: Understanding changes over time and predictive associations. *American Journal of Community Psychology*, *63*, 324–337. https://doi.org/10.1002/ajcp.12327

Horner, R. H., Sugai, G., & Fixsen, D. L. (2017). Implementing effective educational practices at scales of social importance. *Clinical Child and Family Psychology Review*, *20*, 25–35. https://doi.org/10.1007/s10567-017-0224-7

Institute of Medicine & National Research Council. (2015). *Transforming the workforce for children birth through age 8: A unifying foundation*. National Academies Press. https://doi.org/10.17226/19401

LiBetti, A., & Mead, S. (2019). *Leading by exemplar: Instructional models in Head Start Programs*. Bellwether Education Partners. https://bellwethereducation.org/sites/default/files/Leading%20by%20Exemplar%20Instructional%20Models%20in%20Head%20Start%20Programs_Bellwether.pdf

Lieberman, A., Cook, S., & Jackson, S. (2018). *Extracting success in pre-k teaching: Approaches to effective professional learning across five states*. New America. https://www.newamerica.org/education-policy/reports/extracting-success-pre-k-teaching/

Markussen-Brown, J., Juhl, C. B., Piasta, S. B., Bleses, D., Hojen, A., & Justice, L. M. (2017). The effects of language- and literacy-focused professional development on early educators and children: A best-evidence meta-analysis. *Early Childhood Research Quarterly, 38*, 97–115. https://doi.org/10.1016/j.ecresq.2016.07.002

McLeod, R. H., Hardy, J. K., & Grifenhagen, J. F. (2019). Coaching quality in pre-kindergarten classrooms: Perspectives from a statewide study. *Early Childhood Education Journal, 47*, 175–186. https://doi.org/10.1007/s10643-018-0899-5

Mead, S., & Mitchel, A. L. (2016). *Moneyball for Head Start: Using data, evidence, and evaluation to improve outcomes for children and families*. Results for America. http://www.results4america.org/wp-content/uploads/2016/11/RFA_Headstart_Moneyball_i.pdf

Metz, A., Naoom, S. F., Halle, T., & Bartley, L. (2015). *An integrated stage-based framework for implementation of early childhood programs and systems*. OPRE Research Brief 2015-48. Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

Mowrey, S. C., & King, E. K. (2019). Sharing experiences together: Within- and across- sector collaboration among public preschool educators. *Early Education and Development, 30*(8), 1045–1062. https://doi.org/10.1080/10409289.2019.1656986

O'Keefe, B. (2017). *Primetime for coaching: Improving instructional coaching in early childhood education*. Bellwether Education Partners. https://bellwethereducation.org/sites/default/files/Bellwether_ECECoaching_GHS_Final.pdf

Olson, L., & LePage, B. (2022). *Tough test: The nation's troubled early learning assessment landscape.* FutureEd, Georgetown University. https://www.future-ed.org/wp-content/uploads/2022/02/REPORT_Tough_Test.pdf

Phillips, D. A., Lipsey, M. W., Dodge, K. A., Haskins, R., Bassok, D., Burchinal, M. R., Duncan, G. J., Dynarski, M., Magnuson, K. A., & Weiland, C. (2017). *Puzzling it out: The current state of scientific knowledge on pre-kindergarten effects, a consensus statement*. Brookings Institution. https://www.brookings.edu/wp-content/uploads/2017/04/consensus-statement_final.pdf

Pianta, R., Hamre, B., Downer, J., Burchinal, M., Williford, A., LoCasale-Crouch, J., … Scott-Little, C. (2017). Early childhood professional development: Coaching and coursework effects on indicators of children's school readiness. *Early Education & Development, 28*, 956-975. https://doi.org/10.1080/10409289.2017.1319783

Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). Classroom Assessment Scoring System [CLASS] manual: Pre-K. Brookes Publishing.

Pianta, R. C., Whittaker, J. E., Vitiello, V., Ruzek, E., Ansari, A., Hofkens, T., & DeCoster, J. (2020). Children's school readiness skills across the pre-K year: Associations with

teacher-student interactions, teacher practices, and exposure to academic content. *Journal of Applied Developmental Psychology*, *66*, 1–10. https://doi.org/10.1016/j.appdev.2019.101084

Piasta, S. B., Justice, L. M., O'Connell, A. A., Mauck, S. A., Weber-Mayrer, M., Schachter, R. E., Farley, K. S., & Spear, C. F. (2017). Effectiveness of large-scale, state-sponsored language and literacy professional development on early childhood educator outcomes. *Journal of Research of Educational Effectiveness*, *10*(2), 354–378. https://doi.org/10.1080/19345747.2016.1270378

Reinke, W. M., Stormont, M., Herman, K. C., & Newcomer, L. (2014). Using coaching to support teacher implementation of classroom-based interventions. *Journal of Behavioral Education*, *23*, 150–167. https://doi.org/10.1007/s10864-013-9186-0

Rojas, N. M., Morros, P., & Balaraman, A. (2020). Finding rigor within a large-scale expansion of preschool to test impacts of a professional development program. *AERA Open*, *6*(4), 1–21. https://doi.org/10.1177/2332858420975399

Schachter, R. E., Gerde, H. K., & Hatton-Bowers, H. (2019). Guidelines for selecting professional development for early childhood teachers. *Early Childhood Education Journal*, *47*, 395–408. https://doi.org/10.1007/s10643-019-00942-8

Snyder, P., Hemmeter, M. L., & McLaughlin, T. (2011). Professional development in early childhood intervention: Where we stand on the silver anniversary of PL 99–457. *Journal of Early Intervention*, *33*(4), 357-370. https://doi.org/10.1177/1053815111428336

Tout, K., Metz, A., & Bartley, L. (2013). Considering statewide professional development systems. In T. Halle, A. Metz, & I. Martinez-Beck (Eds.), *Applying implementation science in early childhood programs and systems* (pp. 243–267). Brookes.

Virginia Department of Education (VDOE). (2018). *A plan to ensure high-quality instruction in all Virginia Preschool Initiative classrooms*. Commonwealth of Virginia. https://rga.lis.virginia.gov/Published/2018/RD433/PDF

Weiland, C., McCormick, M., Mattera, S., Maier, M., & Morris, P. (2018). Preschool curricula and professional development features for getting to high-quality implementation at scale: A comparative review across five trials. *AERA Open*, *4*, 1–16. https://doi.org/10.1177/2332858418757735

Werner, C. D., Linting, M., Vermeer, H. J., & Van IJzendoorn, M. H. (2016). Do intervention programs in child care promote the quality of caregiver-child interactions? A meta-analysis of randomized control trials. *Prevention Science*, *17*, 259–273. https://doi.org/10.1007/s11121-015-0602-7

Whalen, S., Horsley, H., Parkinson, K., & Pacchiano, D. (2016). A development evaluation study of a professional development initiative to strengthen organizational conditions in early education settings. *Journal of Applied Research on Children: Informing Policy for Children at Risk, 7*(2), Article 9.

Whitebook, M., McLean, C., Austin, L. J. E., & Edwards, B. (2018). *Early childhood workforce index – 2018.* Center for the Study of Child Care Employment, University of California, Berkeley. http://cscce.berkeley.edu/topic/early-childhood-work-force-index/2018/

Williford, A. P., Downer, J. T., & Hamre, B. K. (2014). *Virginia Kindergarten Readiness Project—Phase 2 legislative report*. Research report prepared for the Virginia General Assembly.

Winton, P. J., Snyder, P. A., & Goffin, S. G. (2016). Beyond the status quo: Rethinking professional development for early childhood teachers. In L. Couse, & S. Recchia (Eds.), *Handbook of early childhood teacher education* (pp. 54–68). Routledge.

Yoshikawa, H., Weiland, C., & Brooks-Gunn, J. (2016). When does preschool matter? *The Future of Children*, *26*(2) 21–35.

Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M., Espinosa, L. M., Gormley, W. T., Ludwig, J., Magnuson, K., Phillips, D., & Zaslow, M. J. (2013). *Investing in our future: The evidence base on preschool education.* Foundation for Child Development.

Zaslow, M., Tout, K., Halle, T., Vick Whittaker, J., & Lavelle, B. (2010). *Toward the identification of features of effective professional development for early childhood educators*. US Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service.