Exploration of the Relationship between Professional Development Quality and Teacher Sense of Self-Efficacy in Urban Ohio Elementary Schools

Sarah L. McClusky
Ohio Northern University

Roger D. Goddard
The Ohio State University

Iksang Yoon
The Ohio State University

Abstract

We framed the activities found in professional development as a form of enactive experience hypothesized by social cognitive theory to influence efficacy beliefs. This enabled us to employ multiple regression to test the relationship between teachers' perceptions of professional development quality and their sense of efficacy for teaching. Data were collected from a sample of 354 teachers serving in traditional urban public and charter school elementary schools in Ohio. Results indicated that type of school was a leading predictor of professional development quality. Additionally, results indicated that, when using multiple regression to control for teacher demographics, professional development quality was positively associated with teachers' sense of efficacy. Because teacher efficacy beliefs are positively associated with the use of effective teaching practice, these findings suggest the need for school districts to attend not only to the provision of professional development but also the quality of the experience their teachers receive.

Key Words: Professional Development Quality, Teacher Self-Efficacy Beliefs, Social Cognitive Theory, Charter Schools

Introduction

In an era of high-stakes accountability, school districts nationwide continue to pursue professional development (PD) as a strategy to improve teacher practice and student outcomes. Burchinal et al. (2002) suggest that some teacher PD interventions

have been linked to higher instructional quality. Research also shows that PD can impact teacher effectiveness more positively than a teacher's acquisition of a graduate degree (Early et al., 2007). A casual reading of findings such as these encourage school districts to continue their sizable investments in PD. Indeed, in a study conducted by The New Teacher Project (TNTP) (Jacob & McGovern, 2015), school districts were reported to spend an average of nearly $18,000 per teacher, per year on PD-related activities. Some districts even reported spending more on PD than on transportation, food, and security. Additionally, teachers spent approximately ten percent of the school year participating in PD-related activities (Jacob & McGovern, 2015). Investments of this scale reflect the widespread belief that PD is essential to teacher and student learning and necessary for educational improvement.

Despite its nearly ubiquitous presence in American education, teacher PD does not always achieve the positive outcomes it is presumed to cause. Some actually argue that the improvements expected from PD are a "mirage" or a destination imagined but never reached. For example, TNTP's study (Jacob & McGovern, 2015) found that despite the massive investment districts make in PD, most teachers do not appear to improve substantially from year to year as a result. Similarly, research by Jacob et al. (2015) found that a large-scale research-based PD intervention delivered to principals over two years did not lead to observable change in principal leadership or the practice of teachers in the schools of principals who received the PD. These findings present a problem of practice that asks what characteristic of teacher PD might explain why some PD makes a difference to teacher practice and student achievement while other PD does not. It should

be noted that we are aware of the distinction between the terms professional development and professional learning but because of the predominance of the term Professional Development (PD), we chose to use it instead so that those with an interest in it will have a greater likelihood of learning from the knowledge generated here. We address this question by introducing the notion of quality as an essential feature of PD that varies widely across the range of formal learning experiences afforded to teachers. Variability in PD quality, in turn, could explain why some teachers find PD to be a true learning experience worthy of their time rather than a break from their daily routines or an opportunity to grade papers or work on lesson plans. Further, we argue that the quality of PD teachers experience constitutes a form of enactive experience, which social cognitive theory postulates has the strongest impact on teachers' efficacy beliefs (Bandura, 1997). We focus on teacher efficacy beliefs not only because they can logically be influenced by the quality of the PD teachers receive but also because they are key predictors of effective teaching practice (e.g. Moore & Esselman, 1992; Ross, 1992; Tschannen-Moran, Hoy & Woolfolk Hoy, 1998).

Based on the above, the central focus of this study is to explore whether variability in the quality of the PD teachers receive is related to their sense of self-efficacy for teaching. To answer this question, we first confirmed the validity of the measures of PD quality and teacher self-efficacy beliefs employed in this study. Next, we asked whether teacher-level experience, age, race, and education level predict teachers' reports of PD quality. Third, we tested our hypothesis, which was the quality of the PD in which teachers participate is positively and significantly related to the strength of their

self-efficacy beliefs. We turn next to a review of theory and research on PD quality and teacher self-efficacy beliefs.

Professional Development Quality

Researchers have suggested that when effective PD is provided to teachers, positive transformations in classroom quality and student outcomes can occur (Landry et al., 2009; Burchinal et al., 2002). To understand how this occurs, we turn to the characteristics and features of teacher learning activities found in the literature describing the quality of PD. Scholars frequently equate quality professional development with effective professional development. For example, Neuman and Cunningham (2009) defined effective professional development as activities that increase educators' knowledge in ways that improve instruction and raise academic achievement for children. Landry et al. (2009) described PD as effective when it is characterized by adult learning components such as a) opportunities that allow adults to be intellectually engaged in the subject matter; b) learning experiences situated in authentic contexts; and c) opportunities to engage in collaborative problem solving and practice specific skills. Additionally, others define professional development to be effective when through active learning it leads to true change in practice as opposed to traditional passive forms of learning that are less likely to manifest in sustained behavioral change (Gulamhussein, 2013). In addition, Landry et al. (2009) described professional development as effective when it includes: small group interactive learning, opportunities for practicing specific skills (role playing, developing lesson plans etc.), side by side in-classroom coaching and involvement of all levels of program staff. Similarly, Darling-Hammond et al. (2017)

described a targeted content focus, active learning components, opportunities for collaboration, alignment to curricular goals modeling of best practices as core features of effective PD. Finally, Bray-Clark and Bates (2003) and Demonte (2013) suggested that to be effective, PD should be aligned with curricular goals and assessments, sustained over time and job-embedded, focused on core content and active learning, and fueled by serious collaboration and coaching. We argue that the degree to which PD achieves these goals positively influences the levels of teachers' efficacy beliefs.

Teacher Self-Efficacy Beliefs

Researchers report that a teacher's sense of efficacy has a strong positive impact on instructional practice and student achievement (Goddard, Hoy, & Woolfok Hoy, 2004; Goddard & Salloum, 2011) combined competing theoretical models to argue that the degree to which teachers feel efficacious is a function of their cognitive processing of both the difficulty of the teaching task they face and their sense of professional competence, factors that can be influenced by the quality of the PD to which teachers are exposed. Tschannen-Moran et al. (1998) defined teacher self-efficacy as a teacher's "belief in his or her capability to organize and execute the courses of action required to successfully accomplish a specific teaching task in a particular context" (p. 233). We turn next to the factors individuals consider when making a self-efficacy assessment.

According to social cognitive theory, there are four specific forms of efficacy-belief shaping information that individuals consider when assessing their sense of efficacy to successfully accomplish a specific task in a given context: *enactive experiences*, *vicarious experiences*, *verbal persuasion*, and one's *somatic and emotional*

states (Bandura, 1997). *Enactive experiences* are those that involve an individual's lived experiences and the degree of success characterizing them. Bandura (1997) described enactive experiences as the most powerful form of efficacy belief-shaping information because individuals tend to make strong connections between prior firsthand experience and their sense of how well they expect to do in pursuit of similar goals in the future. This is closely linked to how adults learn and predicated on knowledge gains that serve as resources for later learning (Knowles, 1984). *Vicarious experiences* are those that involve learning from others. While they inform individuals' assessments of personal capability, they are less powerful than enactive experiences because individuals may hold doubts about how well they can successfully adopt behaviors modeled by others. *Verbal persuasion* refers to encouragement from others that persuades one to make positive attributions about self-capability. Put simply, whether a leading athlete will recover from a poor performance rests not only in the firsthand experience of failure but also in the cognitive processing and meta-analytic routines in which one engages to make sense of those experiences; sometimes, encouragement from others can persuade individuals to make positive attributions. S*omatic and emotional states* represent the physical and emotional responses associated with thinking about performing a specific task in context (Bandura, 1977).

Finally, the fundamental assumption of social cognitive theory is that of human agency. Actual skill and capability, whether it is the muscle memory of an athlete or the expertise of a skilled surgeon, are not self-enacting. Insidious self-doubt can easily override the best of skill. Social cognitive theory, thus, assumes that the choices

individuals make—the level of effort they choose to expend in the face of obstacles, the creativity with which they approach challenging problems, and the overall resilience they demonstrate in pursuit of a goal—are heavily influenced by their sense of efficacy. Thus, the more efficacious a teacher feels about educating a group of students, the more likely the teacher is to make choices that positively impact the overall quality of the instruction she delivers, and in turn, the learning of her students. For these reasons, we decided to focus on teachers' sense of efficacy as an important outcome of the quality of the PD teachers receive. We turn next to our hypotheses.

Rationale

As our review has demonstrated, despite the substantial annual investment in teacher PD made by school systems, the results of research on the effectiveness of PD are inconclusive. To address this problem, we designed this study to focus on whether variability in the quality of the PD teachers receive, matters to their sense of self-efficacy. Specifically, our research question is based on literature that explains PD of high quality should be collaborative, interactive, relevant to teachers, and should provide content teachers can apply. We developed this question based on extant literature. For example, prior research by Goddard and Kim (2018) demonstrated a strong and statistically significant link between teacher collaboration and teacher efficacy beliefs. Further, collaborative learning provided opportunities for socially persuasive interactions with colleagues and the potential for the modeling of teaching techniques by peers that provided both vicarious learning for the observer and enactive mastery experience for the one observed. In addition, the more PD is relevant to teachers' daily work, the more

likely it is to result in positive affective reactions in participants (Bandura, 1997). Finally, in a study of the impact of a two-year research-based PD program for principals, Miller et al. (2016) concluded the program had no impact on teachers largely because although principals became more knowledgeable about curriculum, instruction and assessment, the PD was designed in a way that led principals to report no growth in the application of their learning in practice. Based on this, our null hypothesis was that there is no relationship between the quality of PD teachers receive and their sense of efficacy. Concomitantly, our alternative hypothesis was that the greater the quality of the PD teachers experience, the greater their sense of efficacy. We examined the following research questions:

- *Using multiple regression, which teacher-level factors (race, gender, years of teaching experience, education level, grade level taught, type of public school) are statistically and significantly related to teachers' perceptions of the quality of the professional development they receive?*
- *What is the relationship between the quality of professional development and teacher self-efficacy?*

Method

This section will discuss the method for our study including the participants in our sample, the measures we employed, data collection, and the process of statistical analysis including exploratory factor analysis and regression analysis. The authors employed multiple regression to achieve the two main purposes of the study: 1) to test the relationship between teacher-level demographic characteristics and teachers' perceptions

of quality professional development; and 2) to test the relationship between professional development quality and teacher self-efficacy beliefs.

Participants

Non-probability sampling of schools in the local region of the researchers was used to collect data through survey methodology (Henry, 1990). Schools (n=140) staffed by 2,003 teachers (14.3 teachers per school) were invited to participate. 53 schools (37.9% of those invited) agreed to participate of which 11 were charter. Participating schools received a set of Form A and Form B teacher surveys, which were randomly distributed to teachers during regularly scheduled faculty meetings. This procedure resulted in each teacher in attendance at the faculty meeting completing either Form A or B, but not both forms.

A total of 354 teachers (6.7 per school) completed each form for a teacher response rate of 93.7%. No attempts were made to obtain data from teachers who were absent from the faculty meeting so the response rate of those in attendance approached 100%. The measures employed for the present study were obtained from Form B and Form A was not employed because it contained data unrelated to our primary independent and dependent variables.

These teachers were predominantly female (81.2%, compared to 75.1% statewide) and White (73.7%, compared to 92.5% statewide). Additionally, 72% of the respondents worked at non-charter public elementary schools, while 28% of teachers worked at charter elementary schools. Across Ohio in the year of the study, there were a total of 3,517 public schools of which 373 (10.7%) were charter (Fordham Institute, 2017; ODE,

2021). Thus, our urban non-probability sample had a higher proportion of charter schools than the state on average.

Tachers (68.9%) in the sample taught first grade or above. Given that the Ohio Department of Education reported that 85.0% of elementary teachers taught grades 1 or higher in the year of our study (Fordham Institute, 2017), our urban sample may have greater proportions of students in pre-k and kindergarten than the statewide average.

In our sample, slightly more than half of the participants had 10 or more years teaching experience and 55.3% had a graduate degree; in comparison, the Ohio Department of Education reported that, for the year of the study in the State of Ohio, 53.2% of teachers had 10 or more years of experience and 62.5% had a graduate degree (ODE, 2021). Thus, we conclude that our urban non-probability sample was slightly more female, less White, and less in possession of a graduate degree than the statewide average.

Table 1

Descriptive Statistics of Sample (n=354)

	N	%	Ohio Statewide Ave.
Teacher of Color	73	21.9%	7.5%[1]
Male	53	15.5%	24.9%[1]
10+ Years Teaching	195	56.4%	56.0%[2]
Grade 1+ Teacher	244	68.9%	85.0%[1]
Graduate degree	188	55.3%	62.5%[1]
Charter school	99	28.0%	10.7%[2,3]

[1]·Fordham Institute (2017), [2]·ODE (2021), [3]·The number reported here represents the statewide percent of school buildings that were classified by the Ohio Department of

Education (ODE) to be charter schools; data on the proportion of teachers working in charter schools was not publicly reported by ODE.
Note. Teacher of color (1 = White, 0 = Non-white); Male (1 = male, 0 = female); 10+ Years teaching (1 = 10 or more years, 0 = 0 to 9 years); Grade 1+ teachers (0 = PreK-K, 1 = Grade 1 and beyond); Graduate degree (0 = No Graduate degree, 1= Graduate degree); Charter school (0 = Traditional public school, 1 = Charter school).

Measures

Two survey-based measures developed and validated by McClusky (2017) were employed in this study. The first measure, the Quality Professional Development Scale (QPDS), was a nine-item questionnaire designed to determine teachers' perceptions of the quality of their most recent professional development experience. This nine-item QPDS questionnaire asked teachers to report their perceptions of the quality of their most recent PD experience. Sample items from the QPDS include: "I learned something about children's learning and development that will change my instructional practice" and "This experience provided opportunities for interactive learning." The second measure Teacher Efficacy Short Form (TESF) was employed to determine teacher self-efficacy beliefs (Hoy & Woolfolk, 1993; Goddard & Goddard, 2001). Both measures included a six-point Likert-type scale from 1 (Strongly Disagree) to 6 (Strongly Agree). All items are found in Table 2.

Table 2

Quality Professional Development Scale (QPDS) and Teacher Efficacy Short Form (TESF)

QPDS	
Question 1	This learning experience was relevant to my needs as an educator.
Question 2	The pacing of this experience gave me enough time to understand the content.
Question 3	This experience considered my previous knowledge and skills.
Question 4	I am able to apply this content in my setting.
Question 5	This experience provided opportunities for interactive learning.
Question 6	I was able to interact with many different colleagues through this experience.
Question 7	I learned something about children's learning and development that will change my instructional practice.
Question 8	This experience provided opportunities that build positive family and community relationships.
Question 9	Overall, this experience was worth my time.
TESF	
Question 10	If a student did not learn content from a previous lesson, I am confident I would be able to increase his/her retention in the next lesson.
Question 11	If a student in my class becomes disruptive or noisy, I feel confident that I can redirect him/her quickly.
Question 12	If I try really hard, I can get through to even the most difficult or unmotivated students.

Analytic Approach

Exploratory Factor Analysis (EFA). To determine the validity of the previously developed QPDS (McClusky, 2017) and TESF (Tschannen-Moran & Woolfolk Hoy, 2001) measures, exploratory factor analysis (EFA) was performed. Principal-axis

analysis was conducted to assess the structure of the items. We planned Promax rotations for both sets of analysis to perform data reduction by revealing any unobservable or latent variables that may be indicated by the observed variables with the goal of gaining a simple factor structure (Bruin, 2015). We selected Promax over Varimax rotation so that in the event more than one factor was extracted, the two factors could be correlated based on the theoretical grounds that the items address a similar topic. Cronbach's alpha was also calculated to assess the reliability of the final set of items for both measures.

Multiple Regression Analysis. To test our hypotheses, we performed multiple regression analysis. The first dependent variable was the degree of quality teachers reported for their most recent PD experience. The second dependent variable was the degree of self-efficacy teachers reported. The six teacher demographic variables (i.e., race, gender, teaching experience, education level, grade level, and type of school) served as independent variables in both models. Variables were re-coded as indicated in Table 3 from above. Multiple regression was used to examine the association between teacher demographics as predictors of the dependent variables, PD quality, and teacher self-efficacy.

For descriptive purposes, we report teacher-level correlations among all variables in Table 3. Notably, non-charter (traditional) public schools had more experienced teachers on average and PD quality was positively and significantly correlated with teacher self-efficacy beliefs.

Table 3

Correlations among Variables (n=354).

	Grade 1+ teacher	10+ years teaching	Teacher of color	Charter	Teacher Self-efficacy	PD Quality	Male	Graduate degree
Grade 1+ teacher	1							
10+ years teaching	-.03	1						
Teacher of color	.01	-.02	1					
Charter	.05	-.39***	.05	1				
Teacher self-efficacy	-.02	.02	.08	-.02	1			
PD Quality	.04	.03	.02	-.11*	.22***	1		
Male	.13*	-.03	.08	.09	.11*	.07	1	
Graduate degree	.08	.43***	-.01	-.29**	.02	.04	-.02	1

Note. PD = Professional Development; * $p < .05$, *** $p < .001$

Results

This study successfully employed valid and reliable measures of teachers' perceptions of PD quality and self-efficacy beliefs. We found that some teacher demographics were associated with the quality of PD teachers reported. Most

importantly, we rejected our main null hypothesis, which added support for our alternative theoretically-derived hypothesis; specifically, we found a positive and significant link between PD quality and teacher self-efficacy beliefs ($\beta = .20$ $p < .001$).

Quality Professional Development Scale (QPDS). The results of Little's test supported the assumption of missing completely at random (MCAR) for all nine items of QPDS, $\chi 2(84) = 100.02$, $p = .112$. Finally, values of kurtosis and skewness of all nine items ranged from -.94 to .50, which indicates a normal distribution. The validity of QPDS was assessed with EFA of teacher-level data to determine whether the nine items in the QPDS yielded a one factor simple structure matrix. Detailed data for EFA results for QPDS are presented in Table 4 and Figure 1. Results yielded a one factor solution that explained 72.08% of the item variance. Factor loadings for all nine items showed acceptable individual loadings ranging from .79 to .92. Cronbach's alpha was highly reliable ($\alpha = .96$). The single extracted is named PD Quality in the results that follow.

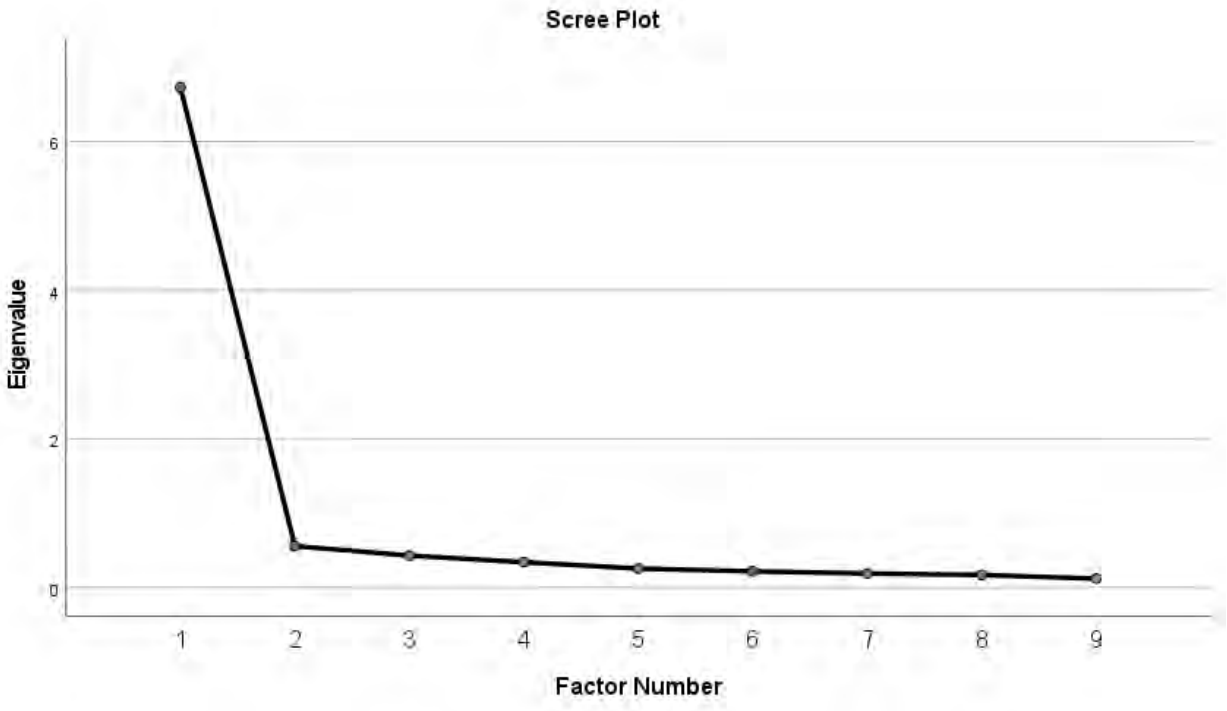
Table 4

Summary of item-level descriptive statistics and factor loading for Quality Professional Development Scale (QPDS) (n=354)

Items	*M*	*SD*	Min	Max	Skewness	Kurtosis	Factor loadings
1. This learning experience was relevant to my needs as an educator.	4.41	1.37	1	6	-0.73	-0.18	0.88
2. The pacing of this experience gave me enough time to understand the content.	4.49	1.24	1	6	-0.71	-0.11	0.79
3. This experience considered my previous knowledge and skills.	4.39	1.37	1	6	-0.59	-0.46	0.87
4. I am able to apply this content in my setting.	4.45	1.31	1	6	-0.65	-0.21	0.86
5. This experience provided opportunities for interactive learning.	4.39	1.29	1	6	-0.46	-0.64	0.88
6. I was able to interact with many different colleagues through this experience.	4.37	1.35	1	6	-0.60	-0.43	0.81
7. I learned something about children's learning and development that will change my instructional practice.	4.20	1.40	1	6	-0.53	-0.50	0.84
8. This experience provided opportunities that build positive family and community relationships.	3.89	1.52	1	6	-0.28	-0.94	0.79
9. Overall, this experience was worth my time.	4.30	1.52	1	6	-0.71	-0.48	0.92
Eigenvalue							6.49
Percentage of variance explained							72.08%

Figure 1

Scree plot supporting one-factor structure for Quality Professional Development Scale (*QPDS*)



Teacher Efficacy Short Form (TESF). We also confirmed the validity and reliability of the TESF. Our EFA yielded a single factor onto which all three teacher self-efficacy belief items loaded with no rotation required. The single factor explained 63.40% of the variance with factor loadings for all three items acceptable and ranging from .74 to .83. Cronbach's alpha for the three items of teacher efficacy short form was .71, which exceeds the minimum acceptable value of .70 reported by Tavakol and Dennick (2011). Detailed information for EFA results for TESF are summarized in Table 5 and Figure 2. The results of Little's MCAR test supported the assumption of missing completely at

random for all three items of TESF, $\chi 2(6) = 3.71$, $p = .716$. The normal distribution for the three items of TESF was confirmed from the values of kurtosis and skewness which ranged from -.76 to .50. Results of the factor analysis are presented in Table 5.

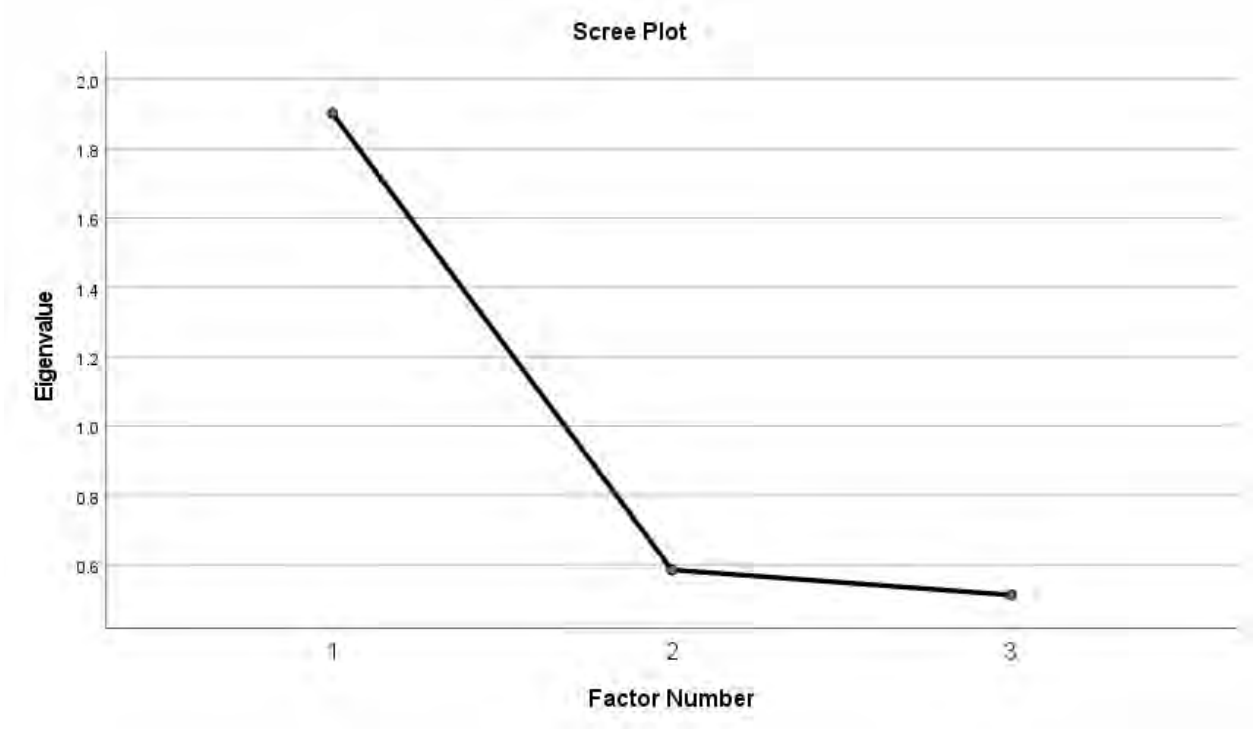
Table 5

Summary of item-level descriptive statistics and factor loading for the Teacher Efficacy Short Form (TESF) (n=354)

Items	*M*	*SD*	Min	Max	Skewness	Kurtosis	Factor loadings
1. If a student did not learn content from a previous lesson, I am confident I would be able to increase his/her retention in the next lesson.	4.45	1.14	1	6	-0.64	0.08	0.83
2. If a student in my class becomes disruptive or noisy, I feel confident that I can redirect him/her quickly.	4.75	1.05	2	6	-0.71	0.02	0.81
3. If I try really hard, I can get through to even the most difficult or unmotivated students.	4.38	1.16	1	6	-0.62	0.06	0.74
Eigenvalue							1.90
Percentage of variance explained							63.40%

Figure 2

Scree plot supporting one-factor structure for Teacher Efficacy Short Form (*TESF*).



Predicting Teacher Reports of Professional Development Quality

Consistent with our research questions, we conducted two multiple regressions to test the relationship between teacher level-factors as predictors of PD quality and teacher efficacy as follows:

1. *Holding constant all others in a multiple regression framework, which teacher-level factors (race, gender, years of teaching experience, education level, grade level taught, type of public school) are statistically and significantly related to teachers' perceptions of the quality of the professional development they receive?*

The first regression analysis examined teacher demographics as predictors of teachers' perceptions of PD quality. Our findings indicate that charter school teachers reported PD quality that was .15 standard deviations lower than did non-charter public school teachers ($p < .05$). While statistically significant, type of public school (charter or not) explained less than 3% of the total variance in teachers reports of PD quality. These findings are consistent with those of Goddard and Skrla (2006) who found that teacher demographic variables explained only 4% of the variance in teachers' collective efficacy beliefs. Findings from this analysis are reported in Table 6.

Table 6

Coefficients for Regression Analysis with PD Quality as Dependent Variable (n=354)

	Unstandardized Coefficients		Standardized Coefficients
Variable	B	Std. Error	Beta
(Constant)	4.32***	.18	
Teacher of color	.02	.17	.01
Graduate degree	.03	.16	.01
Grade 1+ teacher	.10	.16	.04
10+ years teaching	-.06	.16	-.03
Male	.24	.20	.07
Charter School	-.43	.18	-.15*

Note. $R^2 = .028$; * $p < .05$, *** $p < .001$

Predicting the Relationship of PD Quality and Teacher Efficacy

2. *What is the relationship between the quality of professional development teachers receive and their level of self-efficacy beliefs?*

The second regression analysis examined teacher demographics and PD quality as predictors of teachers' sense of self-efficacy. This allowed us to estimate the relationship between PD quality and teachers' self-efficacy beliefs while holding constant the relationship between any teacher demographic variables and teacher efficacy self-efficacy beliefs. Specifically, each standard deviation (SD) increase in teachers' reports of PD quality was associated with .20 standard deviations higher sense of self efficacy *(β* = .20 p <.001). Results are summarized in Table 7. This indicates a direct and positive relationship between teachers' reports of professional development quality and their sense of teaching efficacy. While somewhat modest, this association is consistent with the positive and significant relationship we hypothesized between the quality of the PD teachers experience and their sense of efficacy.

Table 7

Coefficients for Regression Analysis with Teacher Self-efficacy as Dependent Variable

	Unstandardized Coefficients		Standardized Coefficients
Variable	B	Std. Error	Beta
(Constant)	3.84***	.22	
Teacher of color	.22	.12	.11
Graduate degree	.02	.11	.01
Grade 1+ teacher	-.10	.12	-.05
10+ years teaching	.10	.12	.05
Charter school	-.02	.13	-.01
Male	.22	.14	.09
PD Quality	.14***	.04	.20***

Note. PD = Professional Development; R^2 = .066; * p < .05, *** p < .001

Discussion

Several conclusions can be drawn from the current study. The first is that teachers' sense of efficacy is not strongly related to their demographic background. Indeed, we found that the level of quality teachers reported for their professional development was not associated with demographic background characteristics including gender, years of experience, ethnicity, grade level assignment, or whether teachers had earned a graduate degree. Put differently, teachers' personal characteristics do not appear to influence the level of quality characterizing the PD they experience.

The next conclusion was that the only teacher demographic variable that had a statistically significant relationship with the quality of professional development reported by teachers was whether they taught in a traditional public school or a charter school. Teachers in our sample who taught in charter schools reported that their professional development was on average of slightly lower quality than did teachers in traditional public schools (-.15 standard deviation, $p < .05$). Although the strength of the relationship was modest, to understand it, we considered research on charter schools that indicates charter school teachers are paid significantly less per year than teachers in traditional public schools (Harris, 2006). Reasons for the lower average salaries in charter schools might be found in our own data. For example, Table 3 shows that charter school teachers are significantly less likely than their counterparts in traditional public schools to have 10 or more years of teaching experience or to have a graduate degree, both of which are positively linked to teacher pay in traditional teacher salary schedules. In addition to the lower investment in teacher salaries, Gronberg, Jansen and Taylor (2012) reported that

charter schools spent only about 77% of the amount traditional public schools did on "staff development" (p. 307). That said, while we found that teaching in a charter school (as opposed to a traditional public school) was a significant negative predictor of PD quality, the majority of the variability in teachers' reports of PD quality was not explained by the type of school in which teachers taught (charter or traditional public). This is consistent with literature reporting only a modest relationship between educational expenditures and student learning (Salloum, Goddard & Berebitsky, 2018). Therefore, future researchers may wish to investigate the degree to which the magnitude of the investment schools make in professional development for teachers is related to the quality of PD teachers experience.

Notably, our first multiple regression analysis also revealed that neither teacher race nor possession of a graduate degree were significant predictors of PD quality. Thus, regardless of their race or education level, those teachers in traditional public schools reported higher PD quality than did their counterparts in charter schools. This may imply that effective PD is more likely funded, accessible, and consumed by traditional non-charter public schools for various reasons. Another possible explanation for our finding that teachers in traditional public schools reported higher levels of PD quality than teachers in charter schools is based on the sample we employed for this study. Specifically, our sample consisted of teachers from a large urban school district and charter schools in its metropolitan Ohio region; it is possible that a public, urban school district may have more systematic approaches to PD than charter schools that are smaller

in size. Future researchers may wish to examine reasons such as these for differences in PD quality between charter and traditional public schools.

Finally, our findings indicate a direct and positive relationship between PD quality and teacher self-efficacy even after controlling for all other teacher demographics. This positive relationship suggests that high quality PD serves to enhance teachers' sense of efficacy for teaching. This, in turn, is likely to foster the types of positive outcomes associated with a robust sense of efficacy, documented in the literature previously reviewed. Thus, one way in which PD of high quality may make a difference to student learning is through its impact on teachers' sense of efficacy and the resilience that accompanies a robust sense of efficacy. The positive relationship between the quality of PD and teachers' sense of efficacy indicates that quality is a key characteristic of PD that school districts should attend to carefully in order to avoid PD programs and activities that consume large stocks of resources but that yield little positive change.

As districts continue to invest in PD, the results of this study provide significant implications for practice. Having a definition of PD quality provides districts with clear guidance when identifying appropriate PD. As such, districts should consider PD designs that:

- honor the knowledge and experience of each of the learners and allows for the learner to be the driving force of the experience rather than the content being the driving force;
- contain a strong rationale and purpose that clearly articulates how the content can be applied to a variety of settings;

- embed a multitude of opportunities for collaboration and interaction with other learners;
- built with the understanding that the individual is the protagonist of their own learning and that the experience is unique from one individual to another (Knowles, 1984; Landry et al., 2009).

What's more, Katz (2011) claimed that professional development experiences designed with teachers and their stages of development in mind can increase their competency, motivation, and overall success as a teacher. Additionally, professional development designs that adhere to this definition can result in more thoughtful and intentional practices to improve instructional quality and student outcomes. As Guskey and Yoon (2009) noted, no improvement effort has ever succeeded in the absence of thoughtfully planned and well-implemented PD. The work offered here is intended to support the creation and access of quality PD in the future.

Limitations, Recommendations, and Final Remarks

A few limitations of this study are worth noting. First, all the teachers surveyed were from elementary schools and not secondary schools, which are known to have a higher proportion of male teachers. Second, it is unknown if the same results would exist when extending a sample across other districts with different home demographic characteristics, such as socioeconomic status, typology, and prior levels of achievement. A third limitation is that this study did not consider the nested nature of data and that the conclusions assumed an independence in the observations of the teachers surveyed. Finally, our model explained only 6.6% of the variance of teacher self-efficacy, which we

acknowledge as a limitation; future researchers may wish to consider other factors that may predict teacher self-efficacy beliefs and even interact with PD quality such as teacher collaboration.

While this study still demonstrated positive results consistent with the main hypotheses, recommendations for future research in addition to those above are worthy of consideration. First, future studies could include a wider range of samples that are inclusive of a variety of school district typologies (e.g., rural, urban, suburban, socioeconomic status, varied student achievement rates) to generalize findings. Next, additional research should be conducted with a sample of secondary school teachers. Lastly, future research designs could employ multiple types of measures for PD quality to avoid exclusivity of results and reduce bias.

PD plays a significant role in school districts across the country. Although studies exist questioning its effect and worth (Jacob & McGovern, 2015), this study demonstrates that PD quality is a positive predictor of teachers' sense of efficacy for teaching and that in our sample, teachers in traditional public schools reported slightly higher levels of PD quality than did their counterparts in charter schools. Because teacher efficacy beliefs are known to promote positive forms of educational practice and outcomes, attention to PD quality in both traditional and charter schools is warranted based on our findings.

References

Anderson, R., Greene, M., & Loewen, P. (1988). Relationships among teachers' and students' thinking skills, sense of efficacy, and student achievement. *Alberta Journal of Educational Research*, *34* (2), 148-165.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman.

Bland, J., & Altman, D. (1997). Statistics notes: Cronbach's alpha. *BMJ, 314*(7080), 572.

Bray-Clark, N., & Bates, R. (2003). Self-Efficacy Beliefs and Teacher Effectiveness: Implications for Professional Development. *The Professional Educator, 26*(1), 13-22.

Burchinal, M. R., Cryer, D., Clifford, R. M., Howes, C. (2002). Caregiver training and classroom quality in child care centers. *Applied Developmental Science*, *6*(1), 2-11.

Carleton, L., Fitch, J., & Krockover, G. (2007). An In-Service Teacher Education Program's Effect on Teacher Efficacy and Attitudes. *The Educational Forum, 72*(1), 46-62.

Cutler, B., Penrod, S., & Martens, T. (1987). The reliability of eyewitness identification: The role of system and estimator variables. *Human Behavior, 11*(3), 233-258.

Darling-Hammond, L., Hyler, M., Gardner, M., & Espinoza, D. (2017) *Effective Professional Teacher Professional Development*. Learning Policy Institute.

https://learningpolicyinstitute.org/sites/default/files/product-files/Effective_Teacher_Professional_Development_REPORT.pdf

Duran, E., & Duran, L. B. (2005). Project ASTER: A model staff development program and its impact on early childhood teachers' self-efficacy. *Journal of Elementary Science Education, 17*(2), 1-12.

Early, D. M., Maxwell, K. L., Burchinal, M., Alva, S., Bender, R. H., Bryant, D., ... & Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development, 78*(2), 558-580.

Fordham Institute (2017). *Ohio education by number*. https://fordhaminstitute.org/sites/default/files/publication/pdfs/FF-Ohio-EDU-by-the-Numbers-WEB-v2.pdf.

Goddard, R. D., & Goddard, Y. L. (2001). A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. *Teaching and Teacher Education*, *17*(7), 807-818.

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educational Researcher, 33*(3), 3-13.

Goddard, R. D. & Salloum, S. (2011). Collective efficacy beliefs, organizational excellence, and leadership. In K. Cameron & G. Spreitzer (Eds.) *The Oxford Handbook of Positive Organizational Scholarship*, 642-650. Oxford, England: Oxford University Press.

Goddard, Y. L., & Kim, M. (2018). Examining connections between teacher perceptions of collaboration, differentiated instruction, and teacher efficacy. *Teachers College Record*, *120*(1), 1-24.

Guskey, T. R., & Yoon, K. S. (2009). What works in professional development? *Phi Delta Kappan, 90*(7), 495-500.

Harris, D. C. (2006). Lowering the bar or moving the target: A wage decomposition of Michigan's charter and traditional public school teachers. *Educational Administration Quarterly*, *42*(3), 424-460.

Henry, G. T. (1990). Practical Sampling. London: Sage Publications.

Hoy, W. K. & Woolfolk, A.E. (1993). Teachers' sense of efficiency and the organizational health of schools. *The Elementary School Journal*, *93*(4), 356-372.

Jacob, A., & McGovern, K. (2015). *The Mirage: Confronting the hard truth about our quest for Teacher Development.* New York, NY: The New Teacher Project.Katz, L. (1972). The Developmental Stages of Preschool Teachers. *Elementary School Journal 73*(1), 50-54.

Landry, S., Anthony, J., Swank, P., & Monseque-Bailey, P. (2009). Effectiveness of Comprehensive Professional Development for Teachers of At-Risk Preschoolers. *Journal of Educational Psychology*, *101*(2), 448-465.

Nunnally, J., & Bernstein, L. (1994) *Psychometric theory (3rd ed)*. New York, NY: McGraw-Hill.

Ohio Department of Education (ODE) (2021, Aug 15). FY2017 District Profile Report. Retrieved from http://education.ohio.gov/Topics/Finance-and-Funding/School-Payment-Reports/District-Profile-Reports/FY2016-District-Profile-Report.

Ross, J. A. (1992). Teacher Efficacy and Effects of Coaching on Student Achievement. *Canadian Journal of Education. 17*(1), 51-65.

Gronberg, T. J., Jansen, D. W., & Taylor, L. L. (2012). The relative efficiency of charter schools: A cost frontier approach. *Economics of Education Review*, *31*(2), 302-317.

Salloum, S. J., Goddard, R. D., & Berebitsky, D. (2018). Resources, learning, and policy: The relative effects of social and financial capital on student learning in schools. *Journal of Education for Students Placed at Risk (JESPAR)*, *23*(4), 281-303.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53-55.

Tschennen-Moran, M., Wolfolk-Hoy, A., & Hoy, W. (1998). Teacher Efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. Teaching and Teacher Education, 17, 783-805.