Student Learning in a Professional Development School and a Control School

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Abstract

This study investigated the impact of a Professional Development School (PDS) on student learning by comparing student achievement in a PDS and a control school. Student achievement data were collected from an elementary PDS and a matched control school over a 6-year period. The results indicate that the PDS moved more students up to mastery level and more students out of intervention level on state standardized tests than the control school. PDS development descriptions and standards ratings are used to provide a picture of PDS partnership building and a context for the findings. The PDS Standards Student Learning Pyramid is used to interpret the impact of PDS partnership activities on student learning increases.

Purpose

This study investigates the impact of a Professional Development School (PDS) on student learning when compared with a control school. PDS programs involve schools and universities as partners in joint efforts to improve teacher preparation, student learning, professional development, and inquiry-based practice (Levine, 1992; Trachtman, 1998). Those involved in PDSs attest to their value, but research-based connections between PDS activities and school improvement have been difficult to establish (Abhal-Haqq, 1998; Book, 1996; Teitel, 1998; Valli, Cooper, & Frankes, 1997). Most schools have improvement initiatives, either internally developed or externally mandated. What, then, is unique about the PDS model? And what difference does it make in schools? These are critical questions given the intensive and expensive nature of PDS work.

While anecdotal evidence accumulated, little research addressed the impact of PDSs on student achievement (Abdal-Haqq, 1998; Teitel, 1998). However, Teitel (2004) recently highlighted a growing body of research, focusing on the impact of PDSs on student learning. The research looks at such factors as achievement gains and dropout and graduation rates. Standardized test scores are used as achievement measures, but results are often inconclusive, lack comparative studies, or do not address the question of which specific aspects of PDS activities contribute to student learning (Castle, 2001; Grossman, 1994; Pine, 2003).

Compounding the problem of studying student achievement in PDSs is the complexity of factors that affect both PDS work and student learning in these settings. PDSs vary considerably in the activities they undertake, the number of school and university faculty involved, and the number of years required to build effective, collaborative partnerships and to institutionalize complex changes (Fullan, 2001).

In order to control for some of the variance and to explain some of the complexity, this study used a control school design in which a PDS and a non-PDS school were matched on achievement and demographic variables and then compared over a 6-year period. To explain differences in student learning between the PDS and control school, PDS activities and standards ratings were described in some detail so that factors impacting student learning might become evident. In an effort to assist in identifying and relating these complex factors, PDS development and student learning outcomes were mapped onto the PDS Standards Student Learning Pyramid described below (Teitel, 2003).

Teitel (2003) proposed a "logic model" for PDS research in an attempt to increase the explanatory power of findings through a theoretical framework. The model is a pyramid based on the PDS standards (National Council for Accreditation of Teacher Education [NCATE], 2000a). At the base of the pyramid are partnership foundations (indicated by the standards of Collaboration and Structures, Resources, and Roles). In the middle are new approaches to teaching and learning (indicated by the standard of Learning Community). At the top of the pyramid are desired outcomes for K–12 students and preservice and practicing teachers. Along the sides are supports (indicated by the standards of Accountability and Quality Assurance and Diversity and Equity). The logic model begins at the bottom and progresses upward. Thus, the logic model suggests that partnership foundations lead to new approaches to teaching and learning, which lead to desired outcomes for teachers and students. This model provides the theoretical framework for the current study.

Research Questions

What is the impact of the PDS model on student learning? Specifically, is there a difference in student learning over time between a PDS and a control school?

Background

PDS Network Context

The PDS in this study was part of a larger PDS network at a regional university. The PDS network had been in existence for 8 years and included eight schools. PDS activities focused on improvement in four primary areas: 1) teacher education; 2) student achievement; 3) school improvement; and 4) professional development and collegial exchange. Day-to-day operations of the network were governed by university and school faculty who met regularly to coordinate activities and to determine policies. Work at each school was coordinated by a leadership team consisting of the principal, university facilitator, and school-based site facilitator (in this case, the instructional resource teacher, or IRT). The university faculty member was provided released time for PDS responsibilities.

Description of the PDS

SL Elementary School (K–6) was located in a low income, priority-needs school district adjacent to a northeastern city and was one of the two most economically disadvantaged schools in the district. It was considered a low-performing school. The total student body was 450, with 59% on free or reduced lunch, 80% minority, 15% English language learners (ELLs), and 26% transient. Only 45% of fourth graders attained "mastery" on the state standardized test in reading.

The goal set by this particular school district was for each school to increase the percentage of students at mastery by 10% each year on the state standardized tests. This particular state reports, in addition to raw test scores, the percentage of students who have reached one of three levels of attainment: 1) *Mastery*—students who are at or above the state goal; 2) *Proficiency*—students who are slightly below the state goal; and 3) *Intervention*—students who are well below the state goal. For example, in reading, the mastery (or "at goal") level is 50, and the intervention level is 41. Students who receive a score of 50 or above are identified as being "at mastery." Students who receive a score of 41 or below are identified as being "at intervention." Students in between (42–49) are identified as being "at proficiency." Each year, reports sent by the state to each school and district include the percentage of students at mastery, proficiency, and intervention in reading, writing, and math. In addition, it is these percentages that are reported in local newspapers to inform the public about student achievement in particular schools.

During PDS leadership team discussions, the principal noted that moving students from proficiency up to mastery was a challenge, but one that could be met since these students were close to the goal and generally needed only individual or small-group review or remediation of content and skills. The bigger challenge was to move students from intervention up to mastery; these students were significantly below grade-level expectations and often had learning difficulties that would require

intensive, individualized interventions. PDS discussions of student learning focused increasingly on what needed to happen in the school in order to move proficiency and intervention students to mastery. Because of these challenges, the district's 10% goal, and reporting of percentages to the public, the PDS leadership team decided to use the level of attainment percentages to investigate the impact of the PDS on student learning and to compare the changes in percentages to a control school in the same district. This decision was in line with Teitel's (2004) call for research citing learning gains.

"PDSness"

PDSs differ in their level of implementation. The PDS standards ratings (NCATE, 2000a) provide context for the level of "PDSness" present in a school. This network was promoting the use of the PDS standards for systematic assessment after several years of using them for reflection and reporting. Thus, the leadership team at the school in the current study initiated and conducted a modified version of the NCATE PDS self-study process (NCATE, 2000b) at the beginning of its 4th year as a PDS. Each member of the team completed the PDS self-assessment instrument, which included rating the school based on PDS standards on a developmental continuum, and then substantiating the ratings with evidence. The team members then discussed their ratings in order to seek agreement. The leadership team's self-assessment was shared at an end-of-year faculty meeting to solicit additional input and to confirm the ratings. After agreement was reached, the ratings formed the basis for goal setting and action planning for the next year.

The results of the PDS self-study showed that the faculty rated their PDS on Collaboration as "at standard," on Structures and Roles as "developing," on Learning Community as "at standard," on Accountability as "developing," and on Diversity and Equity as "developing" (Table 1). They rated three subelements as "beginning," eight elements as "developing," eight elements as "at standard," and two elements as "leading." Thus, in their 4th year as a PDS, they perceived themselves as being at or above standard on about half of the elements with only three at the beginning level. The results showed particular strengths on two standards: Learning Community and Collaboration. Thus, based on the description of PDS development and the standards ratings, the school could be considered a mature and full-service PDS.

Table 1
Ratings on PDS Standards

Standard	Element	Rating
Collaboration		At standard
	Engages in joint work	At standard
	Designs roles and structures	At standard
	Recognizes joint work and individual contribution	Beginning
Structures		Developing
	Establishes governance and support structures	Developing
	Ensures progress toward goals	Developing
	Creates PDS roles	Developing
	Resources	Leading
	Uses effective communication	Developing

Table 1 (continued)

Standard	Element	Rating
Learning community		At standard
	Supports multiple learners	At standard
	Inquiry-based and focused on learning	At standard
	Shared professional vision	Leading
	Instrument of change	At standard
	Extended learning community	Developing
Accountability		Developing
	Develops professional accountability	At standard
	Assures public accountability	Beginning
	Sets PDS criteria	Developing
	Develops assessments, collects, and uses data	At standard
	Engages with PDS context	Developing
Diversity and equity		Developing
	Ensures equitable opportunities to learn	Beginning
	Evaluates practices to support equitable learning	At standard
	Recruits and supports diverse participants	Beginning

Method

Selection of a Control School

A control school was identified by the school district based on: 1) percentage of students on free and reduced lunch; 2) percentage of students representing ethnic minorities; 3) percentage of ELLs; 4) percentage of transient students; and 5) percentage of students at mastery on the fourth-grade state standardized test in reading. None of these factors differed between the PDS and control school by more than 4%. It was considered a low-performing school, as was the PDS, and had the same district mandate of increasing the percentage of students at mastery by 10%.

Data Collection and Analysis

Data sources. Levels of attainment on the state standardized tests were used in reading, writing, and math for fourth and sixth grades for 6 years: 2 pilot PDS years and 4 full PDS years. The school district provided individual student results by school on a data disk. The data were then transferred to SPSS files and checked for accuracy, consistency, and missing data.

This particular state's standardized test, the Connecticut Mastery Test (CMT), has been shown to possess strong reliability and validity. In the construction of the CMT, the State Department of Education initiated a rigorous and systematic process that involved various phases of standards-setting and norm-setting, as well as implementation of a pilot test year. The results reveal consistently high test-reliability indices and content validity across the various subtests of the reading, writing, and math tests (Connecticut State Department of Education [CSDE], 1999a, 1999b, 2004). During the 6-year period of this study, two different test forms were used: Generation 2 spanned 1993–1999, and Generation 3 spanned 2000–2004. These two versions were compared with confidence since the different generations

were constructed to ensure that "all test forms must be parallel or equivalent so that appropriate comparisons can be made from one form on the CMT to another" (CSDE, 1999b, p. 26).

Data analysis. The percentages of students at mastery and at intervention on the state standardized tests were calculated and compared descriptively. The percentage of students at each of the three levels was obtained from the data files for the PDS, the control school, and the district. These percentages were charted over time, comparing the percentage of students at mastery and intervention in the PDS, the control school, and the district in reading writing, and math. The percentages were charted, comparing the same cohort of students in fourth and sixth grades. This enabled identification of the percentage of students who moved to the mastery level between the 2 testing years. Changes in the percentage of students at mastery and intervention were calculated.

Results

Percentage of Students at Mastery

Table 2 shows the percentage of students at mastery and compares the PDS, the control school, and the district. The PDS increased the percentage of students at mastery to a greater extent than the control school on 9 of the 12 tests (75%): all 4 reading tests, 2 of the writing tests, and 3 of the math tests. In addition, the PDS increased the percentage of students at mastery to a greater extent than the district on 5 of the 12 tests (42%): 2 of the reading tests, 1 of the writing tests, and 2 of the math tests. The PDS met the district goal in increasing the percentage of students at mastery on 4 of the tests (2 reading and 2 writing); the control school met the goal on 2 of the tests (1 reading and 1 writing); and the district, as a whole, met the goal on 5 of the tests (3 reading and 2 writing).

Table 2

Change in Percentage of Students at Mastery Between Fourth and Sixth Grades in the PDS, Control School, and District by Subject and Year

Subject	Pilot 1	Pilot 2	Year 1	Year 2	Year 3	Year 4	Change
Reading							
PDS	15		50				+35**
Control	38		51				+13
District	34		52				+18
PDS		31		46			+15*
Control		39		36			- 3
District		45		61			+16
PDS			40		48		+ 8*
Control			38		36		- 2
District			43		55		+12
PDS				30		37	+ 7**
Control				34		38	+ 4
District				42		46	+ 4

Table 2 (continued)

Subject	Pilot 1	Pilot 2	Year 1	Year 2	Year 3	Year 4	Change
Writing							
PDS	40		21				-19
Control	37		51				+14
District	40		46				+6
PDS		38		60			+22**
Control		38		37			- 1
District		40		54			+14
PDS			29		39		+10*
Control			52		35		-17
District			48		59		+11
PDS				61		41	-20
Control				49		40	- 9
District				58		47	-11
Math							
PDS	60		42				-18
Control	50		42				- 8
District	46		42				- 4
PDS		40		44			+ 4**
Control		58		52			- 6
District		52		49			- 3
PDS			32		26		- 6**
Control			50		33		-17
District			48		40		- 8
PDS				41		22	-19*
Control				57		28	-29
District				49		33	-16
Greater increase for PDS than Control							9/12
Greater increase than District							5/12

*PDS had greater increase than control
**PDS had greater increase than PDS and district

Note. The first number on each line is the percentage of students at mastery in the fourth grade; the second number on the line is the percentage of students at mastery for the same group of students in the sixth grade.

Table 3 shows the mean and range of the increases in percentages of students at mastery for the PDS, control school, and district averaging the 6 years. In reading, the PDS had the highest mean at +17%, indicating that over 6 years, the PDS had moved 17% more students to the mastery level. The district mean was +13, and the control school mean was +3. In writing, the district had the highest mean of +5. The PDS and control school both had negatives means, but the PDS showed a smaller decrease than the control school. The same pattern was evident in math.

Table 3
Average Increase in Percentage of Students at Mastery for PDS, Control School, and District over 6 Years

	Mean	Range	% of Tests with Increase
Reading			
PDS	+17	-7 to +35	100
Control	+3	-2 to +13	50
District	+13	+4 to +18	100
Writing			
PDS	-1.75	-20 to +22	50
Control	-3.25	-17 to +14	25
District	+5	-11 to +14	75
Math			
PDS	-9.75	-19 to +4	25
Control	-15	-29 to -6	0
District	-7.75	-16 to -4	0

Percentage of Students at Intervention

The mastery results showed clear indications that the PDS had moved more students to mastery than the control school. These students could have moved to mastery from the proficiency or intervention levels. In order to analyze the impact of the PDS on the lowest achieving students, the intervention data were analyzed (Table 4). The PDS reduced the percentage of students at intervention to a greater extent than the control school on 9 of the 12 tests (75%): 2 in reading, 3 in writing, and all 4 in math. Table 5 shows the mean and range of the decreases in percentage of students at intervention for the PDS, control school, and district averaging the 6 years. In reading, the PDS had the highest mean (moving the highest percentage of students off intervention) at -12%, with the district at -11%, and the control school at -7%. In writing, the district was higher than the PDS (-3 and -1, respectively), while the percentage of students at intervention actually increased in the control school (+2). In math, the PDS had the highest mean (-10%), moving considerably more students off intervention than the district (-1%) or the control school (+1%).

Table 4

Change in Percentage of Students at Intervention Between Fourth and Sixth Grades in the PDS and Control School by Subject and Year

Subject	Pilot 1	Pilot 2	Year 1	Year 2	Year 3	Year 4	Change
Reading							
PDS	46	--	18				-28*
Control	25	--	23				- 2
PDS		40	--	19			-21*
Control		28	--	8			-20
PDS			36	--	30		-6
Control			46	--	39		-7
PDS				34	--	41	+7
Control				40	--	41	+1
Writing							
PDS	18	--	24				+6
Control	18	--	3				-15
PDS		7	--	4			-3*
Control		12	--	16			+4
PDS			13	--	2		-11*
Control			8	--	17		+9
PDS				2	--	6	+4*
Control				3	--	11	+8
Math							
PDS	23	--	9				-14*
Control	16	--	11				-5
PDS		22	--	4			-18*
Control		12	--	10			-2
PDS			29	--	17		-12*
Control			14	--	15		+1
PDS				20		26	+6*
Control				17		26	+9
Greater Reductions for PDS							9/12

Note. The first number on each line is the percentage of students at intervention in the fourth grade; the second number on the line is the percentage of students at intervention for the same group of students in the sixth grade.

Table 5
Average Decrease in Percentage of Students at Intervention for PDS, Control School, and District over 6 Years

	Mean	Range	% of Tests with Decrease
Reading			
PDS	-12**	+7 to -28	75
Control	-7	+1 to -20	75
District	-11	+1 to -17	75
Writing			
PDS	-1*	+6 to -11	50
Control	+2	+9 to -15	25
District	-3	+6 to -9	75
Math			
PDS	-10**	+6 to -18	75
Control	+1	+9 to -5	50
District	-1	+9 to -6	75

*greater decrease for PDS than control
**greater decrease for PDS than control and district

Discussion

This study examined the impact of the PDS model on student learning by comparing a PDS and a control school. The PDS increased the percentage of students at mastery and decreased the percentage of students at intervention to a greater extent than the control school on 75% of the comparisons. This indicates higher levels of student learning in the PDS, particularly for those students at the lowest levels of achievement. If PDSs do indeed have the power to impact the lowest performing students through joint efforts, then a strong case can be made for PDS work in high-needs schools.

PDS Development

One of the difficulties of PDS research is explaining why an identified impact occurred (Teitel, 2004). In order to attempt to explain PDS factors that impacted student learning in this study, it is important to describe the PDS's development in terms of activities and decision points (Table 6).

Pilot. The PDS participated in a pilot project for 2 years. The school began taking student teachers, and a small group of teachers conducted a pilot math project.

Year 1. After 2 pilot years, the school became an official school-wide PDS. All of the major players were new, including the principal, the university facilitator, and the instructional resource teacher (IRT). Initial efforts were directed toward identifying a PDS focus and creating formal structures for sharing and decision making. This began by involving the entire faculty in identifying a vision, mission, and goals for the school. The principal, IRT, and university facilitator convened this process, providing the opportunity for them to "gel" as a leadership team and for all faculty members to be involved in identifying future directions.

Table 6

PDS Development Organized by Year and PDS Standards Student Learning Pyramid

Year	Partnership Foundations	Teaching and Learning	Teaching Outcomes	Students at Mastery
4	Goals 2000 money* Research: student learning* Research: instruction* School improvement committee Collaboration: at standard*	Assessment and flexible grouping Tutors* IRT support Teacher-conversation groups* Learning Community: at standard*	Flexible grouping 92%	Reading +7
3	Goals 2000 money* Research survey* Research: student learning* New university facilitator*	Assessment and flexible grouping Tutors* IRT support Peer coaching*	Flexible grouping 50%	Reading +8 Writing +10
2	Goals 2000 money* Research group established* IRT support Goal groups*	Assessment and flexible grouping Flexible grouping tutors*	Flexible grouping 25%	Reading +15 Writing +22 Math +4
1	PDS began* Leadership team established Vision, mission, goals rewritten* Goals 2000 grant money obtained	Assessment and flexible grouping District professional development IRT support Goal groups*		Reading +35
Pilot	Student teachers	Small math project		

* unique to PDS; not evident in control school

The district had just announced the goal that each school would increase the percentage of students at mastery by 10% a year and mandated a focus on student assessment and flexible grouping in literacy to help achieve that goal. This became the PDS agenda. District-wide professional development provided a knowledge and skill-base on which to build. Goal groups were created to study and design initiatives on each of the school's six goals. In addition, the state began offering Goals 2000 grants for new and continuing PDSs. Joint grant writing involved the principal, the IRT, and the university facilitator. By the end of the 1st year, PDS organizational structures were in place, and a joint focus had been established with money to support it.

Year 2. Year 2 of the PDS partnership focused on initial implementation of assessment and flexible grouping. One key use of the Goals 2000 grant money targeted hiring tutors to assist teachers in conducting flexible group instruction. The tutors worked with classroom teachers to support the instructional needs of students as evidenced in the assessments. The small-group tutors and goal-group faculty became two primary avenues for impacting student learning.

The research agenda started to evolve during the spring. Additional Goals 2000 money became available for small research grants, and the jointly written proposal was funded. A research group of school and university faculty identified research aims and strategies—new territory for the teachers. Four teachers volunteered to join three university faculty. The principal empowered the group to work independently, but he asked the group to keep him informed and to solicit his input at key decision points.

A potential obstacle emerged when the university facilitator accepted a job at another university for the following fall. The members of the partnership contributed to the decision about how to make an effective transition with regard to future university involvement. The university responded quickly by involving two additional faculty members with the research effort; one of the members was designated as the future university facilitator. A smooth transition occurred as a result of anticipation of a change in the leadership team and the need for proactive planning. Furthermore, the original university facilitator was retained as the primary researcher supported by the Goals 2000 funds. Clarity of roles, responsiveness, and a team commitment to moving the partnership forward were critical factors at this juncture.

Year 3. The research group began to study the impact of flexible grouping on student learning. They developed a questionnaire (not reviewed in this paper) and surveyed the school faculty about the progress of the goal groups and other factors that supported and thwarted the implementation of assessment-driven flexible grouping. The research group teachers acted as liaisons to other faculty and worked with the university researcher in collecting and analyzing data. The survey gave them false expectations that all of the answers they sought would be forthcoming. Instead, they realized the limitations of the survey. It did, however, highlight what the teachers and the leadership team were already observing: The goal groups were not having the intended impact. Not all of the groups were meeting on a regular basis, and teachers were feeling that the time spent was not entirely worthwhile. The survey highlighted the need to find more innovative, sustaining structures that could support improvement to classroom instruction.

One of the important roles the teachers served in the research group was to keep the agenda focused on specific, practical needs of the school. The teachers sought research that would help them understand their students and classrooms and design meaningful improvements. The teachers came with concerns about making a difference with transient students. They also came with weariness of responding defensively to the traditional whole-school reporting of achievement data when large numbers of their students had entered the school a month before the testing. Thus, the research agenda was broadened to include tracking those students who remained in the school over a consistent period of time. Standardized tests and additional assessments were used to track these students. At the end of the school year, the university researcher collected student data from multiple assessments, going back 3 years to the 1st year of flexible grouping and to the start of the PDS partnership. The researcher presented the results to the school faculty the following fall.

As flexible grouping continued, teachers sought ways to implement it more effectively. The goal groups were terminated since they did not appear to be having any impact. The leadership team responded by inviting teachers to participate in a peer coaching pilot that would enable veteran teachers to coach beginning teachers on the implementation of flexible grouping. Three pairs of teachers volunteered, participated in initial training, and designated times to observe and coach each other. Based on the feedback received from these teachers, the research group recommended expanding the opportunities for peer coaching.

This provided an important milestone for the PDS partnership's ability to focus more specifically on supporting changes in classroom practices. During Year 2, the IRT estimated that 25% of teachers were using flexible grouping on a consistent bases; during Year 3, her estimate rose to 50%. District professional development on flexible grouping had ended, yet the teachers still had questions about how to implement it. Despite the IRT's presence in classrooms, providing direct assistance and modeling, teachers still had many "how" questions. At this point, several things came together. Given the positive response to peer coaching, the leadership team felt that it was time to situate professional development more broadly within the school. This meant establishing collaborative structures in which teachers could share their expertise, investigate their questions, and problem solve around implementation issues that focused on their specific challenges and successes. Therefore, teacher-conversation groups were started in Year 4. This put classroom instruction at the heart of teachers' discussions about their practice and professional development.

Year 4. Teacher-conversation groups began to meet every 2 weeks for 2 hr in their grade-level teams. The principal, IRT, and university facilitator each assumed responsibility for convening grade-level meetings. The presence of the leadership team members indicated the importance of dedicating time to teacher conversations. Another Goals 2000 grant provided the substitute coverage necessary for teachers to meet together during school. The leadership team created an agenda and a format for keeping minutes that focused the conversations. The teachers supported the continuation of teacher conversations into Year 5.

The Goals 2000 grant provided the necessary resources for the PDS to continue tracking student learning and changes in teaching practice. At periodic points, research reports were presented and discussed at faculty meetings. This increased faculty involvement in making data-driven decisions. In addition, the results were reported to the assistant superintendent. By Year 4, teachers seemed quite comfortable using research to guide instructional decisions in the school. At the same time, the leadership team used the research as a catalyst to form a school improvement committee that was charged with formulating recommendations based on input from all of the school's stakeholders, including students.

Salient factors. It was clear that the strides in teaching and learning made at this PDS could not have been made by any one partner alone. Critical contributions from the partners included principal support and leadership and an unflagging commitment to improving instruction; the expertise of the IRT and her consistent presence in classrooms; smooth leadership transitions; university support (load credit in particular) for PDS work; joint school-university grant writing; PDS-funded flexible group tutors; data collection and analysis focused on the needs of the school; the impact of school and university perspectives on the direction of the research; and jointly designed goals and activities at each step along the way. While the control school had the same district-based resources and support, it did not have a university partner involved in planning, implementation, professional development, and research; grant writing support and PDS grant money; PDS standards to focus work on professional development and student learning; data-driven, whole-faculty decision making; or continuous, professional development through peer coaching and teacher-conversation groups (Table 6).

Results on the PDS Standards Student Learning Pyramid

Organizing PDS activities and outcomes around the PDS Standards Student Learning Pyramid (Teitel, 2003) helps to make sense of the findings (Table 6). Beginning with Year 1 and moving upward

through Year 4, Partnership Foundations, Teaching and Learning activities, and Student Outcomes can be tracked. As collaboration, joint research activities, and school-based professional development increased, so did the percentage of students at mastery to a greater extent than in the control school.

In terms of Partnership Foundations, the PDS rated itself as "at standard" on Collaboration and as "developing" on Structures and Roles. Collaboration was particularly strong in terms of joint work with roles and structures to support it. Structures and Roles was particularly strong in terms of resources for university load credit for PDS work and jointly obtained Goals 2000 grant money. The description of PDS development shows a focus on improving instruction and substantial contributions from each partner. It also shows a growing commitment to research and to using data to design school-based professional development and to track teacher and student progress. This indicates a strong and growing partnership foundation that was collaborative, focused on learning, and inquiry-based. Table 6 shows Goals 2000 money, research, PDS standards by which to assess collaboration and university involvement as unique to the PDS.

Moving up the pyramid to Teaching and Learning, the PDS rated itself as "at standard" on Learning Community. It was particularly strong on having a shared professional vision, as well as support for and a focus on learning. The description of development shows a focus on instruction and assessment, professional development to support the focus, regular grade-level conversations that provided structured forums to discuss teaching and learning concerns, and research activities to assess impact on instructional effectiveness and student learning. Changes in teaching practice were evident in the increasingly pervasive and consistent implementation of flexible grouping. The teachers attributed student learning gains, at least in part, to instruction based on student needs and to helping students stay focused in small groups. As a group, the teachers increased their ability to provide assessment-based, student-centered instruction. The findings indicate a strong learning community that was able to design and implement school-based initiatives that led to improved teaching. Table 6 shows the Goals 2000-funded tutors and school-based professional development in the form of goal groups, peer coaching, and teacher-conversation groups as unique to the PDS.

At the same time, the PDS rated itself as "developing" on Accountability and on Diversity—the sides of the pyramid that keep the PDS focused. As far as Accountability, the PDS was particularly strong in using results to inform decisions. Diversity showed strength in evaluating practices, again showing a focus on inquiry-based decision making, which kept the PDS focused and served as the "glue" for partnership work. However, all three elements rated at the beginning level were within these two standards. Beginning levels for assuring public accountability and recruiting diverse participants suggest the need for more attention to external aspects of PDS work.

Moving up to the top of the pyramid, the data showed improved Student Outcomes, particularly in reading. The percentage of students who moved to mastery and the percentage of students who moved out of intervention changed to a greater extent than in the control school, even though the control school was also focused on the district-mandated flexible grouping and received the same professional development from the district. This indicates that something vital was added by the PDS.

Following the logic model framed by the pyramid, we can conclude that, over the course of PDS development, a collaborative, inquiry-oriented partnership foundation supported a student-focused learning community that impacted student learning. As the partnership collaboration became stronger and more data-based, the focus on school-based professional development and teaching effectiveness gathered momentum (see Castle & Rockwood, 2002 for a study of teacher effectiveness), and the partners were able to respond to the particular needs of the teachers and students in a spiraling fashion that built on previous learning. Money, school-designed professional development, and joint, data-based decision making were unique to the PDS as compared to the control school, indicating factors important to the PDS in impacting student learning.

Most schools have instructional improvement initiatives. Some are school-based, and some are externally mandated. External mandates are often met with skepticism by teachers who do not have passion for the particular mandate, had no voice in its creation, or have been through mandates they

feel made no difference. For this school, the PDS partnership enabled the faculty to turn the mandate into a shared vision for student learning, and it gave them tools to design and track the impact of instructional changes through a focus on inquiry. The PDS partnership provided strength to their school improvement work through mobilization of critical resources (personal and monetary) that the control school did not have and that were directed toward common, school-based goals. These resources included a shared vision; Goals 2000 money; university facilitation; professional development targeted at the specific needs of the teachers and students; student teachers to assist with assessment and flexible group instruction; and school and university inquiry supporting data-based decision making. What came to be a joint responsibility for mandated improvements shared by the school and university enabled the participants to impact student learning to a greater extent than might have occurred otherwise.

The findings indicate that PDS work may have particular impact on the lowest achieving students. If this is indeed the case, then a strong case can be made for PDSs as an avenue for improving teaching and learning in low-achieving schools. The findings also suggest that PDS impacts may be strongest when PDS-supported initiatives are tied to the priorities of the school, the needs of the teachers in implementing new approaches to teaching, and the particular needs of the student population. The findings resonate with school improvement literature that emphasizes the direct connection between school-based professional development and student learning (Fullan, 2001; Lambert, 2003). They indicate that professional development must produce instructional improvements that occur across classrooms and grade levels in order to impact student learning over more than 1 year, making a case for the kind of school-wide focus characteristic of "at standard" PDSs. The findings support the notion of PDSs as school-wide, long-term partnerships that are focused on student learning, professional development, and inquiry in order to impact student learning.

Limitations and Implications

While the findings are positive, there are limitations to the study that impact the strength of the conclusions. Levels of attainment percentages show changes that favor the PDS in a way that is easy to see and is meaningful to the school and the district. However, statistical methods, such as a repeated measures design, would provide statistically stronger results. The inclusion of the details of PDS development illuminate factors that might have contributed to greater student learning in the PDS, but tracking the development of the control school in parallel with the PDS would enable a more exact comparison and better highlight the differences.

The positive findings from this study point toward continued research that seeks to identify the specific factors inherent in PDS work that impact student learning. Research using standardized test results has been largely unsuccessful (Teitel, 2004); the current study suggests that other measures and procedures, such as the levels of attainment percentages and following students who are in the PDS consistently over a period of time, may be more successful at uncovering impact on learning. Future research must continue to focus on finding outcome measures that are simultaneously robust and sensitive. Learning outcome measures must be coupled with levels of PDSness, descriptive information about the unique PDS factors and interventions, and measures of impact on teaching practice as well as learning.

Author note: The study was partially funded by a Connecticut State Department of Education Goals 2000 Grant for Professional Development Schools and by the NEA Professional Development School Research Project. The authors wish to thank Dot Gavalis, Richard Quinn, Jean Ross, and Lynda Green.

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