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ABSTRACT

This report describes the professional development experiences of teachers in high-performing, high-needs (HPHN) schools. Researchers surveyed K-5 teachers from 10 schools in a district with large numbers of impoverished students, examining: teachers' perceptions of the characteristics and outcomes of their professional development experiences; how those perceptions differed between teachers in HPHN schools and low-achieving schools; and the relationship between aspects of school culture and teachers' perceptions of professional development outcomes in HPHN and other schools. HPHN teachers reported that their professional development addressed content standards, deepened content knowledge, addressed diversity, applied to the classroom, and modeled teaching strategies. They perceived improvements in their teaching experiences and reported that their professional development experiences embodied the characteristics of high quality development programs recommended by research to a greater degree than did teachers from moderate- and low-proficiency schools. HPHN teachers reported lower frequencies of collaboration than teachers in lower-proficiency schools. HPHN teachers had the most positive perceptions of their school cultures and the highest level of belief that they were responsible for all students' learning. Teachers in high-performing schools had more positive perceptions about knowing their students than did other teachers. (Contains 27 references, 7 figures, and 5 tables.) (SM)

Preliminary Findings on the Characteristics of Teacher Learning in High-Performing High-Needs Schools

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EXECUTIVE SUMMARY

This interim report describes preliminary findings on the professional development experiences of teachers in high-performing high-needs (HPHN) schools. Previous research has demonstrated the connection between professional development and student achievement. By examining professional development in HPHN schools and comparing these with practices in lower-performing schools, this study seeks to identify practices associated with high-performing students.

The study investigated three research questions by surveying a total of 155 K–5 teachers from 10 schools who responded to a survey about teaching practices and policies as part of a larger McREL study of HPHN schools. The schools were in a Midwestern school district where a large proportion of students were eligible for federal free/reduced lunch benefits. Schools were categorized as having moderate or high student economic needs, and low, moderate, or high student proficiency, as determined by their 2000 and 2001 state assessment scores in language arts and mathematics. A factorial design was used to analyze the survey data.

The following is a summary of the results for each of the three research questions:

Question 1: What are the perceptions of teachers in HPHN schools concerning the characteristics and outcomes of their professional development experiences?

- Teachers in the HPHN schools reported that their professional development addressed content standards, deepened their content knowledge, addressed diverse learners, applied to the classroom, and modeled teaching strategies.
- Teachers in HPHN schools perceived improvements in their teaching from language arts professional development that addressed reading standards, the district's new reading curriculum, and rubric-guided writing strategies, and from mathematics professional development that addressed standards.

Question 2: How do perceptions concerning professional development differ between teachers in HPHN schools and teachers in schools with lower achievement?

- HPHN teachers reported that their professional development experiences embodied the characteristics of high-quality development programs recommended by research to a greater degree than teachers from moderate- and low-proficiency schools. In particular, HPHN teachers reported more professional development on knowledge and skills to help diverse learners.
- HPHN teachers reported lower frequencies of collaboration than teachers in schools with lower student proficiency; however, they reported more improvement in their teaching due to collaboration.

Question 3: What is the relationship between aspects of school culture and teachers' perceptions of professional development outcomes in HPHN and other schools?

- HPHN teachers had the most positive perceptions regarding their school cultures.
- Teachers in high-performing schools had more positive perceptions about knowing their students than teachers from schools with lower student proficiency.
- Teachers in HPHN schools had the highest amount of agreement with the statement that they felt responsible for all students' learning. Teachers in the low-performing schools had the lowest amount of agreement with this statement.

Overall, the results suggest that to increase student achievement in high-needs schools, professional development should address content standards and teachers' knowledge of content, particularly in literacy, and should support the acquisition of knowledge and skills about teaching diverse learners. In addition, to support effective teacher learning, schools need positive school cultures with shared responsibility for student learning.

INTRODUCTION

Overview

According to the National Commission on Teaching and America's Future (NCTAF, 1996), school reforms based on standards and aligned curricula will not improve student learning without improvements in teacher quality. Most educators and researchers agree with NCTAF that a critical factor in the success of standards-based reforms is professional development that addresses teachers' needs to instruct in ways that can help all children to achieve high standards.

The primary purposes of this study are to examine the characteristics of teachers' professional development in high-performing, high-needs (HPHN) schools, to compare those with characteristics of teacher learning in low-performing, high-needs schools, and to describe the general influences of student economic needs and student achievement on teachers' perceptions about the characteristics and outcomes of their professional development experiences.¹

The purpose of this report is to describe the results of the study and to discuss the implications for designing effective teacher professional development. The report informs education researchers about the relationships between teachers' professional development experiences and their perceptions of professional development impact.

The Nature of Teacher Professional Development

The NCTAF report (1996) states, "There is a mismatch between the kind of teaching and learning teachers are now expected to pursue with their students and the teaching they experience in their own professional education" (p. 84). NCTAF cites the following as missing in teachers' learning opportunities: 1) engagement in understanding new ideas, 2) practice followed by feedback, 3) critical reflection and problem solving, 4) collaboration, 5) a connection between what they are learning and their own experiences, 6) and ongoing assessment. As a result, teachers often do not have effective opportunities to learn how to teach students toward high standards. In data collected by the National Center for Education Statistics (U.S. Department of Education, 1998), teachers were most likely to participate in professional development activities that focused on reform topics such as standards and assessment. However, the majority of these activities lasted for only a day, and only 36% of teachers felt very well prepared to implement state or district standards.

Characteristics of effective professional development. In a report from the National Staff Development Council (NSDC), Sparks & Hirsch (2000) stressed that to improve student achievement in standards-based education systems, teacher quality must be improved through staff development that is

¹ This is the first of two studies that address teacher professional development in HPHN schools. A second study in 2002 will examine teachers' classroom practices and will incorporate data from additional sites. Both studies are part of a larger McREL HPHN study that investigates strategies used in high-performing schools compared to those used in schools with lower student achievement.

- Focused on helping teachers become deeply immersed in subject matter and teaching methods;
- Curriculum-centered and standards-based;
- Results driven and job embedded;
- Sustained, rigorous, and cumulative; and,
- Directly linked to what teachers do in their classrooms

The first two of these features address the content of professional development; the latter three address the format. It is NSDC's position that both the content and the format of teacher professional development influence its effectiveness.

A national study on the effects of the federal government's Eisenhower Professional Development Program on teachers' classroom practices addresses this question. The focus of the Eisenhower Program is to help teachers develop knowledge and skills primarily in the subject areas of mathematics and science. A cross-sectional research study (Garet, Birman, Porter, Desimone, & Herman, 1999) identified six features of professional development that are associated with reported improvements in teaching practices:

- Reform-type organization (e.g., networks, study groups, mentoring, action research, teacher resource center) instead of traditional organization (e.g., one-shot workshop, conference);
- Longer duration in total hours and time span;
- Collective participation of teachers (e.g., by schools or departments);
- Active learning opportunities for teachers (e.g., examining student work, obtaining feedback on teaching);
- Content focus (e.g., in mathematics or science); and,
- Coherence with teachers' goals and with state standards and assessments.

The researchers found that structural professional development features (e.g., duration) influenced the intensity of core features (e.g., content focus), and core features influenced the impact of the learning experience on teachers' reported growth in knowledge, skills, and teaching practices. For example, longer activities gave teachers more opportunities to deepen their content knowledge, and collective participation provided teachers more active learning experiences. Professional development that was content-focused and included active learning was associated with teachers' reported changes in practices.

The content of professional development. Cohen and Hill (1998) studied the influence of professional development in mathematics on the classroom practices of a random sample of 1,000 California teachers in grades two through five. The researchers compared two different kinds of professional development — curriculum-centered workshops and special topics/issues

workshops. Teachers who spent more time in the curriculum workshops than in the special topics workshops reported using more instructional practices that are aligned with the California mathematics curriculum compared to teachers who spent more time in topical workshops. More important, schools with higher proportions of teachers participating in curriculum-centered professional development had higher student achievement scores on the state test. The authors came to the following conclusion:

If our analysis is correct, teaching practice and student performance are likely to improve when educational improvement is focused on learning and teaching academic content, and when curriculum for improving teaching overlaps with curriculum and assessment for students. (p. 11)

In short, to improve teachers' instruction, the content of their professional development should be directly linked to the curriculum.

In other research on professional development content, Kennedy (1999) compared results from 12 studies of teacher professional development that varied in program content in the following four ways: (1) generic teaching behaviors, (2) generic teaching behaviors applied to a specific subject, (3) subject-specific curriculum and pedagogy, and (4) knowledge about how students learn a specific subject. The author described this variation as reflecting "continua from more prescriptive to more discretionary, and from more focused on behaviors to more focused on ideas" (p. 3). The 12 studies were chosen as more rigorous from a pool of 93 due to their inclusion of comparison teacher groups and measures of student learning. The subject matter context was either mathematics or science. The sizes of the effects on student achievement were larger for professional development more closely connected to subject matter (categories 3 and 4) than for the more generic approaches (categories 1 and 2). This finding was particularly true for student reasoning and problem solving. Kennedy's review and analysis demonstrate that successful professional development needs to address what and how to teach a particular subject.

The format of professional development. One influential format feature is a learning environment that supports teachers' intellectual engagement. According to Roskos and Bain (1998), staff development focused simply on improving teaching techniques through the identification of discrete effective behaviors fails to change teachers' practices because it does not engage them intellectually, and often the techniques are wrongly applied without flexible adaptation. The authors also said that teacher empowerment through approaches such as site-based management is inadequate to change instructional quality. Both of these approaches are behavioral rather than cognitive in emphasis. Based on qualitative analysis of a two-year project in which teachers studied curriculum models, the authors identified several features of the learning environment that resulted in increased complexity of teachers' understanding and more functional uses of concepts. These included school involvement of teachers in decisions related to strategic planning and thus, permission for teachers to think and study; models of thoughtfulness provided by individual participants who were eager for intellectual engagement; and, an emphasis on critical discussion (rather than delivery of content) mediated by analytic writing tasks and the posing of challenging questions.

This emphasis on intellectual engagement through professional development is a reminder that the teacher's primary role in professional development is that of a learner. What does it mean to approach professional development as involving teachers as learners? First, it means that the research on learning applies to teachers as well as to their students. For example,

researchers encourage the application of the learner-centered psychological principles (American Psychological Association, 1993) to both inservice (Hawley & Valli, 1999) and preservice teacher learning (Lauer, 1999). This means that professional development should consider teachers' prior knowledge, higher-order thinking, motivation, developmental stages of learning, and social contexts (Alexander & Murphy, 1998).

With regard to social contexts of teacher learning, consensus has developed about the importance of collaboration to achieve change in teacher practices and ultimately student achievement. As Darling-Hammond (1998) asserts: "Teachers learn best by studying, doing, and reflecting; by collaborating with other teachers; by looking closely at students and their work; and by sharing what they see" (p. 8). The Eisenhower study described earlier indicated that collective participation of teachers from the same grade or department provides more active learning opportunities for the participants compared to approaches in which teachers participate individually (Garet et al., 1999). Peer coaching is a specific type of teacher collaboration that has been effective in changing teachers' practices (Sprinthall, Reiman, & Theis-Sprinthall, 1996). Peer coaching involves one teacher or a teacher team providing in-class assistance and feedback to teachers who are practicing and applying new instructional strategies. Based on research reviewed by Joyce and Showers (1995), peer coaching increases the likelihood that teachers will transfer their professional development training to the classroom.

In summary, research indicates that both the content and the format of professional development influence its effectiveness in changing teachers' instructional practices. The described studies suggest that teacher professional development should be content-based, aligned with curriculum and standards, be of sufficient duration, engage teachers intellectually, be based on principles of human learning, and involve teachers in collaboration.

Role of School Culture in Teacher Learning

King and Newmann (2000) stressed that teachers must learn how to support the collective work of the school so that achievement gains can occur for all students. The authors cited two examples of elementary schools with diverse and low-income students in which school capacity positively influenced student achievement. They indicated that to achieve positive outcomes in student learning, professional development needs to address two dimensions of school capacity. First, individual teachers must be competent in instruction and assessment of the curriculum and have high expectations for all students. Second, there must be a school-wide professional community with shared goals for student learning and collaboration among staff members. Thus, opportunities for teachers to learn how to improve their practices are necessary but not sufficient for school-wide student success. There must be a supportive school culture conducive to collaborative learning.

Research by Quellmalz, Shields, and Knapp (1995) provides evidence for the importance of both school culture and professional development. The researchers cited three key features in successful school-based reforms among the 32 schools that they studied: "(1) challenging learning experiences for all students, (2) a school culture that nurtured staff collaboration and participation in decision making, and (3) meaningful opportunities for professional growth" (p. 14).

An influential aspect of school culture is whether faculty members share responsibility for student learning. For example, Scheurich (1998) described successful elementary schools with primarily high-poverty students of color. Educators in these schools believe that all students can achieve at high levels, and they make it possible by assuming responsibility for all children to succeed. Based on interviews and observations of teachers and administrators, Scheurich concluded that the operationalization of such beliefs is responsible for the high academic performances of students in these schools.

In summary, for professional development to influence instruction and ultimately student achievement, there needs to be a supportive school culture. Specifically, the school culture must be conducive to collaboration, encourage teacher learning, and foster shared responsibility for student learning.

Teacher Learning in HPHN Schools

Traditionally, students in high needs schools are not expected to achieve at high levels. Research has identified both formal professional development and informal teacher learning opportunities as important influences on student performance in these schools. The Education Trust's (1999) study found that high-poverty schools that exceeded expectations spent proportionately more money on teacher professional development compared to other schools. Taylor, Pearson, Clark, and Walpole (1999) studied 14 schools that were "beating the odds in teaching all children to read" (p. 1). Ongoing teacher professional development such as yearlong workshops and mentoring were occurring in these schools. According to a study by the Charles A. Dana Center (1999), teacher collaboration about instructional issues is an element of teacher learning associated with student success in HPHN schools.

One specific example of success is New York City's District 2. Staff development in this diverse school district is subject-oriented, collaborative, linked to student outcomes, ongoing, and builds on teachers' expertise. The district's professional development programs are based on a coherent instructional framework and supported by strong instructional leadership and policies that make staff development central to the district's work. Several case studies have demonstrated that the district's professional development approach has resulted in changes in teachers' instructional practices and improved student achievement (e.g., Stein & D'Amico, 1999; Harwell, D'Amico, Stein, & Gatti, 2000).

Thus, studies of HPHN schools indicate that teacher professional development is important to their successes. However, with the exception of the research of District 2, such studies usually do not examine in detail the nature of the professional development that teachers in HPHN schools experience.

RESEARCH QUESTIONS

Research on the characteristics of teacher learning in HPHN schools can increase the knowledge about how to design and implement professional development in ways that can improve teaching and student learning. The study described in this report provides initial findings on professional development in three HPHN schools and compares the results with high-needs schools with lower student achievement in the same district. The study addresses the following research questions:

1. What are the perceptions of teachers in HPHN schools concerning the characteristics and outcomes of their professional development experiences?
2. How do perceptions concerning professional development differ between teachers in HPHN schools and teachers in schools with lower achievement?
3. What is the relationship between aspects of school culture and teachers' perceptions of professional development outcomes in HPHN and other schools?

METHOD

Research Design

This study analyzed a subset of data that McREL researchers collected in a larger study of HPHN elementary schools in a Midwestern school district. As described by Snow-Renner (2001), the HPHN study employed a two-stage sampling design. In the first stage, researchers used state data about 2000–2001 student free and/or reduced lunch (F/RL) eligibility to determine economic needs of students in elementary schools throughout the state. Then researchers used school-level performance across 1999–2000 state accountability assessments in grade 3 reading, grade 4 reading and writing, and grade 5 mathematics to determine achievement levels for the state's elementary schools. Using this data, the state's definition of HPHN schools was used to select a school district as follows:

1. More than 50% of students enrolled in the school are eligible for F/RL benefits; and,
2. The proportion of students in the school who perform at the “advanced” or “proficient” level on the state accountability assessment exceeds the state average of proficiency in reading and writing and mathematics.

The district selected for the study has 22 elementary schools and 11 secondary schools. Seven of the elementary schools were identified as HPHN (out of a total of 16 in the state). The district has approximately 18,000 students and is located in a city with a population of 100,000. Students are 53% Hispanic, 42% White, 2% Black, and 2% American Indian, with 51% of the total students eligible for free/reduced lunch. Across the district elementary schools, 25% or more of students were eligible for F/RL benefits during the 2000–2001 school year.

In the second stage of sampling, researchers selected 11 elementary schools to represent the range of poverty and achievement levels in the district. One of these, a low-proficiency, high-needs school, declined to participate at the time of data collection. The remaining 10 schools varied in size and poverty level, but generally had relatively experienced teachers and consistent class sizes. (Average class sizes ranged between 19 and 27 students for language arts instruction and between 20 and 28 students for mathematics instruction.) Schools also spent nearly twice as much instructional time on language arts (generally two hours per day) as on mathematics (generally one hour per day). Table 1 indicates the classification of the 10 selected schools based on 2000-01 FR/L data and average proficiency on the 2000 and 2001 state assessments in grades 2, 3, 4 reading, grade 4 writing, and grade 5 mathematics.

Table 1.
Distribution of Schools and Teachers Based on Student Economic Needs and Proficiency

Percent of Students Proficient on State Assessment*	Student Economic Needs: % F/RL**	
	Moderate 25–50 %	High >50 %
Low <33%		1 (n=21)
Moderate 34%–53%	1 (n=18)	2 (n=28)
High >53%	3 (n=46)	3 (n=42)

*Average state proficiency = 53%

**Eligible for federal free or reduced lunch benefits

Thus, there are six high-needs schools in the sample: three HPHN schools, two moderate-proficiency high-needs schools, and one-low-proficiency high-needs school. The remaining four schools had moderate student needs and constitute a comparison group for the study.

Survey Instrument

McREL researchers constructed a Teacher Survey of Policies and Practices to collect data for the HPHN study. The survey asked teachers about professional development experiences; leadership; school context; beliefs about policies and practices related to standards; and classroom practices in mathematics, reading, and writing. The present study analyzed teachers' responses to survey items about the quality and quantity of professional development. Items are based on previous research on professional development (e.g., Sparks & Hirsch, 2000) and other surveys with relevant items (Newmann & Wehlage, 1995; U.S. Department of Education, 1999 Schools and Staffing Survey). The selected items asked teachers to indicate their years of teaching experience, instructional time for language arts and mathematics, professional learning opportunities, format and content features of their professional development, collaborative activities, professional development activities in language arts and mathematics, perceived improvement from professional development, and perceptions of school context.

Procedure and Participants

Within each sampled school, all K–5 teachers and certified staff (excluding administrators) were surveyed in the spring of 2001. Teachers who chose to participate signed an informed consent form, removed it from the survey, and placed it in a separate envelope. The survey required approximately one hour to complete. A classroom teacher supervised the administration of the survey and mailed the completed surveys and the envelope with consent forms to McREL.

A total of 172 certified staff out of an estimated 249 in the 10 selected schools completed the Teacher Survey of Policies and Practices, resulting in a 69% response rate. Due to the emphasis on professional development in language arts and mathematics in the current study, music and physical education teachers, media specialists (i.e. librarians), and school counselors were excluded. This resulted in a total sample of 155 teachers for the current analysis.

To examine possible sources of teacher differences tangential to the research questions, the survey asked teachers about their experience, and professional development opportunities. There were no significant differences among teachers from the different categories of schools in years of teaching experience ($M = 15$) or in the number of years at the current school ($M = 7$). There were no significant differences in professional development days among the five categories of schools. However, the district emphasis on language arts was reflected in teachers' professional development activities. Teachers reported significantly more professional development days per year in language arts ($M = 6.33$, $SD = 6.34$) than in mathematics ($M = 2.86$, $SD = 2.42$).

Analyses

A factorial design was used to analyze the data. As shown in Table 1, one factor was student economic needs with either moderate or high levels based on percent of students eligible for F/R lunch. The second factor was average student proficiency with low, moderate-, or high-proficiency levels based on average student performance on the state assessments in language arts and mathematics for 2000 and 2001.² The use of a factorial design allowed for analysis of the separate contributions to the data by student economic needs and proficiency level as well as the interaction of the two factors. The combination of the two factors resulted in six school categories, but one of the categories had no representation. The five categories of schools and the number of teachers in the analysis were as follows:

- Moderate-proficiency Moderate Needs (MPMN), $n = 18$
- High-proficiency Moderate Needs (HPMN), $n = 46$
- Low-proficiency High Needs (LPHN), $n = 21$
- Moderate-proficiency High Needs (MPHN), $n = 28$
- High-proficiency High Needs (HPHN), $n = 42$

Both univariate and multivariate analysis of variance (ANOVA and MANOVA) statistical procedures were used to analyze the results. ANOVA was used to analyze a single dependent variable or survey item, while MANOVA was used to analyze responses to sets of related survey items. For both procedures, the level for statistical significance was $p < .05$. Tukey's *HSD* was used for post hoc comparisons.

RESULTS

The first two research questions are addressed together in the next three sections. The first section discusses teachers' perceptions of the characteristics of their professional development. The second section describes results concerning teachers' collaborative activities. The third section examines teachers' perceptions of their professional development activities in

² For purposes of this report, the terms "high-performing" and "high-proficiency" are used interchangeably. Both phrases refer to high student achievement of standards on the state assessment.

language arts and mathematics. The next section addresses the third research question on the effects of school culture. The last section describes results for correlations that relate to all three research questions.

Professional Development Characteristics

To determine how teachers in HPHN schools perceived their professional development compared to teachers in the other high-needs schools, responses about the characteristics of their professional development experiences over the last three years were analyzed. (Table A1 in the Appendix contains the means and standard deviations for the 12 survey items.) There were no differences between the levels of student economic needs, but there were differences on eight items related to the level of student proficiency. As shown in Figure 1, teachers in high-proficiency schools rated their professional development higher than teachers in the low- or moderate-proficiency schools on the following professional development quality characteristics: applied content standards, deepened content knowledge, addressed diverse learners, applied to the classroom, had connected sessions, considered teacher input, was based on student test results, and analyzed student work. All the differences between teachers in the high- and moderate-proficiency schools were statistically significant. The difference between teachers in high- and low-proficiency schools was significant, only for the characteristic of addressing diverse learners.

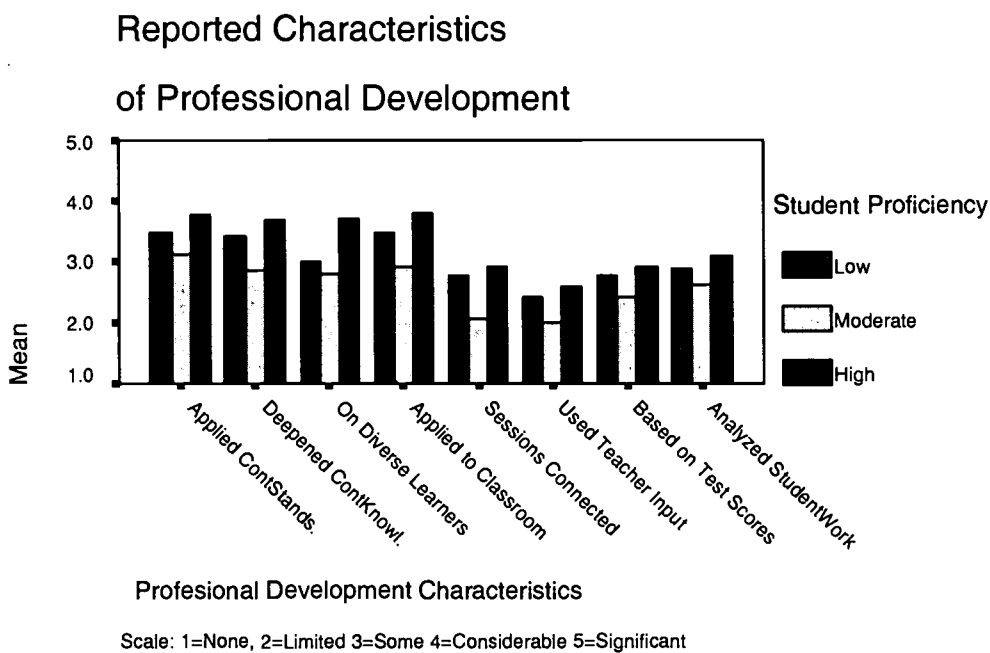


Figure 1. Teacher Perceptions of Professional Development Characteristics.

Collaborative Activities

To determine the frequency and impact of professional development through collaboration, nine survey items asked teachers how often they participated in various collaborative activities and how much each activity had improved their teaching. The most frequent types of collaborative activities were 1) planning instruction with other teachers, 2)

analyzing student test scores with other teachers, and 3) analyzing student test scores with the principal. Perceived improvement was highest for 1) planning instruction with other teachers, 2) administrator feedback, 3) and teacher mentoring. (Table A2 in the Appendix indicates the survey items and the mean frequencies and perceived improvement for each activity.)

To obtain the overall picture of collaboration in the schools, the mean frequency of collaboration and the mean perceived improvement from collaboration were calculated.³ Overall *frequency of collaboration* was significantly higher for the low-proficiency school ($M = 2.56$, $SD = .57$) compared to moderate- ($M = 2.14$, $SD = .52$) and high- ($M = 2.26$, $SD = 2.22$) proficiency schools, which did not differ. In contrast, overall *perceived improvement in teaching due to collaboration* was higher for high-proficiency schools ($M = 3.56$, $SD = .65$) than moderate- ($M = 3.26$, $SD = .75$) and low-proficiency schools ($M = 3.26$, $SD = .58$). The difference approached statistical significance ($p < .07$). Together the analyses of the two measures of collaboration suggest higher frequencies of collaboration in the low-proficiency school, but lower perceptions of improvements in teaching due to collaboration. (Figures A1 and A2 in the Appendix show group differences related to collaboration.)

Professional Development in Language Arts and Mathematics

To examine differences among teachers on content-focused professional development, teachers reported on their professional development activities for the last three years in language arts and mathematics. For each subject area, they indicated the percent of professional development they had spent on various activities. They also indicated the extent to which each activity improved their teaching. The language arts questions for teachers in grades K–3 addressed reading while the language arts questions for teachers in grades 4–5 dealt with writing. The mathematics questions were the same for both grade groups.

Grades K–3. Teachers in grades K–3 reported that the highest percentage of their language arts professional development was on 1) the new reading curriculum that the district had adopted, 2) professional development on reading standards, 3) reading comprehension strategies, and 4) teaching struggling readers. Teachers in the high-proficiency schools (both high and moderate student needs) reported significantly more professional development on the reading standards and the new reading curriculum than teachers in the low-proficiency school (Figure 2). For perceived improvement (Figure 3), there was a similar pattern of effects. An important result was that teachers in the high-proficiency schools reported significantly greater improvement than the other teachers from professional development on teaching different student populations.

³ Cronbach's alpha, which measures internal consistency or reliability of composite measures, was .66 for collaboration frequency and .84 for collaboration improvement.

Proportion of Language Arts Professional Development: Grades K-3

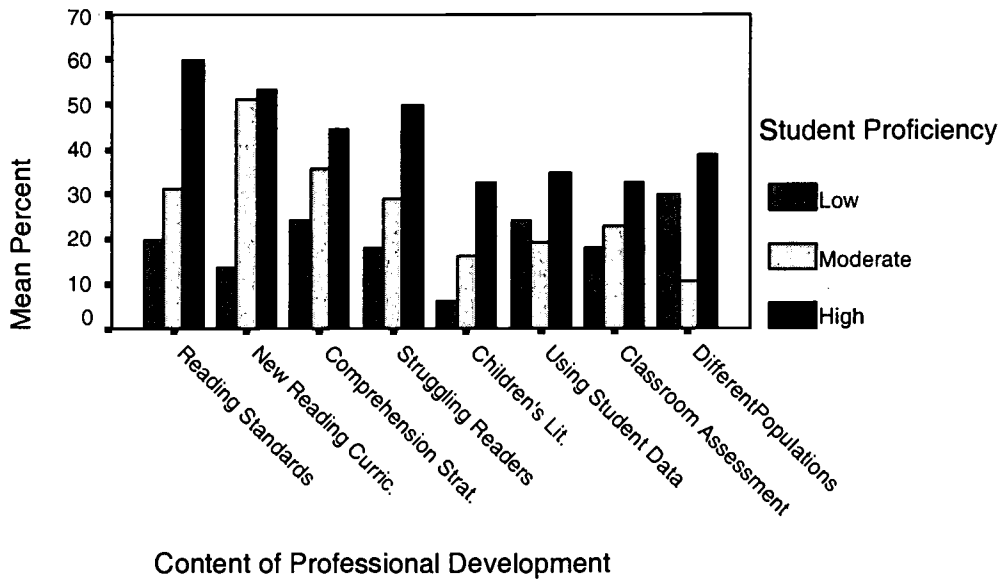
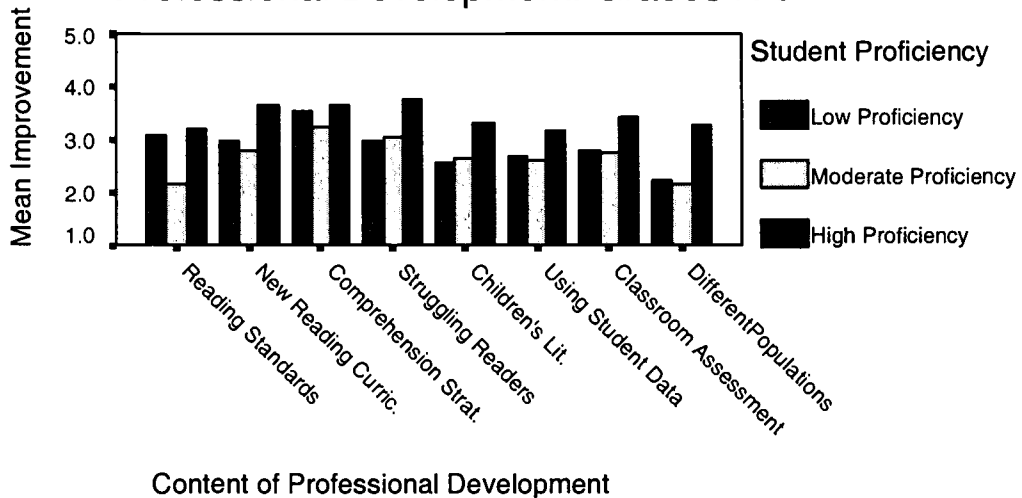


Figure 2. Grades K-3 Language Arts Professional Development.

Perceived Improvement from Language Arts Professional Development: Grades K-3



Scale: Extent it helped me improve my teaching.
1 = None, 3 = Moderately, 5 = Extensively

Figure 3. Grades K-3 Teacher Perceptions of Improvement Due to Language Arts Professional Development.

For mathematics, the K–3 teachers reported the highest mean percentage of mathematics professional development for mathematics standards and much less for the other professional development activities. Student proficiency again was related to teachers’ perceived improvement. Teachers in high-proficiency schools reported significantly higher percentages than teachers in moderate-proficiency schools for professional development on mathematics standards, on student thinking, and on using student data. Teachers from the low-proficiency school perceived statistically more improvement from professional development on using manipulatives than other teachers.

Grades 4–5. Teachers in grades 4–5 reported that the highest percentage of their language arts professional development was for 1) rubric-guided writing strategies, 2) professional development on writing standards, and 3) professional development on writing processes. Figure 4 shows the differences in proportion of professional development related to student proficiency. Due to the variability and small sample sizes, the only statistically significant difference was the higher percent of professional development on portfolios reported by teachers in the low-proficiency school.

Grades 4–5 teachers perceived the most improvement in their teaching from professional development on 1) rubric-guided writing strategies, 2) writing standards, and 3) writing processes. Figure 5 indicates the differences among teachers from schools with different student proficiency. Teachers in moderate-proficiency schools perceived significantly less improvement than other teachers from professional development on writing standards, on writing across the curriculum, and professional development on different student populations.

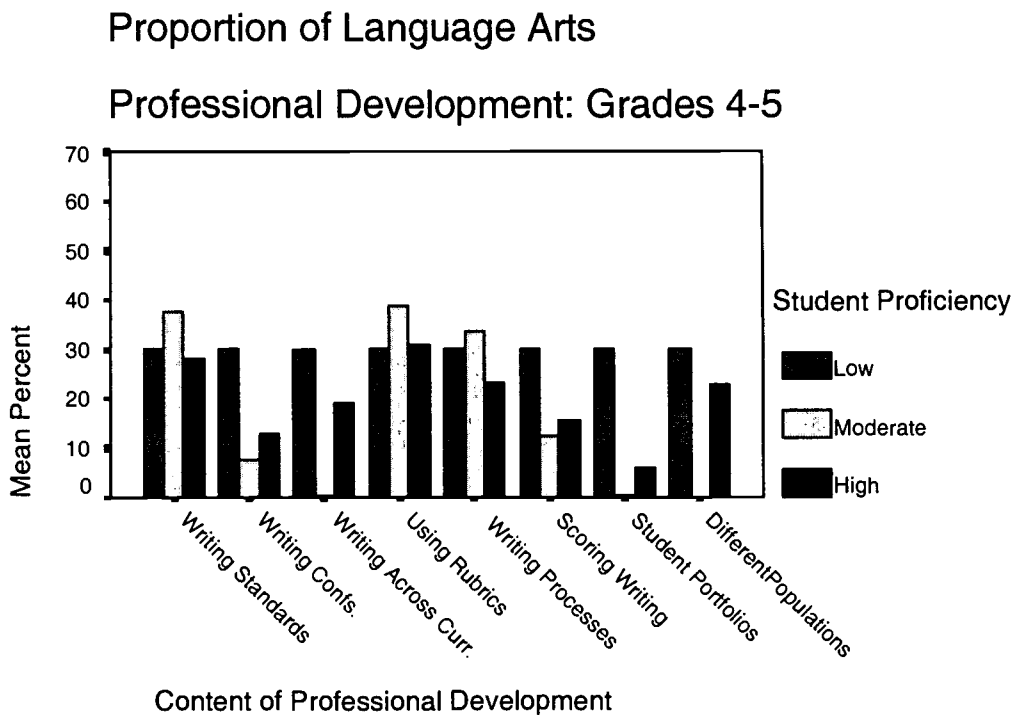
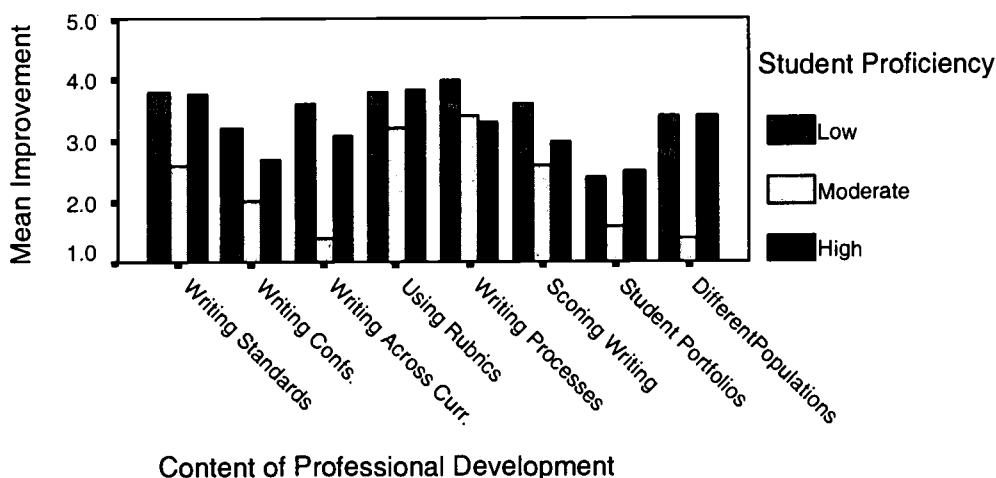


Figure 4. Grades 4–5 Language Arts Professional Development.

Perceived Improvement from Language Arts

Professional Development: Grades 4-5



Scale: Extent it helped me improve my teaching.

1 = None, 3 = Moderately, 5 = Extensively

Figure 5. Grades 4–5 Teacher Perceptions of Improvement Due to Language Arts Professional Development.

In response to the questions about professional development in mathematics, teachers in grades 4–5 reported that the highest percentage of their professional development was on mathematics standards, followed by professional development on problem solving. There were no significant differences among the student proficiency groups. Teachers in grades 4–5 perceived more improvement in their teaching from professional development on manipulatives and classroom assessment compared to other professional development in mathematics. Teachers in moderate-proficiency schools perceived less improvement in teaching mathematics due to professional development than teachers from other schools.

Mean perceived improvement. To obtain an overall picture of teachers' perceptions about improvement in language arts and mathematics instruction, composites (overall means) were calculated for each subject area for teachers from the combined grade levels.⁴ Table 2 shows the means and standard deviations for perceptions of improvement in the two subject areas by K–5 teachers in the five categories of schools. Teachers in high-proficiency schools (HPMN and HPHN) reported significantly more improvement in teaching language arts due to professional development than teachers in moderate-proficiency schools (MPMN and MPHN). Teachers in the low-proficiency school (LPHN) were intermediate in perceived improvement and did not differ significantly from the other two proficiency groups. There was a similar pattern of results for improvements in teaching mathematics. Overall, teachers in HPHN schools perceived more improvement in teaching language arts and mathematics due to professional development than

⁴ Cronbach's alphas for these measures ranged from .88 to .90.

teachers in other schools. However, the differences were statistically significant only for comparisons with the two moderate-proficiency schools.

Table 2.

Perceived Improvement* from Professional Development in Language Arts and Mathematics

School Category	Type of Professional Development			
	Language Arts		Mathematics	
	Mean	SD	Mean	SD
Moderate-proficiency Moderate Needs (MPMN), $n = 16$	2.88	.80	2.58	1.04
High-proficiency Moderate Needs (HPMN), $n = 45$	3.41	.93	2.89	.90
Low-proficiency High Needs (LPHN), $n = 19$	3.07	.87	3.00	.74
Moderate-proficiency High Needs (MPHN), $n = 26$	2.88	1.05	2.13	1.10
High-proficiency High Needs (HPHN), $n = 40$	3.60	.76	3.36	.69

* Scale: Extent it helped me improve my teaching. 1 = none, 3 = moderately, 5 = extensively

Teacher Perceptions of Useful Professional Development. The survey asked teachers to describe the professional development activity that was most useful in raising their students' achievement in language arts (in reading for grades K–3 teachers and in writing for grades 4–5 teachers) and in mathematics. Teachers also indicated the number of contact hours for the most useful professional development activity.

Approximately 66 percent of the teachers responded to the language arts question. Of these, 35 percent reported that the most useful professional development was on the new reading curriculum that the district had adopted ($n = 36$). There were 16 percent who reported that professional development on rubric-guided writing was most useful ($n = 16$) and 14 percent for another curriculum-related professional development ($n = 11$). The mean number of contact hours for these professional development activities was 23 and was largest for the most useful professional development (47 hours).

When schools were categorized according to student proficiency and economic needs, the most useful professional development for language arts was reported for the new reading curriculum (MPMN - 50%, HPMN - 23%, LPHN - 25%, MPHN - 37%, and HPHN - 45%). Teachers in the HPHN schools reported significantly more contact hours for the most useful language arts professional development ($M = 52.3$, $SD = 62.1$) than did teachers in HPMN schools ($M = 7.8$, $SD = 5.5$) and LPHN schools ($M = 18.8$, $SD = 16.3$).

Approximately 37 percent of the teachers responded to the mathematics question. Of these, 25 percent ($n = 14$) reported that activities related to the district's new series of

mathematics texts was the most useful in raising students' mathematics achievement. Another frequent response among teachers was a workshop on problem solving (13%, $n = 7$). However, 14 percent reported that they had participated in no useful mathematics professional development. Teachers in HPHN and MPMN schools most frequently identified professional development related to the new math series as most helpful (27% and 24%). Teachers in the LPHN school indicated that the new mathematics series was helpful (33%) as well as district meeting reviews (33%). The categories of schools did not differ significantly in the number of contact hours for the most useful mathematics professional development.

School Context

In order to answer the third research question about school culture, 10 survey items asked teachers about their agreement with statements about the contexts of their schools. (Table A3 in the Appendix indicates the survey items with means and standard deviations.). A factor analysis of responses to the 10 items resulted in two factors: positive school culture (five items, Cronbach's alpha = .71) and knowledge of students (two items, Cronbach's alpha = .66). The remaining three survey items did not load with the two factors nor form another factor, and so were analyzed separately. (Table A4 in the Appendix indicates the factor analysis results.)

The statistical analysis of school culture resulted in significant effects of student economic needs and student proficiency, and the interaction of these two factors approached significance ($p < .053$). As Table 3 indicates, teachers in the low-proficiency school (LPHN) had the lowest perceptions of school culture among the five categories of schools, while teachers in the HPHN schools had the highest or most positive perceptions.

Table 3.
Perceptions of School Context*

School Category	Measure of School Context					
	Positive School Culture		Knowledge of Students		Feel Responsible for All Students Learning	
	Mean	SD	Mean	SD	Mean	SD
Moderate-proficiency Moderate Needs (MPMN), $n = 17$	3.02	.30	3.11	.58	2.24	1.03
High-proficiency Moderate Needs (HPMN), $n = 45$	2.87	.55	3.54	.50	2.98	.92
Low-proficiency High Needs (LPHN), $n = 20$	2.52	.86	3.30	.55	2.65	.99
Moderate-proficiency High Needs (MPHN), $n = 27$	3.10	.61	3.39	.61	3.11	.80
High-proficiency High Needs (HPHN), $n = 41$	3.36	.48	3.57	.52	3.29	.60

* Scale: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree

Teachers in schools with high student proficiency (HPMN and HPHN) had the highest perceptions about knowledge of students and were statistically different from teachers in schools with moderate student proficiency (MPMN and MPHN).

For the context item on whether administrators understand standards, there were no significant group differences. For the context item on whether the state test had narrowed the curriculum, teachers in the schools with moderate student proficiency were significantly more in agreement with this statement ($M = 3.83$, $SD = 1.12$) than were teachers in the low ($M = 3.53$, $SD = .84$) and high-proficiency ($M = 3.51$, $SD = .75$) schools.

A final context item concerned whether teachers felt responsible for all students learning. Teachers in schools with high student proficiency agreed significantly more that they felt responsible compared to teachers in low- or moderate-proficiency schools. As Table 3 shows, teachers in the HPHN schools had the highest agreement with this item.

Summary of Results

The following is a summary of the main results obtained for the different measures that were analyzed. The discussion section that follows indicates more specifically how these results answer the research questions that were posed in the introduction.

- In the analysis of teachers' perceptions about the characteristics of their professional development experiences, teachers from high-proficiency schools indicated more quality characteristics than teachers from moderate or low-proficiency schools. However, the differences were statistically significant primarily in comparisons between high and moderate-proficiency.
- For the measures of collaboration, teachers reported highest frequencies for collaborative planning of instruction and collaborating with teachers and administrators in analyzing student test scores. Teachers in low-proficiency schools reported higher frequencies for collaborating with the principal and with teachers on student tests scores than other teachers but perceived lower improvement from these activities. Overall results for collaboration suggested higher frequencies of collaboration in the low-proficiency school but less perceived improvement from collaboration.
 - The analyses of professional development in language arts and mathematics reflected influences related to subject area, grade level, and student proficiency.
 - Professional development on reading for teachers in grades K–3 emphasized the district's new reading curriculum. Teachers in schools with high-proficiency reported a higher percentage of their language arts professional development on reading standards and on the new reading curriculum. Grades K–3 teachers in high-proficiency schools also perceived more improvement in teaching reading from these professional development activities compared to other teachers. Grades 4–5 teachers in schools with moderate-proficiency perceived less improvement from several of the professional development

activities compared to other teachers. The analysis of a question about most useful professional development corroborated the survey results (although only two-thirds of teachers responded to this question). Teachers in the HPHN schools reported more contact hours with their most useful language arts professional development than teachers from the other categories of schools.

- Mathematics professional development emphasized mathematics content standards for both K–3 and 4–5 teachers, although less so for K–3 teachers in the school with low-proficiency. Teachers in schools with moderate student proficiency generally perceived less improvement from mathematics professional development than other teachers.
- The analysis of overall perceived improvements in teaching due to professional development in language arts and mathematics indicated higher perceptions of improvement by the teachers in the high-performing schools.
- On the measures of context, teachers in high-proficiency schools had more agreement than other teachers with positive aspects of school culture, knowledge of students, and feeling responsible for all students learning. These measures were highest for teachers in the HPHN schools. Teachers in the low-proficiency school had the lowest perceptions about school culture. Teachers in moderate-proficiency schools agreed more than other teachers that the state test had narrowed the curriculum.

DISCUSSION

This study produced preliminary findings about professional development in 10 schools that varied in student economic needs and student proficiency. The HPHN schools in the study were distinguished from the other five categories of schools on many of the measures analyzed. However, the strongest influence came from the level of student proficiency in the different schools. That is, teachers from schools with high student proficiency with either high or moderate student economic needs responded more in alignment with research-based expectations about teacher professional development than teachers from low or moderate-proficiency schools.

Relationship of Findings to the Research Questions

The analyses of results produced the following information regarding the research questions that were posed.

1. *What are the perceptions of teachers in HPHN schools concerning the characteristics and outcomes of their professional development experiences?*

Teachers in the HPHN (and to a lesser extent HPMN) schools perceived the following about their professional development experiences:

- Professional development addressed content standards, deepened their content knowledge, addressed diverse learners, applied to the classroom, and modeled teaching strategies.
- Teaching language arts was improved by professional on reading standards, on the district's new reading curriculum, and on using rubric-guided writing strategies.
- Teaching mathematics was improved by professional development on mathematics standards.
- Teaching was improved by collaborative activities.

2. *How do perceptions concerning professional development differ between teachers in HPHN schools and teachers in schools with lower achievement?*

The perceptions of teachers in HPHN (and to a lesser extent high-proficiency moderate-needs) schools differed from those of teachers in schools with lower student achievement in the following ways:

- HPHN teachers reported that their professional development experiences had the quality characteristics recommended by research more than teachers from moderate and to a lesser degree low-proficiency schools. HPHN teachers particularly reported more professional development to increase their knowledge and skills to help diverse learners.
- HPHN teachers reported lower frequencies of collaboration than teachers in schools with lower student proficiency but more overall improvement in their teaching from collaboration.
- HPHN teachers generally had more positive perceptions about improvements in teaching language arts and mathematics due to professional development than teachers in low or moderate-proficiency schools.

3. *What is the relationship between aspects of school culture and teachers' perceptions of professional development outcomes in HPHN and other schools?*

The analyses of teachers' perceptions about the contexts of their schools indicated the following influences of school culture on teachers' perceptions:

- Teachers in HPHN schools had the most positive perceptions regarding the cultures in their schools.
- Teachers in high-proficiency schools had higher perceptions about knowing their students than teachers from schools with lower student proficiency.

- Teachers in HPHN schools had the highest amount of agreement with the statement that they felt responsible for all students learning. Teachers in the low-proficiency school had the lowest amount of agreement with this statement.
- Positive perceptions of school culture were correlated with perceptions of improvements in teaching due to collaboration.

Based on the experiences of teachers in the HPHN schools in this study, teacher professional development should address content standards and deepen teachers' knowledge of content and how to instruct the school curriculum, particularly in literacy. Teachers in high-needs schools also benefit from professional development that helps them acquire knowledge and skills about teaching diverse learners. In addition, to support teacher learning in ways that can improve student achievement, schools need positive school cultures with shared responsibility for student learning.

With regard to language arts, there was more evidence for the importance of the *content* (e.g., discussed diverse learners) of professional development than the *format* (e.g., had connected sessions). However, format was more important for teachers' perceptions about their mathematics professional development. This difference probably reflects the greater emphasis in the district on language arts. It also may reflect the frequently cited finding that many elementary teachers are uncomfortable with mathematics content (Adams, 1998).

The number of annual professional development days reported by teachers did not relate to student proficiency and were not correlated with perceived improvements in teaching language arts or mathematics. However, in answers to the question about most useful professional development in language arts, teachers in the HPHN schools reported more contact hours with their most useful activity than teachers in the low-proficiency school. This result indicates that duration does make a difference if the professional development activity is perceived as useful in improving teaching.

Many researchers have emphasized that collaboration is an important type of professional development (Darling-Hammond, 1998). However, in the current study, the frequency of collaboration was not associated with higher student proficiency. Instead, teachers in high-proficiency schools reported less frequent collaboration but more improvement from collaboration. This finding suggests that the quality of collaboration influences whether it benefits teaching practices.

The results for the analyses of contextual influences may be informative. Teachers in the high-proficiency schools had more positive perceptions about school context than teachers in the low and moderate-proficiency schools. Thus, as predicted by King and Newmann (2000), a positive school culture and shared responsibility for student learning had positive associations with student achievement. In addition, teachers' perceptions of positive school culture in the present study correlated positively with perceived improvements in teaching from collaboration. Quellmalz et al. (1995) found that school culture is important for effective teacher collaboration. This may explain why teachers in HPHN schools perceived more improvement from collaborating compared to teachers in the low-proficiency school. A less positive school culture may have detracted from the quality of collaboration and its effects on teaching practices.

The results of the present study add to prior findings about HPHN schools (Taylor et al., 1999). Specifically, teachers in this study's HPHN schools reported that their professional development emphasized the district's language arts curriculum, and to a lesser extent mathematics standards, and had quality characteristics aligned with the professional development research.

The main implications of these results are that to be effective in improving teaching and student achievement, professional development should emphasize content standards, curriculum, and teaching diverse learners. In addition, a positive school culture that promulgates the belief that all faculty are responsible for all students learning also appears to support teacher learning.

This study provides preliminary information about the characteristics of teacher learning in HPHN schools. The results indicated strong relationships between teachers' perceptions about the characteristics and outcomes of their professional development experiences and the proficiency of their students in achieving standards. The influence of student economic needs (high vs. moderate) was less apparent than the influence of student proficiency. However, the range of student economic needs in the present study may have been too restrictive to produce group differences.

Complicating the results was the pattern of responding by teachers in schools with high student needs and moderate student proficiency. Their responses tended to be the least in alignment with expectations based on prior research. One possible explanation is that at least one of the schools experienced a downtrend in their student test scores over the past year, and teachers may be responding in light of this result. An area for further investigation is the influence of changes in test scores on collective teacher efficacy (Goddard, Hoy, & Hoy, 2000). In a high-stakes testing environment, the publicity associated with increased or decreased student test scores is likely to influence teachers' sense of efficacy about their abilities to teach all students.

The purpose of professional development is to improve teachers' practices in ways that improve student learning. Therefore, the next step is to study the relationships between the perceptions of teachers' professional development and their reported classroom practices. Do HPHN teachers with quality professional development experiences report using classroom practices that are effective, based on research? Future analyses of data from the McREL HPHN study will address this question.

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APPENDIX

Table A1.
Characteristics of Teacher Professional Development*

Survey Item	Mean	SD
1. Were specific to student learning of content standards	3.54	.97
2. Deepened your knowledge in a content area	3.39	.99
3. Deepened your knowledge and skills to help diverse learners	3.34	1.14
4. Were directly applicable to your classroom practices	3.45	1.05
5. Modeled the teaching strategies that they addressed	3.30	1.08
6. Were supported through online technology (e.g., e-mail)	2.08	.91
7. Were regularly scheduled to support long-term learning	2.60	1.00
8. Provided adequate time for inquiry and reflection	2.49	.93
9. Sessions were connected to and built on one another	2.66	1.04
10. Format and content were planned with teacher input	2.37	1.04
11. Format and content were identified from student test results	2.74	1.05
12. Analyzed samples of student work	2.92	1.07

*Scale: To what extent did your professional development over the past three years have the following characteristics? 1 = none, 2 = limited, 3 = some, 4 = considerable, 5 = significant

Table A2.
Collaborative Activities

Survey Item	Frequency*		Improvement**	
	Mean	SD	Mean	SD
1. Analyzing student test scores with other teachers	2.86	.80	3.38	1.01
2. Planning instructional strategies with other teachers	3.63	.76	4.17	.89
3. Observing in other classrooms or having teachers observe my classroom teaching	1.91	.99	3.23	1.19
4. Working with the principal to analyze and address student test results	2.44	.68	3.40	.93
5. Receiving feedback about my teaching from the principal or other administrator	2.17	.56	3.66	1.01
6. Being mentored by another teacher	1.96	1.18	3.59	1.22
7. Working with a curriculum specialist in mathematics	1.66	.92	2.32	1.25
8. Working with a curriculum specialist in language arts	2.01	1.08	3.28	1.19
9. Participating in a subject-area professional organization of teachers, e.g. NSTA, NCTE, CEC, NCTM	1.44	.67	2.69	1.21

*Scale: 1 = never, 2 = once or twice a year, 3 = monthly, 4 = weekly

**Scale: Extent it helped me improve my teaching, 1 = none, 5 = significant

Table A3.
Perceptions of School Context*

Survey Item	Mean	SD
1. Staff members are recognized for a job well done.	3.21	.87
2. There is a formal support system at my school for beginning teachers.	3.00	.92
3. I do not feel comfortable voicing my concerns in this school.**	1.93	1.04
4. I have influence on the decisions within the school that affect me.	2.80	.83
5. Administrators in my school don't understand what standards mean for classroom instruction.**	1.52	.92
6. Emphasis on the state test has narrowed the curriculum and reduced time spent on content areas that are not tested.	3.61	.69
7. I feel responsible for the learning of students in the school who are not in my classroom.	2.96	.90
8. Parents know what students are expected to learn and be able to do for their grade level.	3.01	.91
9. I am very familiar with my students' backgrounds.	3.36	.69
10. I have a lot of contact with my students' parents (e.g., by phone, conferences, etc.).	3.52	.60

* Scale: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree

** Item reversed for data analysis.

Table A4.
Factor Loadings for School Context Survey Items*

Survey Item	Loading
Factor 1 Positive School Culture	
Staff members are recognized for a job well done.	.78
There is a formal support system at my school for beginning teachers.	.62
I do not feel comfortable voicing my concerns in this school.**	-.62
I have influence on the decisions within the school that affect me.	.66
Parents know what students are expected to learn and be able to do for their grade level.	.58
Factor 2 Knowledge of Students	
I am very familiar with my students' backgrounds.	.74
I have a lot of contact with my students' parents (e.g., by phone, conferences, etc.).	.77

* Varimax rotation

** Item reversed for data analysis.

Reported Frequencies of Collaborative Activities

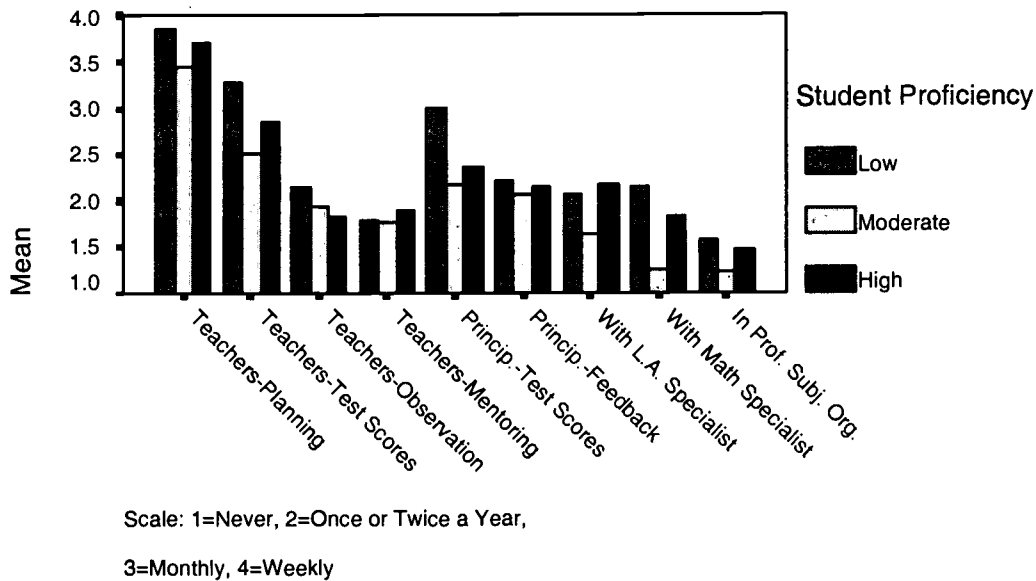


Figure 1A. Reported Frequencies of Collaborative Activities.

Perceived Improvement from Collaborative Activities

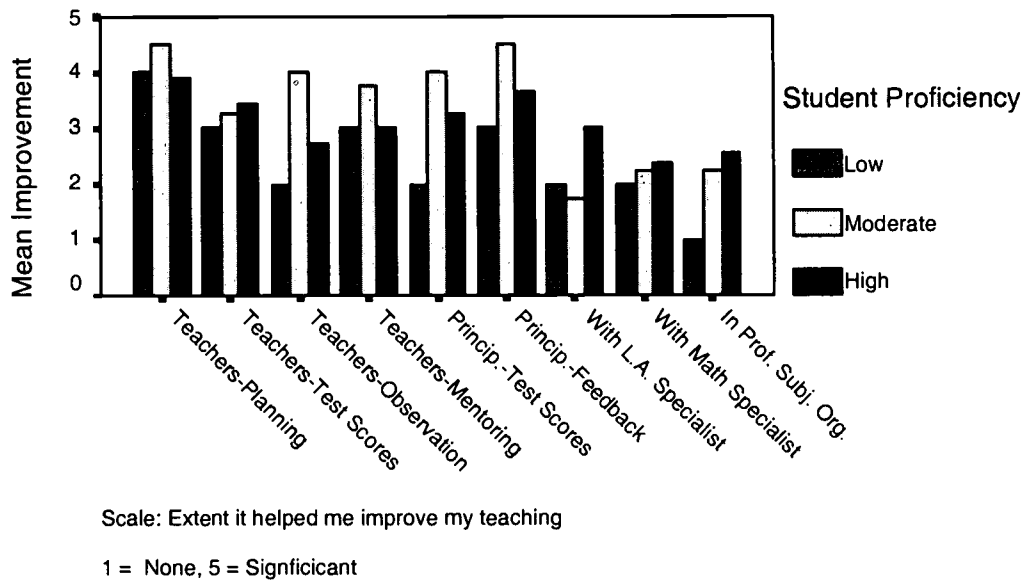


Figure 2A. Perceptions of Improvement Due to Collaborative Activities.



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