

Leadership as Accountability for Learning: The Effects of School Poverty, Teacher Experience, Previous Achievement, and Principal Preparation Programs on Student Achievement

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Abstract In the current era of accountability for achievement, school principals play the pivotal role of instructional leader. In a high-stakes testing environment, leadership preparation programs in universities and school districts need to be positively related to academic outcomes. The purpose of this study was to examine the relationship between school leadership preparation programs and student achievement in urban settings. Because leadership is contingent on the setting, school contextual factors and their impact on student achievement framed this study. Regression techniques were employed to construct a conceptual model with predictors of criterion and norm-referenced student achievement scores. Confirming previous research findings, student poverty, teacher experience, and previous achievement were the strongest predictors and accounted for a significant amount of variance in student achievement; however, university and district preparation programs were not significant predictors. Implications for policy, practice, and future research are discussed.

Keywords School leadership · Principal preparation · Student achievement · Poverty concentration

1 Leadership as Accountability for Learning: The Effects of School Poverty, Teacher Experience, Previous Achievement, and Principal Preparation Programs on Student Achievement

Administrator recruitment in American public school districts is an uphill struggle. School districts are finding it increasingly difficult to hire and retain qualified principals capable of

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affecting the academic performance of all children. The shortage of public school administrators is becoming a crisis nationwide due to the lack of sufficient numbers of qualified applicants (Whitaker 2001; Whitaker and Vogel 2005) and massive retirements (Winter et al. 2002).

Enhancing administrator recruitment is an urgent task given the declining numbers of individuals willing to pursue the job (McAdams 1998) and the increased responsibilities school reform programs place on administrators (Murphy and Beck 1994). The current policy environment demands that school leadership center their focus on instructional improvement as a means to increase student achievement (Spillane 2004). Implementing steps to reform schools and improve student achievement requires the leadership of excellent principals and assistant principals (Greenfield 1995; Hallinger and Heck 1996a, 1998; Murphy and Beck 1994).

Educational researchers have continually identified the principal as an essential force in school reform efforts (Elmore 2000; Fullan 2000); according to Leithwood and Jantzi (1999), the school principal can account for about 20% of a school's impact on student achievement. This recurrent research finding suggests an increasing need to study principals, particularly framed as leadership as accountability for learning. The job of a principal can make a difference not only in transforming school structures, but also on student achievement.

1.1 Principal Leadership and Student Achievement

When considering what constitutes an effective principal, the importance of principal instructional leadership behaviors continues to emerge as critical to the principals' impact on student achievement. An extensive research base has examined the school principal's role as an instructional leader and the impact of this role on the alteration of everyday practices that lead to improved student performance (Andrews and Soder 1987; Blasé and Blasé 2004; Goldman 1998; Spillane 2004). As the instructional leader of the school, the principal is responsible for informing teachers about new educational strategies, technologies, and other tools that promote effective instruction (Quinn 2002).

In an effort to synthesize the extensive body of research on effective school leadership practices, Waters et al. (2003) conducted a meta-analysis of nearly every available study that examined the relationship between leadership and student achievement since the early 1970s. Findings revealed a substantial relationship between school leadership and student achievement and identified 21 specific leadership practices that are significantly correlated with student achievement. Some studies indicated an effect size as large as 0.50, translating into a 19 percentage point mean increase in student achievement.

According to Waters et al. (2003), the three most effective leadership practices that were identified are (a) situational awareness (the principal is aware of details and undercurrents in running the school and uses information to address current and potential problems); (b) intellectual stimulation (the principal ensures that faculty and staff are made aware of the most current theories and practices and incorporates discussion of these as aspect of school culture); and, (c) input (teachers are involved in the design and implementation of important decisions).

Recruiting and developing effective school administrators who are willing and able to sustain effective leadership practices are hefty, yet necessary tasks. In the current high-stakes accountability environment, the pressure to reform schools has forced school districts to examine their administrator recruitment and preparation efforts to ensure that qualified principal candidates are both available and well-prepared when an opening occurs.

Similarly, the accountability and reform pressure has also led to increased district scrutiny of university based principal preparation programs.

2 Conceptual Framework

In spite of the existing research regarding the principal's role in altering practices that ultimately lead to improved student achievement, using a direct model (linking the principal's preparation participation directly to achievement scores) can be considered a questionable approach in light of numerous school contextual variables such as school poverty. Reviews of 32 empirical studies from 1996 to 2005 indicated that the primary effects of transformational leadership on student achievement are primarily indirect due to various mediating factors (Leithwood and Jantzi 2005). Moreover, recognizing schools as loosely coupled systems embedded within larger complex systems is a critical theoretically based contextual dynamic that must be considered.

2.1 Theoretical Considerations

A critical theoretically based consideration relevant to this study is the notion that, unlike many other organizations, educational organizations are loosely coupled systems (Weick 1976). Within open systems, system parts may be loosely or tightly coupled. Systems are interdependent activities linking shifting alliances of participants; the systems are embedded in and dependent on continuing exchanges with the environments in which they operate (Scott 1998). Weick (1982) described the complexity of school administration using the theory of loose coupling. Schools are loosely coupled and complex organizations in that the administration and staff have different roles, agendas, and independent authority. Thus, there is multi-dimensional coupling with no single locus of control (Goldspink 2005).

Additionally, a growing body of research emphasizes the theoretical and practical importance of understanding school reform from a systems perspective (Datnow and Stringfield 2000). Dissect the complex interactions among and between systems levels (e.g., leaders, teachers, students, parents, community, district, state and federal) and their direct and indirect influence becomes crucial. Such considerations must be understood when analyzing the impact of the principal and the principal's preparation on student achievement. As such, Mansberger (2005) called for leadership preparation programs to ensure that educational leaders understand the interconnectedness of system components (i.e., how change in one system function interacts with the others) and are able to identify what points in the system they can leverage to make a positive impact.

2.2 School Poverty Concentration

The district in the present study is a large, Midwestern, high-poverty district. Thus, understanding the impact of school poverty is necessary in order to appropriately frame this study. Although it has been established that individual poverty impacts student achievement, a growing body of research demonstrates that poverty concentration at the school level is a stronger predictor of academic failure than is individual poverty. Because concentrated school poverty has negative effects on students, teachers, and the school, the effect of concentrated poverty extends beyond the effect of the individual student condition (Banks 2001). In addition to high teacher turnover, high-poverty schools must struggle with the challenges posed by a study body

lacking health care and proper nutrition and facing violence and unstable home environments (Orfield and Lee 2005).

In a recent report, Banks (1999) highlighted two key findings in this growing body of research. First, students' achievement showed sharp declines when the school poverty concentration rose above 40% (Lippman et al. 1996); and, having an above-average proportion of free or reduced-price lunch students increases the likelihood of a school not meeting growth targets established by state formulas by 27% (Johnson and Ward 1998). Research also reveals that higher poverty schools are more likely to have less experienced teachers than low poverty schools (Clotfelter et al. 2006).

In order to examine concentrated school poverty as a mediating factor, the researchers in the present study used quartiles to differentiate the levels of poverty in schools in which the district principals reside. The use of poverty quartiles as a grouping mechanism is a standard practice in education research (Clotfelter et al. 2006). The percent of students receiving free or reduced-price lunch is used as a measure of poverty. The poverty concentration quartiles are as follows: Low (11.8–42.3%), Medium-low (42.4–62.7%), Medium-high (62.8–76.8%), and High (76.9–97.9%).

2.3 Purpose of the Study

This objective of this exploratory study was to analyze both district-driven and university-driven principal preparation programs and their impact on student achievement. By examining various indicators of achievement at the school level, this study sought to explore the relationship (and strength of relationship) between student achievement and a wide range of principal experiences, principal preparation program participation, and school-level contextual variables.

More specifically, the first part of the study explored the relationship between student achievement scores (i.e., criterion and norm-referenced), various principal experiences, and school factors. The second part of the study sought to examine the strength of relationship between achievement scores and principal and school factors. The final portion of this study explored predictors of achievement scores. The specific research questions that guided this portion of the study were:

1. Do criterion and norm-referenced achievement scores differ by principal experiences (i.e., teaching experience of the principal, number of years served in current school location)?
2. Do criterion and norm-referenced achievement scores differ by school contextual factors (i.e., level of concentrated poverty, average teaching experience of teachers in school)?
3. Do criterion and norm-referenced achievement scores differ by principal participation in district- and university-driven preparation programs?
4. What are the predictors of criterion- and norm-referenced achievement scores?

3 Materials and Methods

3.1 Research Context

A large, Midwestern, urban school district serve as the site of this study. The district has 133 schools that serve approximately 96,000 students. In terms of ethnic distribution, the student population is 58% White, 36% African American, and 6% "Other." The district

defines 52% of students as active participants in the free or reduced-price national lunch program. More than half of the students (54%) reside in single-parent homes. The district has a student assignment plan based on managed choice, which facilitates the racial desegregation of its schools by providing students with transportation from their home neighborhoods to other parts of the district.

3.2 Participants

The study sample included all certified school principals working in the study site district. According to Fullan (2000), it takes about 3 years to achieve successful change in student performance in an elementary school; furthermore, depending on size, it takes about 6 years to do so in a secondary school. Due to the district accountability system and the required sample sizes, the researchers decided to include only principals with 2 or more years at their current location in the analyses ($N=91$).

Because poverty concentration frames much of this research, participants are described with respect to the level of poverty concentration of the school in which they are located. As shown in Table 1, 66% of the principals in this study are female. This percentage is far above the latest national statistic available. Interestingly, the percent of female principals declines as the school level (i.e., elementary, middle, high) increases. With respect to race, the overall percent of minority principals is slightly higher than the percent of minorities in the metropolitan labor force (20%). Table 1 reveals that the demographic characteristics of the majority of principals in high-poverty schools are White, female, and have served in the school between 2 and 6 years.

3.3 Instrumentation

Data for this study were collected from the district's database. The independent variables in this study are district principal preparation programs, and university-based principal preparation programs. The primary goal of the district-driven principal preparation programs in this study is to strengthen the ability of school leaders to positively impact student achievement. The district preparation effort is multi-pronged and includes three key programs. The three primary programs utilize different models and serve target groups based on their position within the principal candidacy spectrum.

The three programs can be described as:

- (1) A collaborative yearlong program with a mid-sized university. This program is designed for certified K-12 teachers who are currently working for the district and seeking their principal certification;
- (2) A yearlong program designed to identify potential principal candidates and improve instructional leadership skills. The target population is certified teachers who work in non-teaching leadership roles that include assistant principals, counselors, and instructional coaches; and,
- (3) A yearlong field experience that is based on a medical model. The internship program provides on-the-job instructional and managerial leadership training to prepare candidates for the role of principal or assistant principal.

The university-driven preparation program includes numerous courses necessary to obtain principal certification from the State. Due to the fact that 56% of the district's

Table 1 Principal and school variables by school poverty concentration (N=91)

	Low		Med-low		Med-high		High		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Gender</i>										
Male	8	40.0	11	45.8	6	22.2	8	40.0	33	36.3
Female	12	60.0	13	54.2	21	77.8	12	60.0	58	63.7
<i>Race</i>										
White	16	80.0	22	91.7	16	59.3	13	65.0	67	73.0
Minority	4	20.0	2	8.3	11	40.7	7	35.0	24	26.4
<i>School level</i>										
Elementary	12	60.0	12	50.0	19	70.4	17	85.0	60	65.9
Middle	5	25.0	5	20.8	3	11.1	3	15.0	16	17.6
High	3	15.0	7	29.2	5	18.5	0	0	15	16.5
<i>No. yrs. in location</i>										
2–3	7	35.0	8	33.3	11	40.7	7	35.0	33	36.3
4–6	4	20.0	8	33.3	10	37.0	9	45.0	31	34.1
7+	9	45.0	8	33.3	6	22.2	4	20.0	27	29.7
<i>Avg. teaching exp. of teachers in loc.</i>										
5–9	0	0	4	16.7	13	48.1	9	45.0	26	28.6
10–12	4	20.0	12	50.0	11	40.7	7	35.0	34	37.4
13 +	16	80.0	8	33.3	3	11.1	4	20.0	91	100
<i>District preparation</i>										
Participated	7	30.0	12	50.0	17	62.9	14	70.0	50	54.9
No participation	13	65.0	12	50.0	10	37.0	6	30.0	41	45.1
<i>University preparation</i>										
Primary university	13	65.0	14	58.3	13	48.1	13	65.0	53	58.2
Other state	7	35.0	10	41.7	14	51.9	7	35.0	38	41.8
<i>Total</i>	20	100	24	100	27	100	20	100	91	100

principals emerged from one metropolitan university, the description and analysis with respect to University preparation only includes the “primary” university versus other university training programs. Other universities included mostly local and state universities, with a few out-of-state higher education institutions.

The dependent variables are Total Academic Index (TAI), a criterion-referenced test, and the Comprehensive Test of Basic Skills (CTBS) Total Battery, a norm-referenced test. The TAI is a composite index of multiple subject areas and is an integral part of the annual state assessment (Kentucky Department of Education 2005). CTBS in reading, language arts, and mathematics (Kramer et al. 1992) is a standardized, norm-referenced achievement test. Due to changes in the state’s accountability system in the 1998–1999 school year, data from this point forward are included in the analysis.

Additional variables in the analysis included principal experiences (i.e., number of years teaching experience, number of years in current location); and, school factors (i.e., free or reduced-price lunch quartiles, and average teaching experience of teachers). A detailed description of all variables used in the analysis is presented in Table 2.

3.4 Design and Procedures

This exploratory study included descriptive and inferential analyses. Descriptive statistic crosstabs were used to describe participants’ demographic information and achievement

scores during principal tenure across groups. For comparative purposes, factorial Multivariate Analysis of Variance (MANOVA) was utilized to determine any statistically significant differences between groups on the dependent variables (i.e., TAI and CTBS Total Battery). The Bonferroni post-hoc procedure was used to test for significance in cases of multiple comparisons. A Bonferroni Adjustment was used to reduce Type I error (Stevens 1999). Thus, in this analysis, the p value was set to <0.003 .

Hierarchical regressions were also employed to construct a conceptual model of predictors of the student achievement measures in 2005. The order in which the variables were entered into the analyses was directed by the literature, as demanded by hierarchical analytic convention (Cohen and Cohen 1991). Also, the number of predictors was based on the literature and the number of cases included in the final sample (Stevens 1999).

4 Results

4.1 Principals' Experience

Regarding the teaching experience of principals, schools with principals who had between 9 and 17 years of teaching experience ($n=46$) had higher mean 2005 TAI achievement scores ($M=77.35$, $SD=11.78$) than schools with principals who had between 3 and 8 years ($n=23$) of teaching experience ($M=74.19$, $SD=12.84$). Interestingly, schools with principals who had between 18 and 32 years ($n=22$) of teaching experience had the lowest mean scores ($M=69.02$, $SD=8.96$). A similar pattern was found with respect to 2005 norm-referenced achievement scores. That is, schools with principals who had between 9 and 17 years of teaching experience had higher mean 2005 CTBS total battery achievement scores ($M=55.03$, $SD=9.99$) than schools with principals who had between 3 and 8 years of teaching experience ($M=52.38$, $SD=10.39$) and schools with principals who had between 18 and 32 years of teaching experience ($M=49.01$, $SD=8.43$). Statistical significance was not

Table 2 Definitions of variables in analyses

Dependent variables

Total Academic Index (TAI) Summary statistic reflecting all academic components tested (i.e. reading, math, social studies, arts & humanities, practical living, and writing)

CTBS Total Battery (CTBS) Summary statistic reflecting comprehensive test of basic skills components (i.e. reading, language, and math)

Independent variables

District preparation programs

District preparation Participation in one or combination of district driven programs

None No participation in district driven programs

University preparation programs

Primary Completed principal preparation coursework at the primary university^a

Other Completed principal preparation coursework at other local, state or out of state

Contextual variables

Principal experiences

years teaching experience Number of years of principals' teaching experience

years in current location Number of years principal has been in current school location

School factors

F/R quartiles % of free/reduced student population by quartiles

Avg. teaching experience Average teaching experience of teachers in location

found at the specified alpha level of 0.003. MANOVA results revealed no significant multivariate effect of principals' years of teaching experience on achievement scores, Wilks' Lambda=0.92, $F(4,174)=1.93$, $p=0.11$.

With respect to the effect of principal tenure (i.e., the number of years principals served in their current location) on achievement scores, results indicate that schools in which the principals served in their school for 7 or more years ($n=27$) had higher mean 2005 TAI achievement scores ($M=81.22$, $SD=12.45$) than schools in which the principal served between 4 and 6 years ($n=21$, $M=68.74$, $SD=10.31$), and schools in which principals served between 2 and 3 years ($n=33$, $M=74.52$, $SD=9.89$). The same pattern was found with respect to 2005 norm-referenced achievement scores. Principals who served in their school for 7 or more years had higher mean 2005 CTBS total battery achievement scores ($M=57.40$, $SD=9.97$) than principals who served between 4 and 6 years ($M=49.02$, $SD=8.59$), and principals who served between 2 and 3 years ($M=52.88$, $SD=9.83$).

Box's test for equality of covariance matrices revealed no differences in variability between the groups, $F(1, 6)=1.27$, $p=0.27$. The MANOVA was statistically significant, Wilks' Lambda=0.819, $F(4,174)=4.58$, $p<0.003$. A between-subjects effects test revealed no significant difference on the CTBS total battery test, $F(2, 88)=5.65$, $p=0.005$. However, the test revealed a significant difference on the TAI scores $F(2, 88)=9.55$, $p<0.003$. The partial eta square statistic was 0.18, indicating that years in location had a small to moderate effect size on the TAI test scores. Bonferroni post hoc procedures revealed that principals who served 7 or more years had significantly higher TAI scores than principals who served between 4 and 6 years ($p<0.001$).

4.2 School Factors

As illustrated in Fig. 1, a clear pattern is evident with respect to school poverty concentration and achievement scores. Schools with a low concentration of free or reduced-price lunch students ($n=20$) had higher 2005 mean scores on CTBS total battery than schools with medium low concentration ($n=24$), medium high concentration ($n=27$), and high concentration ($n=20$). This pattern is consistent when looking at the relationship between school poverty and TAI. Figure 1 clearly reveals that as the schools' poverty concentration levels increase, achievement scores decrease. Box's test for equality of covariance matrices revealed no differences in variability between the groups, $F(30, 1739)=1.42$, $p=0.07$.

The MANOVA results reveal a statistically significant multivariate effect of concentrated poverty (poverty quartiles) on the dependant variables (CTBS total battery and TAI), Wilks' Lambda=0.59, $F(6, 158)=7.76$, $p<0.001$. A between-subjects effects test revealed significant differences for both the 2005 CTBS and 2005 TAI. There was a statistically significant effect of concentrated poverty on TAI, $F(3, 80)=15.60$, $p<0.001$. The partial eta square statistic was 0.37, indicating that concentrated poverty has a moderate effect size on the TAI scores. A Bonferroni post-hoc test indicated that there were statistically significant differences between low-poverty schools and all others ($p<0.001$). The only differences that were not statistically significant were between medium-low and medium-high poverty schools, between medium-low and high-poverty schools, and between medium-high and high-poverty schools.

Similarly, there was a statistically significant effect of concentrated poverty on CTBS, $F(3, 80)=11.95$, $p<0.001$. The partial eta square statistic was .31, indicating that concentrated poverty has a moderate effect size on the TAI test scores. Bonferroni post-hoc tests indicated a statistically significant difference between low-poverty schools and all

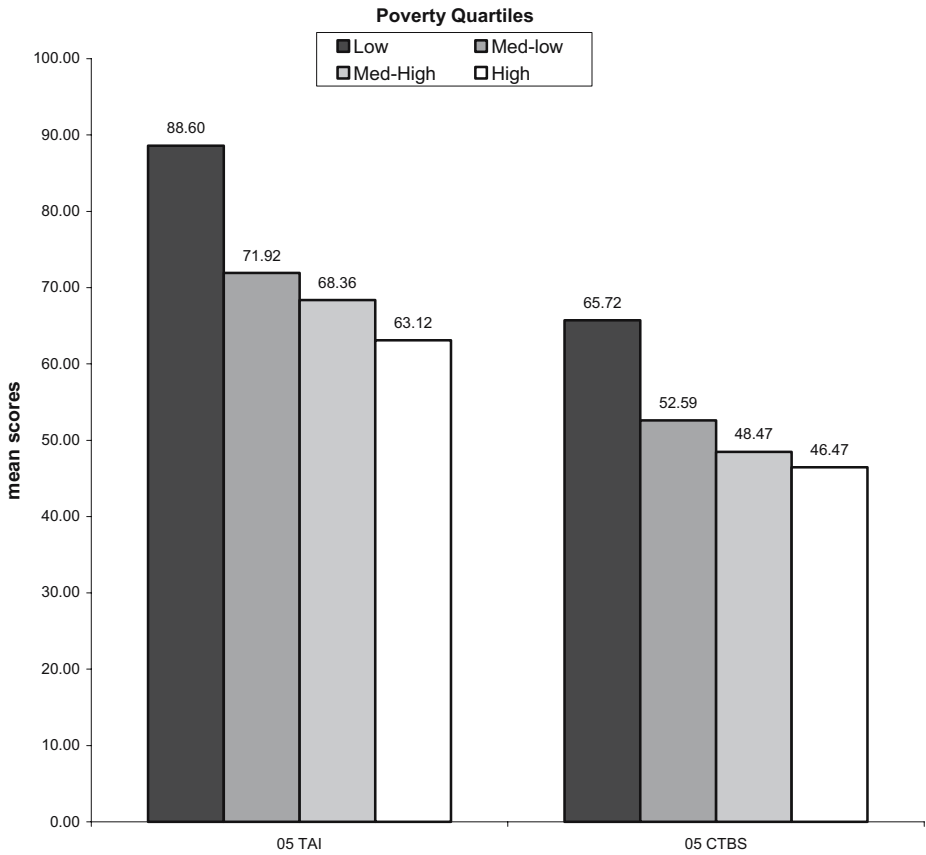


Fig. 1 Mean scores by poverty quartiles

others ($p < 0.001$). Again, the only differences between poverty levels that were not statistically significant were between medium-low and medium-high poverty schools, between medium-low and high-poverty schools, and between medium-high and high-poverty schools.

As illustrated in Fig. 2, average 2005 achievement scores increase as the average teachers teaching experience increases. Schools staffed with teachers who have an average teaching experience of 13+ years ($n = 31$) have higher 2005 mean scores on CTBS total battery than schools staffed with teachers who have an average teaching experience of 10–12 years ($n = 34$), and schools staffed with teachers who have the lowest average teaching experience of between 5 and 9 years ($n = 26$). This pattern is consistent when looking at the relationship between school poverty and TAI. As demonstrated in Fig. 2, the relationship is linear. That is, the greater the average teaching experience of teachers, the higher the achievement test scores. MANOVA results approached significance for the main effect of average teaching experience of teachers on achievement scores, Wilks' Lambda = 0.90, $F(4, 158) = 2.12$, $p = 0.08$, but no significant interaction effect of concentrated poverty and average teaching experience was found, Wilks' Lambda = 0.89, $F(10, 158) = 0.908$, $p = 0.53$.

A one-way Analysis of Variance (ANOVA) was conducted on average teaching experience of teachers and TAI and CTBS achievement scores. For TAI, results reveal a significant difference between groups $F(2, 88) = 20.40$, $p < 0.001$. A Bonferroni post-hoc

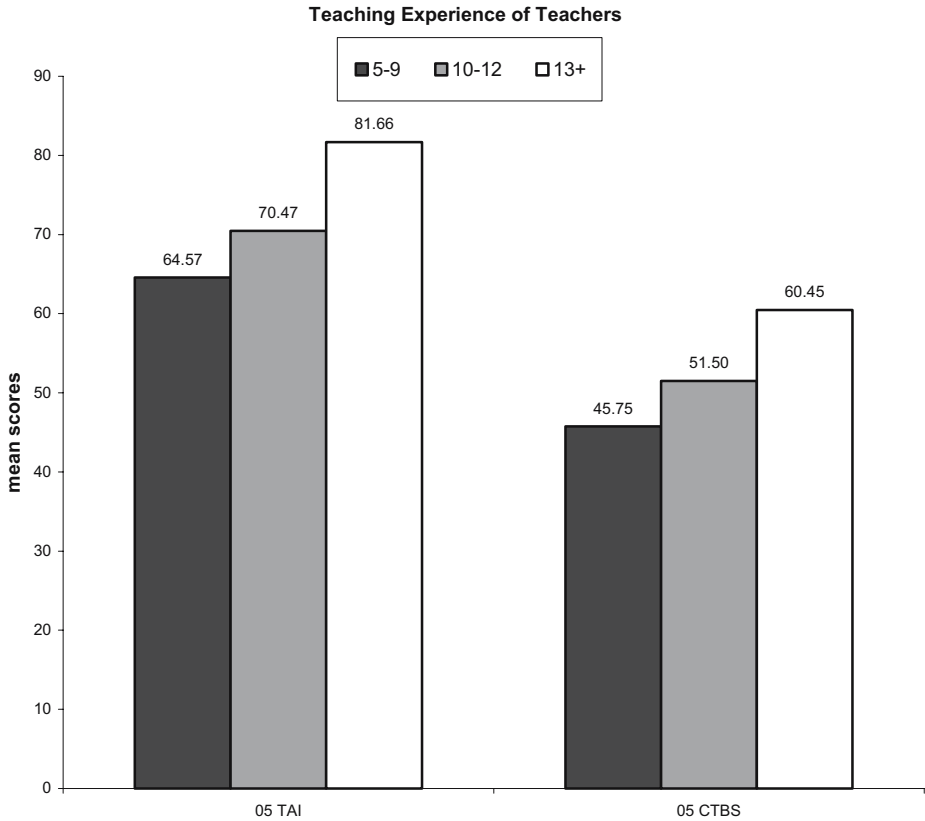


Fig. 2 Mean scores by average teaching experience of teachers

test indicates a statistically significant difference between average teaching experience of 5–9 years, and 13+ years ($p < 0.001$) and between 10 and 12 years and 13+ years ($p < 0.001$).

For CTBS, an ANOVA indicates that there is a significant difference between groups $F(2, 88) = 24.17$, $p < 0.001$. A Bonferroni post-hoc test indicates a statistically significant difference between average teaching experience of 5–9 years, and 13+ years ($p < 0.001$) and between 10 and 12 years and 13+ years ($p < 0.001$).

4.3 Principal Preparation

Schools that had principals who received their training from the primary university ($n = 53$) had slightly higher average 2005 scores on CTBS total battery test ($M = 53.90$, $SD = 8.52$) than principals from other universities ($n = 38$, $M = 52.75$, $SD = 11.81$). Similarly, schools that had principals who received their training from the primary university had higher average 2005 scores on TAI test ($M = 73.81$, $SD = 11.94$) than principals from other universities ($M = 70.89$, $SD = 12.94$). The MANOVA revealed no statistically significant main effect of university preparation achievement scores, Wilks Lambda = 0.97, $F(2, 86) = 1.49$, $p = 0.23$.

With respect to district-driven preparation program participation, schools that had principals who participated in district-driven preparation programs ($n = 50$) had slightly higher average 2005 scores on the CTBS total battery test ($M = 53.04$, $SD = 8.24$) than

schools with principals who did not participate in district preparation ($n=41$, $M=52.75$, $SD=11.81$). The 2005 TAI scores were approximately the same for schools in which principals participated in district preparation ($M=72.68$, $SD=11.03$) and schools in which principals did not participate in district preparation ($M=72.48$, $SD=13.99$). The MANOVA revealed no statistically significant main effect of district preparation on achievement scores, Wilks' Lambda=1.0, $F(2, 86)=0.006$, $p=0.99$. Further, multivariate tests indicated no significant interaction effect between university and district preparation, Wilks' Lambda=0.94, $F(2, 86)=0.94$, $p=0.077$.

4.4 Hierarchical Regression Analyses

Pearson correlations were conducted to determine the relationship and the strength of the relationship between the predictor variables (i.e., percent free or reduced-price lunch, average experience of teachers, 2004 test scores, principal tenure, district preparation, and university preparation) and both dependent variables (i.e., 2005 CTBS Total Battery and 2005 TAI). Three contextual variables (i.e., percent free or reduced-price lunch, average experience of teachers, and 2004 test scores) were strongly correlated (-0.71 , 0.67 , and 0.91 respectively) with the 2005 CTBS ($p<0.001$). This same pattern was evident with the 2005 TAI scores. Thus, based on previous research (Muñoz and Dossett 2001; Roeder 2000) and due to the evidence of multicollinearity (Stevens 1999), the researchers decided to factor analyze these three variables into a composite score (contextual factor).

As shown on Table 3, correlations reveal that several predictors were significantly related to 2005 TAI. The TAI has a statistically significant positive correlation ($p<0.007$) with contextual factor (0.90) and number of years in current location (0.37). However, district preparation (0.01) and university preparation (0.12) were not significantly correlated to the TAI.

Table 4 reveals the same pattern of relationships when examining correlations between the 2005 CTBS Total Battery and the other variables in the analyses. The CTBS total battery has a statistically significant positive correlation ($p<0.003$) with contextual factor (0.87) and number of years in current location (0.30). Again, district preparation (0.01) and university preparation (0.17) were not significantly correlated to the CTBS test scores.

Hierarchical regression analyses were used to build a statistical model. Hierarchical regression analyses were conducted on 2005 TAI and 2005 CTBS Total Battery. The regression analysis on 2005 TAI is presented in Table 5. The contextual factor score was entered first as a block and explained 80% of the variance in 2005 TAI. The second block entered into the analysis, number of years in current location, uniquely explained an additional 2% of the variance. The third block entered in the analysis was district

Table 3 Correlations among predictor variables on 2005 total academic index

Variables	1	2	3	4	5
1. 2005 CTBS total battery	–	0.90 ^a	0.37 ^a	0.01	0.12
2. Contextual factor		–	0.25 ^a	–0.03	0.20
3. Number of years in current location			–	0.01	0.00
4. District preparation				–	0.22
5. University preparation					–

^a $p<0.01$.

Table 4 Correlations among predictor variables on 2005 CTBS total battery

Variables	1	2	3	4	5
1. 2005 CTBS total battery	–	0.87 ^a	0.30 ^a	0.01	0.17
2. Contextual factor		–	0.24 ^a	–0.07	0.19
3. Number of years in current location			–	0.02	0.00
4. District preparation				–	0.22
5. University preparation					–

^ap<0.01.

preparation and university preparation and did not explain any additional percent of variance. In sum, the conceptual model explained 82% of the variance in 2005 TAI.

Hierarchical regression results conducted on the 2005 CTBS total battery scores revealed a similar pattern. As shown in Table 6, the contextual factor entered in the first block explained 75% of the variance in 2005 CTBS scores. The second block, number of years in current location, uniquely explained an additional 1% of the variance. Finally, the third block, consisting of district and university preparation, did not explain any further percent of variance. In sum, the conceptual model explained 76% of variance in 2005 CTBS Total Battery.

In summary, hierarchical regression analyses indicated a significant amount of variance in student achievement associated with criterion- and norm-referenced test scores could be predicted from contextual factors (i.e., poverty, average teaching experience, prior test scores) and principals' tenure; however, district and university preparation programs did not add to the explained variance.

5 Discussion

In the current context of public educational reform, leadership is directed towards outcomes rather than concentrating on technical management (Boyan 1988; Murphy and Louis 1999). In public education, the goals to be served focus on student learning, particularly academic knowledge and skills. The accountability of leadership for learning is expressed in multiple ways, including “leading for learning,” “learning-focused leadership,” or “learner-centered” accountability (Darling-Hammond 1997; DuFour 2002; Knapp et al. 2002).

Table 5 Hierarchical regression results on 2005 total academic index

Predictor variables	B	SE B	β	t	ΔR^2
Step 1					
Contextual factor	11.11	0.58	0.90	19.17 ^a	0.80
Step 2					
Contextual factor	10.64	0.57	0.86	18.70 ^a	
Number years in current location	0.38	0.12	0.15	3.27 ^a	0.82
Step 3					
Contextual factor	10.85	0.58	0.88	18.67 ^a	
Number years in current location	0.37	0.12	0.15	3.18 ^a	
District preparation	1.15	1.13	0.05	1.02	
University preparation	–1.75	1.16	–0.07	–1.50	0.82

^ap<0.01.

Table 6 Hierarchical regression results on 2005 CTBS total battery

Predictor variables	B	SE B	β	t	ΔR^2
Step 1					
Contextual factor	0.86	0.53	0.87	16.42 ^a	0.75
Step 2					
Contextual factor	8.3	0.54	0.84	15.69 ^a	
Number years in current location	0.20	0.11	0.10	1.78	0.76
Step 3					
Contextual factor	8.4	0.55	0.85	15.42 ^a	
Number years in current location	1.9	0.11	0.09	1.72	
District preparation	1.56	1.07	0.08	1.45	
University preparation	-0.36	1.01	-0.02	-0.33	0.76

^a $p < 0.01$.

The increased focus on outcomes has made understanding the kind of leadership that can help improve learning of driving interest in educational leadership circles. The basic assumption is that educational reform depends on the capacities and behaviors of school leaders (Marzano et al. 2005; Murphy and Datnow 2002). However, the context in which leadership is exerted is an important consideration. Leadership is contingent on the setting and many other factors, including the characteristics of leaders themselves (Hallinger and Heck 1996b; Leithwood and Duke 1999).

This exploratory study analyzed principals, school setting, preparation programs, and the impact of preparation programs on student achievement using descriptive and inferential statistics. This study also generated a conceptual model in which poverty, teaching experience, prior achievement, number of years in school location, and participation in a principal preparation program were used as predictors of student achievement. The next section discusses the findings in light of implications for practice.

5.1 Implications for Practice

This study has several implications for practice. First, this study confirms that the context in which leadership takes place matters. Thus, school context should be an important consideration in preparation program designs. Research findings indicated that student achievement was negatively impacted when school poverty concentration rose above 40%. Principals in high-poverty settings face different challenges than principals in low-poverty settings. This implies that a different set of knowledge and skills are needed for school leaders in high-poverty schools. Leadership preparation program curricula should be designed with this concept in mind.

District and university partnerships can have a positive effect on key educational indicators related to teaching and learning outcomes (Muñoz et al. 2006). District partnerships with universities are critical in multiple domains, but it is clear that principal preparation is a key area of common interest. The current high-stakes reform environment increasingly calls for school districts to strengthen and maintain strong collaborative relationships with the universities preparing their school leaders (Quinn 2005). School districts and state universities should periodically assess the quality of collaboration (Kirschenbaum and Regan 2001) and ensure that critical skills are taught in principal preparation programs.

The pattern of achievement in schools might be influenced by years of principal tenure. A positive significant correlation was found between number of years at the school location and student achievement. It also was observed that scores are higher for those principals with seven or more years of experience in one location. Though a causal relationship between achievement and principal tenure was not determined due to the correlational nature of this study, districts would be wise to ensure that their preparation programs and policies encourage the sustainability of school leadership within one location (Fullan 2005), regardless of school context.

The pattern of achievement is influenced by poverty concentration. As expected from previous research, the lower the poverty concentration, the higher the test scores (Muñoz and Dossett 2001; Roeder 2000). Although the condition of school poverty itself is not the sole limiting factor, other dynamics associated with high-poverty schools (e.g., teacher turnover, cultural incongruency) demand a more focused preparation of leaders in such schools. Both university- and district-driven principal preparation programs should work in concert with each other to provide individualized skill development based on the context of the school in which they are expected to lead (Whitaker and Barnett 1999).

Findings across the criterion and norm-referenced academic measures show a positive correlation with principal tenure, average years of teaching experience, and previous test scores; also, a negative correlation was observed with the percentage of students on free or reduced-price lunch. In other words, findings indicated that the longer a principal stays in a location, the more average teaching experience of the staff, and the higher the previous years score, the higher the academic achievement test scores.

Findings indicated that, by far, free and reduced-price lunch participation, average teaching experience of teachers, and previous test scores were the most robust predictors of student achievement. As such, districts may want to consider student assignment policies that more evenly distribute the student body based on socioeconomic status. Many large urban districts are saturated with a high-poverty student body. In light of this situation, districts may also consider instituting policies in concert with teachers' unions that encourage teachers to maintain positions in high-poverty schools for an extended period of time (Darling-Hammond and Green 1994; Clotfelter et al. 2006).

We believe that all students can achieve at high levels, regardless of their individual socioeconomic status or their schools' socioeconomic composition. Though a large body of research identifies poverty as one of the strongest predictors of student achievement, other research reveals that high-poverty schools can, and do, beat the odds (Cunningham 2007). Further, using a value added model of achievement, Raudenbush (2004) found that though the mean achievement between high and low poverty schools was large; they had essentially equivalent rates of achievement growth over time.

5.2 Limitations and Implications for Future Research

Pitner (1988) identified different approaches to modeling principal effects on teaching and learning. Because our data did not lend themselves to an examination of mediated effects modeling, the present study only incorporated the features of the direct effects model. In this model, the principal is seen as an independent variable that influences the learning of the students (Hallinger and Murphy 1986a; Leithwood et al. 1990). Hallinger et al. (1996) argued that “for the purposes of policy makers and practitioners, whether the principal’s influence on student learning is direct or indirect ought not to be of primary concern” (p. 545).

Still, the limitation of the direct effects model is that it is not a comprehensive framework for viewing the principal’s role in school effectiveness (Hallinger et al. 1996).

The principal is both a dependent and independent variable; as a dependent variable, the principal is subject to the influence of other variables within the school and its environment, particularly the concentration of school poverty, and average experience of teachers.

Years of research show that principals make a difference in student achievement (Marzano et al. 2005). Principals influence student achievement by influencing teachers and staff, which in turn shapes the student learning outcomes. Direct effect models are helpful for understanding the direct impact of principals on student learning. However, more sophisticated models are needed to understand the principal as dependent variable and its influence on mediating and moderating factors. Modern statistical procedures can facilitate the study of principal effects on student achievement, particularly when the methodology takes into consideration the nested structure of schooling (i.e., students within schools) and utilizes a value-added model of achievement (Raudenbush 2004). More research is needed to understand why and how some principals are more effective than others in shaping the school setting in which learning takes place. Future studies need to control for possible confounding variables and rule out alternative explanations (Shaddish et al. 2002).

A final limitation of this research is that principal preparation programs have been in constant development. In this sense, the “treatment” has been changing throughout the years. Though a lack of standardized treatment is intrinsic to many real-world interventions, unreliability of treatment implementation is considered a statistical conclusion validity threat (Shaddish et al. 2002). It might be useful to sustain the curriculum to assess its differential impact on student achievement.

5.3 Conclusion

In the high-stakes accountability environment, school districts are examining their administrator recruitment and preparation efforts to ensure that qualified principal candidates are available when an opening occurs (Winter et al. 2002). It is clear that well-conceived programs for principal preparation can and should exist side-by-side with strong university-based preparation programs.

School districts and universities need to define a curriculum in leadership programs that is positively related to academic outcomes and sustainable over time. Principal preparation programs must ensure that leaders develop the knowledge and skills necessary to increase achievement in various school contexts (Marzano et al. 2005). Principal preparation programs that detract from their focus on increasing academic performance should be redefined, and high-quality principal preparation programs can and should promote practices that ensure student academic achievement.

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