Examining the Unexpected:

Outlier Analyses of Factors Affecting Student Achievement

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No Child Left Behind (NLCB, 2001) was initiated to eradicate the gaps in educational achievement that have persisted in the United States for decades between minority and nonminority students. Although all states continue to struggle to establish equitable educational systems, the issue is particularly problematic in Connecticut. Recent data from the National Assessment of Educational Progress (NAEP) indicate that the gap between students who are eligible for free/reduced price lunch and those who are not is the largest in the nation at both the fourth-grade reading and mathematics assessment levels and eighth-grade reading and mathematics assessment levels (Connecticut State Department of Education [CSDE], 2007). On the 2007 Connecticut Mastery Test (CMT), the Connecticut state assess-

In this study, we predicted achievement based on a variety of school demographic and background variables and identified schools that had achievement profiles that exceeded or fell short of their expected achievement levels. We identified schools that were over- or underperforming and surveyed parents, teachers, and administrators in an effort to isolate factors that differ across the two types of schools. Across the three sets of surveys, perceptions of parents and perceptions about parents emerged as an interesting area of difference. Although parents in the positive and negative outlier schools reported similar perceptions about parent/teacher communication, teachers and administrators in the positive outlier schools appeared to have more positive perceptions of parents. Specifically, these teachers perceived the parents in their school as being more involved in their children's education, and they encouraged high levels of parent involvement. Certainly, these more positive attitudes may help educators work more effectively with parents, building a more effective partnership to increase student achievement. Perhaps consequently, parents in the positive outlier schools reported greater satisfaction with their schools than parents in the negative outlier schools did. This study found that parental involvement and parental perceptions were key variables that helped to explain differences of the over- and underachieving schools. Thus, communication and collaboration among parents, teachers, and staff appear to be critical factors predicting the success of low-SES schools.

summary

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ment, 69% of White fourth-grade students scored at or above the state's goal in reading, but only 29% of Black students and 27% of Hispanic students reached that target (CSDE, 2008). Similar disparities were evident for mathematics.

Despite the bleak assessment data, administrators and researchers felt that many Connecticut schools with diverse populations were effecting a positive change in student learning. Typical evaluation of school success entails the examination of mean scores for the school or the percentage of students who meet or exceed some cutoff proficiency value. Unfortunately, such an approach does not account for the diverse clientele of different schools, nor does it account for baseline differences among students at the start of the school year. A variety of growth, value added, and residual based approaches to data analysis exist to take into account individual differences that exist prior to the start of instruction.

For this study, we employed a residual based approach to studying the issue of student achievement. Rather than evaluating schools based on their mean achievement, we chose to predict achievement based on a variety of school demographic and background variables and identified schools that had achievement profiles that exceeded or fell short of their expected achievement levels, which allowed for a more direct and equitable comparison of schools with similar compositions of students. We believe that such an approach more accurately represents the educational effectiveness of urban or low-SES schools. A static, performance-based approach confounds the effects of the school with the entry characteristics of its clientele. Further, it sets the same benchmark or expected value for all schools, regardless of differences in the school's clientele. Our residual-based approach explicitly takes the clientele of the school into account when predicting school achievement levels. Although the current study is applied to the data from only one state (Connecticut), the approach that we take could be applied to any national or state-level dataset.

After we identified over- and underperforming schools, we conducted a multifaceted survey study to examine parent, teacher, and administrator-related factors that were related to the performance of these schools. We developed parent, teacher, and

administrator surveys, and invited all of the over- and underperforming schools to take part in the surveys. The goal of the survey study was to identify malleable school and teacher-related factors that distinguish over- and underperforming schools.

Review of the Literature

Student Demographics and Student Achievement

The composition of the student body in any given school is determined largely by sociological and economic factors. In addition to educating their students, teachers in schools that serve students from more challenged backgrounds grapple with issues such as inadequate instructional resources, student hunger, lack of parental involvement, and school and student safety issues. Despite these differences in context, all schools are held to the same standard for student achievement on state assessments, regardless of the populations they serve.

Having a large percentage of proficient students in a school does not necessarily mean that students' high achievement is the result of good instruction. Instead, prior achievement or other relevant characteristics of the student body may help to explain current levels of achievement (Linn, 2005). When large-scale assessments are used as the sole measure of accountability, the characteristics of the school's clientele are confounded with change that is directly attributable to the effectiveness of the school (Carlson, 2002; Ponisciak & Bryk, 2005), producing biased estimates of school effects. As such, holding all schools accountable for the same mean achievement levels when students enter schools with vastly differing levels of achievement puts the neediest schools at a further disadvantage (Ballou, Sanders, & Wright, 2004). A more appropriate measure of a school's effect on student achievement should account for the nature of students in the schools as well as the characteristics of the schools themselves. For instance, the correlation between socioeconomic status (SES) and achievement tends to be approximately .30 at

the student level (Sirin, 2005). When aggregated to the school level, the correlation between SES and academic achievement is approximately .60 (Sirin, 2005), although that correlation has been estimated to be even higher (.73) in an earlier meta-analysis (White, 1982). The racial achievement gap has been well-documented (Jencks & Phillips, 1998) as well.

In the aggregate, background characteristics such as SES, ethnicity, and language status are predictive of achievement. However, any individual's achievement may be similar to or different from the value predicted by demography. The same is true at the school level. Although there is a relationship between the SES and racial composition of the school and the school's average achievement level, this relationship is neither perfect nor deterministic. Further, factors such as SES, ethnicity, and language status are fixed characteristics: students and schools cannot intervene to change these variables. A number of malleable school, teacher, and parent factors have been associated with student achievement in the research literature. Below, we review the most salient of these factors for the present study.

School Leadership and Student Achievement

Research has suggested that strong leaders are critical to successful learning environments (Briggs & Wohlstetter, 2003; Hallinger, Bickman, & Davis, 1996; Haycock, Jerald, & Huang, 2001; Jesse, Davis, & Pokorny, 2004; McGee, 2004; Muijs, Harris, Chapman, Stoll, & Russ, 2004; Murphy, 2004; Scribner & Scribner, 2001; Snipes, 2004; Yau, 2002). Several characteristics of strong leaders are evident in the literature: They have a clear vision for their schools that is continuously communicated to school staff and parents (Cole-Henderson, 2000; EdSource, 2006; Jesse et al., 2004); they have high expectations for all students (Cole-Henderson, 2000; EdSource, 2006; McGee, 2004; Scribner et al., 2001); and they are able to translate their vision and expectations into concrete goals for teachers by aligning curriculum with state standards and standardized tests (EdSource, 2006;

Education Trust, 2003). These principles transfer to increases in student achievement. Principals' attention to the state standards relates to overall school achievement (EdSource, 2006; Education Trust, 2003; Hallinger et al., 1996; Heck, 1992; Hopkins, 1999; Jesse et al., 2004; McGee, 2004). In conclusion,

> a focus on teaching and learning, effective distributed leadership, creating an information-rich environment, creating positive school culture, creating a learning environment and a strong emphasis on continuous professional development . . . have all consistently been demonstrated to be important in improving schools in difficult or challenging circumstances. (Muijs et al., 2004, p. 168)

Teachers and Student Achievement

A number of teaching-related factors have been associated with increased achievement. Teachers' attitudes, strategies, and expectations affect students' school performance (EdSource, 2006; Gaddy, 1988; Niebuhr & Niebuhr, 1999; Ramirez, 2003; Romo, 1999; Rosenthal & Jacobson, 1968; Smrekar, Guthrie, Owens, & Sims, 2001). Niebuhr and Niebuhr (1999) found that teachers who demonstrated a warm and friendly attitude toward students and who allowed students to know them as people increased student achievement. In Hopkins' (1999) research, effective teachers interacted frequently with individual students during lessons, and they communicated expectations and provided praise for student success. Other characteristics of strong teachers include making themselves readily available to students, committing significant time to planning, working collaboratively with other teachers, making an effort to continually develop their teaching craft, and aligning themselves with the school's mission to improve achievement (EdSource, 2006; Hallinger et al., 1996; Heck, 1992; Hopkins, 1999; Jesse et al., 2004; McGee, 2004).

Standards-based teaching may also increase student achievement. Stone and Lane (2003) combined data from student assessments as well as student and teacher surveys using longitudinal

hierarchical linear models to explore the consequences of a state accountability program on student learning. Their analysis revealed that performance on the statewide testing program was related to the extent to which teachers aligned their instruction with state-defined standards. Further, students in lower performing schools reported an increased use of classroom tasks more aligned with the statewide assessment format rather than more broadly based classroom activities.

In an EdSource (2006) study of California's educational system, nearly 100% of surveyed principals and 94% of teachers reported aligning curriculum with state standards and standardized tests. Teachers at more successful schools were more likely to report that their schools had consciously identified key state standards in mathematics and reading; that they used instructional strategies and materials in their classrooms that aligned with state standards; and that they mapped state standards onto their lesson plans.

Parental Involvement

Teachers can make significant strides toward improving student achievement if they are able to involve parents (McDermott & Rothenberg, 2001). One potential barrier to parent involvement is the parent's perception that teachers lack knowledge about the student's culture (Ramirez, 2003). If a parent perceives the teacher to be sensitive to the student's culture, the parent is more likely to become involved with the classroom and the school.

Several other factors have been identified that either help or hinder parental involvement, and these factors may increase student achievement. In one study, McDermott and Rothenberg (2001) found that low-income parents wanted to take part in their children's education; however, because they perceived that teachers saw them negatively, they often felt excluded. Moreover, some of the interviewed parents discussed teachers who had made a positive difference. These parents identified three essential qualities of good teachers: The teachers displayed respect and love for

the children; they communicated frequently with families; and they visited the communities of their students.

Research has suggested that creating and maintaining relationships with students' families improves achievement (Jesse et al., 2004; McGee, 2004; Ramirez, 2003; Scribner & Scribner, 2001; Sheldon, 2003). However, studies appear to demonstrate incongruous effect sizes of parental involvement (Fan & Chen, 2001). Although the correlation between parental involvement and student achievement was .25, this correlation ranged from .09 to .34, depending on the way that parental involvement and student achievement were defined. For example, parental involvement could be defined as participation at school or involvement in the student's academic and social lives. Other factors that contribute to inconsistent effect sizes are the differential involvement of parents across grade levels, differences across subject areas, and the variety of indicators of student achievement such as GPA, grades, or standardized achievement scores (Fan & Chen, 2001; Keith, Keith, Troutman, & Bickley, 1993). Fan and Chen's (2001) meta-analysis of parental involvement revealed relatively small effects of parental involvement on student achievement. However, because socioeconomic status and parental involvement have been shown empirically to be positively related, one of their recommendations was the need for more studies that include both socioeconomic status and parental involvement as factors influencing academic achievement. In this way, researchers can control for the effects of socioeconomic status and better extricate the true relationship between parental involvement and academic achievement (Fan & Chen, 2001).

The Present Study

We undertook this research study to gain a more comprehensive understanding of the factors that contribute to student achievement in Connecticut schools. The following research question guided the study: What factors, identified by parents,

teachers, and administrators, differentiate schools that perform above and below expectations?

This research question was addressed in two phases. In the first phase of the study, we used single and multilevel linear regression models to examine fall 2004 results from the Connecticut Mastery Test (CMT) in grades 4 and 8 and the Connecticut Academic Performance Test (CAPT) in grade 10. First, we estimated a model to predict school reading or math achievement using school-level demographic factors such as the percentage of minority students in the school, the percentage of students in the school who received free or reduced price lunch, the percentage of ELL students in the school, and the average income in the community. Then, we used the results of these models to identify positive and negative "outlier" schools. Positive outlier schools were schools in which actual results exceeded predicted results; in the negative outlier schools, predicted results exceeded actual results. Positive outlier schools can be thought of as overperforming schools: These are schools where the students are doing better than would be expected based on their demography. In contrast, the negative outliers are underperforming schools. In the underperforming schools, we would expect better student performance based on the background characteristics of the school's clientele. For example, the regression models predicted higher reading and math achievement in affluent, low-minority schools and lower reading and math achievement in high poverty, high minority schools. In the second phase of the study, three separate surveys were developed and distributed to parents, teachers, and administrators in both sets of schools. We used the results of the survey analysis to isolate differences between the over- and underperforming schools. The goal of the survey analysis was to isolate potential malleable factors that help schools to boost student performance.

Method

Data Sources

CMT/CAPT. Connecticut's statewide testing program consists of two main assessments: the Connecticut Mastery Test (CMT), which was administered only in grades 4, 6, and 8 until 2006; and the Connecticut Academic Performance Test (CAPT), which is administered in grade 10. The CMT a standards-based assessment designed to measure student performance in the areas of mathematics, reading, and writing focuses on content that students at each grade level can reasonably be expected to have mastered. In addition to those areas covered by the CMT, the CAPT also includes an assessment of science knowledge. For this study, we used fourth- and eighth-grade mathematics and reading CMT data and 10th-grade mathematics and reading CAPT data from 2004 to identify outliers at the elementary, middle, and high school levels respectively. Data from every Connecticut school with at least 20 students at the grade level of interest were included in the analysis.

Survey data. Three separate surveys were developed for parents, teachers, and administrators based on a thorough review of the literature. Strength of agreement with the survey items was measured using a 5-point Likert-type scale using a range from 1 to 5, where 1 = *strongly disagree* and 5 = *strongly agree*. There were 23 items on the parent survey in addition to several demographic questions. The Teacher Survey consisted of 70 items and additional items that addressed teaching experience, teaching techniques, and other demographic data. The Administrator Survey had approximately 80 items.

We conducted content validation of the surveys prior to their use in the study. Initially, each survey was reviewed by content experts at the University of Connecticut and the Connecticut State Department of Education. The Teacher Survey underwent additional content reviews. First, it was distributed to a group of 12 teachers enrolled in a graduate-level summer program to review and share comments in a small-group discus-

sion. Acceptable suggestions were noted by the researchers and the survey was edited accordingly. Additionally, 100 teachers at a summer professional development conference were asked to review the edited survey. These responses were analyzed descriptively and analytically; a number of additional edits were made based on the teachers' comments.

Procedures

In the first phase of this study, school demographic characteristics were used to establish predicted school-level achievement; then predicted school achievement was compared to actual school-level achievement. By controlling for demographic differences among the schools, schools from less privileged communities emerged as positive outliers, or schools that were achieving above expectations. It is important to note that this approach did not identify high or low achieving schools per se but, instead, identified schools that were achieving above or below their predicted values based on their school demographic profiles. Studies of academic underachievement at the student level have often employed a similar regression based technique for identifying students as over- or underachievers (McCall, 1994; McCall, Evahn, & Kratzer, 1992). The present study extends this framework to identify schools that are overachieving or underachieving, given their socioeconomic and demographic profiles.

The CMT data were analyzed using hierarchical linear modeling (HLM), which accounted for the clustering of schools within districts. A two-level model predicted schools' mean reading and math CMT scale scores, where level 1 represented the school level and level 2 represented the district level. The prediction equation for school achievement in reading and mathematics was:

$$Y_{ij} = \gamma_{00} + \gamma_{01}(ADJ\_INC) + \gamma_{10}(LEP) + \gamma_{20}(LUNCH) + \gamma_{30}(MIN)$$
$$+ u_{0j} + r_{ij}$$

where *ADJ_INC* was the per capita town/district income, divided by 1,000. *LEP* indicated the percentage of students with limited English proficiency at the school. *LUNCH* represented the percentage of students receiving free or reduced price lunch at the school. *MIN* represented the percentage of underrepresented minority students at the school, including Black, Hispanic, and Native American/American Indian. All of these variables were grand-mean centered to aid in the interpretation of the HLM results. All of these covariates were statistically significant for both math and reading at the α = .001 level.

Middle School Analyses

As 224 schools were represented by 147 districts, many districts consisted of only one school, bringing into question the need for a two-level model. Thus, we ran linear regression models and compared them to the multilevel models. Both types of models identified the same predictor variables as significant and both models revealed the same outlier schools (with the linear models for math and reading revealing 82% and 73% of the total variance accounted for, respectively, by the four demographic variables). Given that the assumption of independence of observations is not required with the multilevel model, we chose to employ the multilevel model. The final models reduced prediction error by 71% and 76% for reading and math, respectively.

High School Analyses

Because more than 90% of Connecticut school districts have only one high school per district, the high school analyses used single-level multiple regression analyses. The prediction equation was:

$$Predicted\ SCORE = \beta_0 + \beta_1(LUNCH) + \beta_2(MIN) + \beta_3(ADJ\_INC) + \beta_4(LUNCH*MIN) + e$$

LUNCH, MIN, and *ADJ_INC* were defined as stated in the earlier analyses; these variables were centered at their respective means for this analysis. *LUNCH*MIN*, the interaction between percent free lunch and percent minority, was modeled by including the product of the two centered variables in the model.[1] We originally included a covariate representing the proportion of LEP students in the high school in the model. Because this LEP variable was not a statistically significant predictor of either reading or math scores, it was eliminated from the final models. The remaining three variables (*LUNCH, MIN,* and *ADJ_INC)*, as well as the interaction, *LUNCH*MIN*, were significant at the α = .001 level for both outcome measures. The final regression model accounted for approximately 86.6% of the variability in mathematics CAPT scores and 76.4% of the variability in reading CAPT scores.

Residual Analyses

Predicted levels of student achievement were then compared to actual CMT and CAPT scores for each school. For the elementary and middle schools, residuals for the Empirical Bayes-estimated intercepts were calculated in HLM and standardized in SPSS. The standardized residuals reported in Tables 2 and 3 represent the number of standard errors above or below the regression line the school's actual score fell. For example, school E1's actual reading scores were 3.68 standard errors above their model-predicted value; their actual math scores were 3.2 standard errors above their model-predicted math score. Note that negative residuals are produced when a school's actual mean test score is lower than would be predicted from the demographic characteristics of the school; the reverse is true for positive residuals. Histograms indicated a normal distribution of the residuals. At the high school level, casewise diagnostics from SPSS were used to identify schools with large standardized residual scores. Histograms indicated a generally normal distribution of the residuals.

Initially, outlier analyses were conducted for reading only, for math only, and for both subjects. A review of the preliminary results

indicated that a sufficient number of schools obtained outlier status for both subjects. Accordingly, we decided to focus on those schools that were either positive or negative outliers in both reading and mathematics. A portion of the residual is inherently error. Thus, a school could be identified as a positive or negative residual erroneously. Measurement error exists and would be normally distributed around the regression line. Moreover, a certain percentage of observations will always have a standardized residual above a given value. For example, approximately 5% of residuals will have standardized residuals of at least $|1.96|$. However, there is no reason that measurement or other random error should operate in the same direction across the two separate analyses. By identifying schools that had large outliers (in the same direction⎯ either positive or negative) on both the reading and math assessments, we hoped to minimize the possibility that we were erroneously identifying schools based on random error. Therefore, for the purposes of this study, schools were designated as positive outliers if their actual scores exceeded their predicted scores by at least 1.8 standard errors in *both* reading and mathematics, whereas schools were designated as negative outliers if their predicted scores exceeded their actual scores by at least 1.8 standard errors in *both* reading and mathematics. This standard identified approximately 3.5% of the schools with achievement results that were among the most extreme results in either a positive or negative direction. Notice that we did not necessarily identify the same proportion of schools as positive and negative outliers. Even though the residuals for each of the analyses were normally distributed around their respective regression lines, the combination of the two analyses produced more schools that had two extreme positive scores than schools that had two extreme negative scores.

In the fall of 2005, following a letter of invitation from the State Commissioner of Education, we mailed boxes of survey packets to the 37 schools identified as positive and negative outliers. Survey data were analyzed descriptively. Multivariate data reduction techniques (principal axis factoring) were also used to examine themes within the survey data as predictors of the schools' outlier status.

Table 1

Descriptive Statistics

	Elementary schools	Middle schools	High schools
Mean CMT reading score	242.7 (21.1)	250.2 (24.7)	—
Mean CMT math score	246.1 (20.2)	246.6 (23.0)	—
Mean CAPT math score	—	—	247.4 (23.1)
Mean CAPT reading score	—	—	247.9 (23.2)
Mean school median income	$30,507	$30,396	$28,630
Mean % LEP	5.6	2.9	NS
Mean % free lunch	31.6	29.1	19.6
Mean % minority	33.3	30.6	25.9

Results

Outlier Analysis

Descriptive statistics for all Connecticut schools on the modeled variables are presented in Table 1. The HLM analyses identified 25 positive outlier schools (11 at the elementary school level, 11 at the middle school level, and 3 at the high school level) and 12 negative outlier schools (5 at the elementary school level, 5 at the middle school level, and 2 at the high school level). Descriptive statistics for these schools are presented in Tables 2 through 4.

A review of these data indicated that many of the positive outlier schools were urban schools with high levels of poverty. We reiterate that a school can be identified as a positive outlier, which indicates a high level of achievement relative to other schools with similar demographic profiles, but can still be a low-achieving school, when compared in an absolute sense (without regard to demographic differences) to other schools in the state.

Table 2

Elementary School Outliers for Both Reading and Mathematics

	School	School size	Analysis size	Mean reading scale score	Reading stand. residual	Mean math scale score	Math stand. residual	% LEP	% free/ reduced price lunch	% minority	Per capita district income
Positive	E1	249	33	272.36	3.68	284.88	3.2	6.06	9.09	9.09	$22,396
	E2	457	49	237.54	3.22	247.42	3.25	42.86	91.84	77.55	$16,306
	E3	206	54	224.38	3.06	227.85	1.81	31.48	94.44	100	$16,393
	E4	649	91	270.6	3.03	281.12	3.13	16.48	36.26	40.66	$34,987
	E5	561	66	227.52	2.77	241.47	3.02	10.61	90.91	83.33	$13,428
	E6	421	51	229.09	2.41	240.06	2.84	27.45	94.12	76.47	$17,701
	E7	319	49	241.77	2.2	248.47	2.28	8.16	69.39	51.02	$20,742
	E8	300	22	243.18	2.16	268.95	3.64	0	63.64	100	n/a
	E9	477	77	272.3	1.88	287.56	1.87	1.3	1.3	2.6	$34,931
	E10	352	53	227.43	1.85	257.77	4.19	3.77	98.11	98.11	$16,306
	E11	390	35	248.77	1.8	259.37	1.89	0	48.57	22.86	$23,995
Negative	E12	129	23	229.52	-2.32	234.26	-1.95	0	4.35	0	n/a
	E13	442	73	214.3	-2.21	220.88	-2.18	16.44	30.14	28.77	$24,500
	E14	341	46	218.18	-2.14	219.09	-2.08	2.17	34.78	28.26	$25,150
	E15	536	54	185.94	-2.07	184.06	-2.16	5.56	90.74	100	$13,428
	E16	936	67	198.85	-1.9	177.34	-3.6	7.46	91.04	97.01	$16,306

Table 3

Middle School Outliers for Both Reading and Mathematics

	School size	Analysis size	Mean reading scale score	Reading stand. residual	Mean math scale score	Math stand. residual	% LEP	% free/ reduced price lunch	% minority	Per capita district income
M1	455	49	271.9	3.77	263.16	3.99	0	63.27	61.22	$16,306
M2	243	61	259	3.12	252.77	3.06	0	77.05	88.52	n/a
M3	457	54	257.81	3.07	237.81	1.93	0	88.89	72.22	$16,306
M4	433	43	270.48	2.92	262	3.05	4.65	25.58	53.49	$16,393
M5	442	74	241.35	2.8	234.99	2.98	6.76	85.14	93.24	$13,428
M6	593	199	254.93	2.69	244.17	2.46	4.52	51.76	79.9	$13,428
M7	507	46	248.98	2.59	245.5	3.04	0	95.65	69.57	$16,306
M8	300	16	247.56	2.56	258.56	3.86	0	81.25	100	n/a
M9	249	39	280.87	2.28	273.1	2.25	0	15.38	10.26	$22,396
M10	800	416	294.82	2.17	284.85	1.91	0.96	4.33	5.77	$39,710
M11	369	42	239.69	1.84	235.59	2.18	2.38	73.81	83.33	$16,393
M12	456	42	226.12	-3.1	231.76	-2.58	0	11.9	0	$19,680
M13	272	42	247.07	-2.28	251.36	-1.88	0	9.52	2.38	$45,420
M14	810	170	221.07	-2.18	210.98	-2.68	0	0	84.12	$28,843
M15	808	375	199.73	-2.138	198.38	-2.21	1.07	71.73	99.73	$13,428
M16	153	18	253.67	-1.87	245.89	-2.6	0	0	0	$42,480

Positive (M1–M11); Negative (M12–M16)

Table 4

High School Outliers for Both Reading and Mathematics

		Analysis size	Mean reading scale score	Reading standardized residual	Mean math scale score	Math standardized residual	% free/ reduced price lunch	% minority	Per capita district income
	School size								
Positive									
H1	141	38	284.45	3.89	269.29	3.32	15.79	34.21	$21,760
H2	442	63	237.92	1.95	245.26	4.15	52.38	90.48	$13,430
H3	654	164	240.69	1.93	234.54	2.39	46.34	82.32	$16,390
Negative									
H4	113	29	194.11	-1.99	193.69	-1.83	82.76	100	$16,390
H5	1213	286	200.12	-1.98	193.38	-2.76	29.72	89.51	$16,310

For example, schools M13 and M16 were identified as negative outlier schools even though their CMT scores were higher than those of several of the positive outlier schools. In contrast, E3 and E5 were identified as positive outlier schools even though they had relatively low levels of achievement because their actual achievement was substantially higher than what would have been predicted based on the background characteristics of their respective schools. Thus, 5 of the schools that were identified as positive outlier schools in the elementary dataset scored below the state mean in reading, and 3 of the 11 positive outlier schools at the elementary level scored below the state mean in both reading and mathematics. Similarly, at the middle school level, 4 of the 11 positive outlier schools scored below the state mean on reading, and 5 of the 11 positive outlier schools scores below the state mean on math. In addition, 1 of the 5 negative outlier schools scored above the mean in reading, and another of the negative outlier schools scored above the statewide mean in math. Finally, at the high school level, 2 of the 3 positive outlier schools scored below the statewide mean in both reading and mathematics.

Survey Analysis

Surveys were mailed to parents, teachers, and administrators at the outlier schools. Table 5 contains information about the response rates for each survey. Table 6 contains descriptive statistics for each of the parent and teacher subscales.

Parent Surveys

For the Parent Survey, an exploratory factor analysis using principal axis factoring with oblimin rotation was conducted to reduce the set of 23 items to a set of 2 subscales. The final two-factor solution accounted for 54.89% of the variance among the items with two scales: Parent Satisfaction with School and Parent Communication with School. The scores on these two scales exhibited good internal consistency reliability (alpha = .94

Table 5

Survey Distribution and Response Rates Across Schools

	Positive outlier schools	Negative outlier schools	Total across schools
Parent survey			
# distributed	8703	5658	14361
# received	1010	267	1277
Overall response rate	11.61%	4.72%	8.89%
Teacher survey			
# distributed	1380	820	2200
# returned	246	155	401
Overall response rate	17.83%	18.90%	18.23%
Administrator survey			
# distributed	49	26	75
# returned	17	8	25
Overall response rate	34.69%	30.77%	33.33%

and alpha = .86, respectively; see Table 6). Independent sample *t* tests were conducted to compare the subscale means by school outlier status. The analysis showed that there were no differences between positive and negative outlier schools with regard to Parent Communication (p = .84). There were, however, differences between positive and negative outlier schools with regard to Parent Satisfaction $t(1275)$ = -4.07, $p < .001$ (positive M = 4.14, SD = .72; negative M = 3.94, SD = .78). However, the effect size for this difference was small (d = .27).

Additional multilevel analyses were conducted to compute the proportion of variability that lay between and within schools on the two parent subscales. These results suggested that there was more between school variation in the parent satisfaction variable than there was in the parent communication variable. For the communication subscale, 6.9% of the variance was between schools, and 93.1% of the variance was within schools. For the satisfaction subscale, 12.76% of the variance was between schools, while 87.24% of the variance was within schools. Adding outlier status to the multilevel model explained 12.5% of the between

Table 6

Parent and Teacher Survey Scales

Scale	n of items	Reliability	Mean	SD	Items
Parent Satisfaction with School	15	.94	3.95	0.90	Q17, Q18, Q16, Q12, Q7, Q1, Q5, Q13, Q2, Q10, Q22, Q23, Q19, Q14, Q21
Parent Communication with School	4	.86	4.10	0.74	Q8, Q11, Q4, Q9
Administration and Decision Making	19	.96	3.76	0.84	Q70, Q14, Q2, Q64, Q61, Q48, Q37, Q19, Q24, Q60, Q10, Q67, Q53, Q69, Q66, Q56, Q57, Q63, Q40
Parent Involvement	6	.86	3.43	0.84	Q32, Q6, Q42, Q25, Q47, Q26, Q49
Professional Development	8	.85	3.67	0.75	Q16, Q33, Q65, Q28, Q59, Q30, Q29, Q21
Peer Collaboration	6	.80	3.95	0.70	Q44, Q34, Q55, Q7, Q35, Q45
Goals and Expectations	5	.79	4.33	0.61	Q1, Q5, Q52, Q4, Q9
Support for Instruction	9	.78	3.15	0.74	Q15r, Q12r, Q36, Q46, Q51r, Q11, Q58, Q43, Q38
Integration of State Standards	5	.65	4.05	0.58	Q54, Q41, Q62, Q27, Q8

school variance. Overall, the results of the parent analyses suggest that parents from both positive and negative outlier schools reported being satisfied with their children's schools. However, parents in the positive outlier schools exhibited slightly more satisfaction with their children's schools than parents in the negative outlier schools. Given that there were no differences between the two groups on the communication scale, increased or more effective communication from the school seems an unlikely explanation for the higher satisfaction in the positive outlier group.

Teacher Surveys

For the Teacher Survey, we conducted an exploratory factor analysis using principal axis factoring with oblimin rotation to reduce the set of 70 items to a set of subscales. A forced eight factor solution accounted for 30.3% of the total variance among the items. The Administration and Decision Making factor represented the relationship between teachers and their administrators; high scores on this factor indicated that the teachers felt valued by their administrators. The Professional Development factor represented the opportunity to participate in meaningful professional development activities. The Peer Collaboration factor was a measure of effective and meaningful collaboration with peers. The Goals and Expectations factor indicated the extent to which teachers felt that the school had a culture of high goals and expectations and that there were high levels of effort from both teachers and students. The Support for Instruction factor indicated the extent to which teachers feel that there were nonleadership support structures in place to allow them to be effective instructors (i.e., class size, student behavior, and support staff). The Integration of State Standards factor was a measure of teachers' understanding and use of state standards for planning instruction. An additional subscale related to assessment was eliminated from subsequent analyses because the items did not exhibit adequate reliability. Reliabilities for the other subscales are reported in Table 6.

Independent sample t tests were conducted to compare the subscale means by school outlier status. Because separate analyses were conducted for each scale, a cutoff of $p < .01$ was used to control for the inflation of Type I error. A statistically significant difference between positive and negative outlier schools ($p < .01$) was evident for all of the factors except Professional Development and Integration of State Standards (see Table 7). Additionally, HLM analyses were conducted to determine whether outlier status was a significant predictor of teachers' scores on each of the factors, accounting for the clustered nature of the data (i.e., that teachers were nested within schools). In each of these analyses, teachers'

Table 7

*Statistically Significant Differences Between
Scale Means, Teacher Survey*

	Outlier	N	Mean	SD	Effect size
Administration and Decision Making	Negative	155	3.399	0.976	0.75
	Positive	245	3.993	0.652	
Parent Involvement	Negative	155	2.847	0.889	1.53
	Positive	245	3.949	0.583	
Professional Development	Negative	155	3.587	0.776	0.20
	Positive	245	3.733	0.725	
Peer Collaboration	Negative	155	3.758	0.690	0.46
	Positive	245	4.073	0.687	
Goals and Expectations	Negative	155	4.018	0.654	0.92
	Positive	245	4.534	0.489	
Support for Instruction	Negative	155	2.733	0.714	1.04
	Positive	245	3.420	0.630	
Integration of State Standards	Negative	155	3.976	0.604	0.20
	Positive	245	4.095	0.563	

responses were at level 1 and school status was at level 2. Because separate analyses were conducted for each scale, a cutoff of $p < .01$ was used to control for the inflation of Type I error. Based on these analyses, outlier status was only a significant predictor of scores on the Parent Involvement scale ($p = .007$). This result is consistent with the large effect size for this scale ($d = 1.53$). The largest difference between teachers in the positive and negative outlier schools was on the Parent Involvement subscale. Although the mean for teachers in negative outlier schools was below the midpoint, indicating that they tended to disagree or endorse neutral responses to the parental involvement items, the mean for teachers in the positive outlier schools was almost 4.0, indicating general agreement with the items on this scale. In other words, while teachers in the positive outlier schools tended to perceive the parents as engaged and involved, teachers in the negative outlier schools were much less likely to share these perceptions.

Table 8

*Differences Between Positive and Negative Outlier
Schools in Terms of Allocation of Class Time*

	Outlier	N	Mean	SD	Effect size
Direct instruction	Negative	134	22.291	9.294	0.46
	Positive	228	26.930	10.557	
Discipline issu es	Negative	130	8.800	6.709	0.53
	Positive	210	5.481	5.991	

In an additional set of items, teachers were also asked to specify the number of minutes of a 45-minute period they apportioned to administrative issues, direct instruction, indirect instruction, and discipline issues. There were statistically significant differences between teachers in positive and negative outlier schools for both direct instruction and discipline issues. Teachers in positive outlier schools reported spending more time engaged in direct instruction and less time dealing with disciplinary issues. In contrast, teachers in negative outlier schools spent more time on discipline and less time engaged in direct instruction (see Table 8).

Teachers were also asked about strategy use. There were statistically significant differences between the responses of teachers in the positive and negative outlier schools for three different strategies. When students were having difficulty with material, teachers in positive outlier schools were more likely to report that they presented material in a different way, they consulted with other teachers, and they talked to the student's parents. Although the effect sizes for these differences were small to moderate, these data reinforce a theme of collaboration and communication in the positive outlier schools. Means, standard deviations, and effect sizes for these strategies are listed in Table 9.

Teachers were asked whether they attended professional development on a variety of topics over the past year. Patterns of attendance were similar between teachers in positive and negative outlier schools with some exceptions. Pearson χ^2 tests indicate that teachers in positive outlier schools were more likely to attend professional development in ($p < .05$) linking assessment/

Table 9

*Differences Between Positive and Negative
Outlier Schools in Strategy Use*

	Outlier	N	Mean	SD	Effect size
Q76. Present the material in a different way	Negative	152	4.329	0.947	0.33
	Positive	234	4.590	0.664	
Q79. Consult with other teachers	Negative	151	4.265	0.830	0.31
	Positive	235	4.506	0.730	
Q80. Talk to students' parents	Negative	151	4.106	0.960	0.42
	Positive	236	4.449	0.716	

performance data to instructional strategies, thinking skills, and multicultural/diversity issues.

The results of the teacher analyses suggest that teachers in the positive outlier schools worked in an environment focused on collaboration and communication. Specifically, these teachers felt more valued and appreciated by their administrators. In addition, teachers in the positive outlier schools felt more supported by the organizational structure of the school and the environment. For teachers in negative outlier schools, the mean on support for instruction was below the midpoint of the scale, indicating a relatively low perception of support in this area. Although both groups exhibited high means on the goals and expectations subscale, teachers in the positive outlier schools reported having higher goals and expectations for their students than teachers in the negative outlier schools. Teachers in the positive outlier schools also reported higher levels of peer collaboration than their counterparts in negative outlier schools.

Finally, teachers in positive outlier schools indicated that most of their time was spent engaged in instructional activities. Parent involvement, support for instruction, and administrative support appear to distinguish teachers in the positive outlier schools from teachers in the negative outlier schools. There were only very minor differences between teachers in the positive and negative outlier schools on the integration of state standards and the professional development subscales.

Table 10

*Statistically Significant Differences Between
Item Means, Administrator Survey*

	Negative			Positive			Effect size
	N	Mean	SD	N	Mean	SD	
Q6. Teachers at this school frequently work together to plan instruction.	8	3.75	1.16	17	4.59	0.62	1.02
Q16. It is difficult to fill teacher vacancies at this school.	7	2.71	1.38	17	1.59	0.94	1.04
Q19. Most parents at this school play an active role in their children's education.	8	2.63	1.06	17	3.82	0.95	1.21
Q35. The teachers in my school are effective instructors.	8	3.63	0.74	17	4.24	0.56	.98
Q46. Most teachers in this school use student data to make instructional decisions.	8	3.13	0.83	17	4.06	0.9	1.06
Q55. Teachers in my school have high performance expectations for all students.	8	3.63	0.92	17	4.24	0.56	.88

For the Administrator Survey, independent sample *t* tests were used to compare the subscale means by school outlier status. Table 10 shows the items for which there was a statistically significant difference between the responses for negative and positive outlier schools ($p < .05$). There were no statistically significant differences between positive and negative outlier schools with regard to factors emphasized during teacher evaluations or budgetary decision making. Although the sample size of schools and administrators is quite small, these results are suggestive. First, administrators in positive outlier schools tended to have higher perceptions of their teachers' behaviors and capabilities (as evidenced by the responses

to Questions 6, 19, 46, and 55). In addition, administrators at positive outlier schools perceived their parents as playing a more active role in their children's education. Finally, administrators in negative outlier schools were more likely to report having difficulty filling teacher vacancies.

Discussion and Implications

The residual based method described in this paper provides an analytically straightforward approach to identifying schools that are performing above or below expectations, given their demographic composition. Using the four school-level demographic variables explained more than 70% of the variance in school achievement. This means that the composition of the school is an incredibly powerful predictor of school achievement. Analyses that fail to take the context and clientele of a school into account when evaluating achievement implicitly penalize the neediest schools and reward the most affluent schools.

The advantage to using such a residual based approach is that it allows us to take the demography of the school clientele into account when determining predicted or expected levels of achievement. It also allows low-SES schools to emerge as strong performing schools, even if their absolute achievement level seems low. Such a method allows educators to identify and compare schools in a more equitable fashion by explicitly modeling demographic differences and taking those demographic differences among schools into account when developing predicted achievement levels for the schools. This allows a very different set of schools to emerge as over- or underperforming, when compared to a more static, mean achievement based approach. Using such an analytic strategy, low-SES schools can emerge as overperforming schools whereas high-SES schools can emerge as underperforming schools. We believe that this approach to data analysis has great utility for educators, administrators, and policymakers.

Across the three sets of surveys, perceptions of parents and perceptions about parents emerge as an interesting area of differ-

ence between the two groups of schools. Although parents in the positive and negative outlier schools reported similar perceptions about parent/teacher communication, teachers and administrators in the positive outlier schools appear to have more positive perceptions of parents. Specifically, these teachers perceive the parents in their school as being more involved in their children's education, and they encourage high levels of parent involvement. Certainly, these more positive attitudes may help educators work more effectively with parents, building a more effective partnership to increase student achievement. Perhaps consequently, parents in the positive outlier schools report greater satisfaction with their schools than parents in the negative outlier schools do. It is important to note that both the positive and negative outlier schools were both composed of low-SES schools. In many studies, parental involvement may be a proxy for SES. However, in this study, we find that parental involvement and parental perceptions are key variables that help to explain differences of the overachieving and underachieving schools. Thus, communication and collaboration among parents, teachers, and staff appear to be critical factors predicting the success of low-SES schools.

The greater appreciation of parents by teachers and administrators in the positive outlier schools is an intriguing finding. The results of this research raise an interesting question: Are parents in the low-performing schools actually less involved than parents in the high-performing schools, or is it the attitudes and perceptions of the teachers that differ across these two groups? If the parents in the positive outlier schools are more involved, is this the result of the teachers' more positive attitudes toward them, or is it the cause of the teachers' more positive attitudes toward them?

Additionally, teachers in the positive outlier schools reported higher levels of support from administrators. The more positive relationships between teachers and administrators in the positive outlier schools may allow these schools to more effectively focus their attention on the needs of their students, rather than having their attention diverted by faculty and staff tensions. Although teachers report there is an overall culture of high goals and expectations for both students and teachers in both positive

and negative outlier schools, these expectations were higher and less variable in the positive outlier schools than they were in the negative outlier schools. Further, teachers in the positive outlier schools perceived that there were more nonleadership support structures in place in their schools, allowing them to be more effective instructors. To a lesser extent, differences between teachers from the two types of schools were also identified with regard to participation in valuable professional development activities, meaningful collaboration with peers, and the integration of state standards in planning instruction. Teachers in positive outlier schools also reported spending more time engaged in direct instruction and less time on discipline issues.

The themes of peer collaboration and parent participation were also echoed in the Administrator Survey. In addition, administrators in positive outlier schools viewed their teachers as being more effective instructors and reported that their teachers were more likely to use student data to make instructional decisions. Finally, administrators in positive outlier schools were less likely to report having difficulty filling teacher vacancies.

The survey results suggest an association between school climate and culture and student achievement. Given that both the positive and negative outlier schools were predominantly located in low-SES urban locales, the differences between the positive and negative outlier schools are all the more striking and intriguing. These results suggest that school climate and teacher-related variables may be able to moderate the influence of sociodemographic variables.

Limitations and Considerations for Further Investigation

Several limitations should be considered when interpreting the results of this investigation. First, the outlier schools were identified with regression models that employed a limited set of predictor variables. Variables not included in this study may prove to be better predictors of student test scores or may help

explain the relationship among the included variables and student scores. In addition, residual analyses treat the error term within a regression equation as the most salient result. However, stability and reliability of such error is questionable. Further, residual analyses in general are predicated on the assumption that important covariates are omitted from the analyses. This means that the model is misspecified, which in turn, violates one of the assumptions of the analysis, an inherent irony of residual analysis. In an effort to avoid overcapitalization on chance and random error, we only classified schools as positive or negative outliers if they exhibited large residuals in the same direction on both the reading and math achievement tests, and we feel that researchers who make use of this technique are well-advised to triangulate their data in this fashion. However, even this practice does not ensure that residual analyses render reliable results.

Schools with fewer than 20 students were excluded from the analyses; the factors investigated in this study may function differently in very small schools. Race/ethnicity was dichotomized in the regression models, and Asian students were not included in the percentage of minority students. Additional study into the patterns of student achievement across different minority groups may produce different outcomes when examined in this context.

Moreover, there are several limitations to the conclusions that can be drawn from the survey component. First, the response rate was low, particularly for the Parent Survey and the Administrator Survey. It should be noted, however, that the patterns of missingness were consistent across the positive and negative outlier school groups. This missing data may affect the representativeness of the present sample, and constitutes a notable limitation of the present investigation. Another limitation was the potential influence of social desirability in the survey responses. Still, the survey results provide preliminary insight into the factors that contribute to school success.

Most importantly, this study was designed to explore relationships among student test scores and the attitudes and beliefs of system stakeholders. Thus, it is not possible to draw causal inference from the results presented here. Although parent involve-

ment, support for instruction, and administrative support are evident in successful schools, one cannot infer from this particular study that these variables directly contribute to student achievement. Experimental research designed to manipulate these variables may or may not produce similar results.

In conclusion, the results of this study provide an interesting way to identify over- and underperforming schools. In addition, the study identified parental communication and collaboration as key components that differed across the two types of schools, suggesting that increased parent/school alliances may help to increase academic achievement, regardless of the school's clientele.

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Author Note

Endnote

1   We also examined this interaction term for the elementary and middle school models. However, because the interaction was not statistically significant, we did not include the term in the final HLM models.

Appendix A: Teacher Survey

For the following questions, please rate how strongly you agree or disagree with the following statements. In answering the questions, please use a range from **1** to **5**, where **1 = strongly disagree** and **5 = strongly agree**. Please circle only one response choice per question. Please answer every question.

Some questions ask about parents. Please consider parents as either parents or other guardians where applicable. Thank you for your participation.

	SD	D	N	A	SA
1. There are clear and focused goals for student learning at my school.	1	2	3	4	5
2. My school administrators solicit input from teachers.	1	2	3	4	5
3. I use assessment information to plan instruction.	1	2	3	4	5
4. Students in this school are engaged in learning during class-time.	1	2	3	4	5
5. Teachers in my school have high performance expectations for all students.	1	2	3	4	5
6. Parents at this school play an active role in their children's education.	1	2	3	4	5
7. I collaborate with other teachers to plan instruction and select curricular materials.	1	2	3	4	5
8. I use pre-tests to measure students' prior knowledge.	1	2	3	4	5
9. Most teachers work at school more than the required hours.	1	2	3	4	5
10. My school administrators have an awareness of the expertise of the teachers.	1	2	3	4	5
11. We have adequate support staff in my school.	1	2	3	4	5

	SD	D	N	A	SA
12. Students need to pay more attention than they usually do.	1	2	3	4	5
13. I assess every learning objective that I teach.	1	2	3	4	5
14. I can freely express my opinions or concerns to my school administrators.	1	2	3	4	5
15. Student misbehavior frequently interferes with classroom learning.	1	2	3	4	5
16. Professional development is integrated with our school goals.	1	2	3	4	5
17. Teachers in this school respect racial and ethnic diversity of students.	1	2	3	4	5
18. I share assessment criteria with students before the assessment.	1	2	3	4	5
19. Teachers have the opportunity to be involved in making important decisions in this school.	1	2	3	4	5
20. Students at this school feel welcome and valued regardless of their racial/ethnic background.	1	2	3	4	5
21. I have the resources and supplies that I need to be successful with my students.	1	2	3	4	5
22. I do background reading and research to enhance my curriculum.	1	2	3	4	5
23. Most of my class-time is spent on instructional activities.	1	2	3	4	5
24. Administrators are available to handle discipline problems.	1	2	3	4	5
25. I have regular contact with my students' parents.	1	2	3	4	5
26. My school provides a variety of ways for parents to become involved.	1	2	3	4	5
27. I am comfortable explaining the results of standardized assessments (like the CMT/CAPT) to students and parents.	1	2	3	4	5

	SD	D	N	A	SA
28. Professional development opportunities at this school help me to grow professionally.	1	2	3	4	5
29. Teachers have the opportunity to be involved in establishing the curriculum and instructional program.	1	2	3	4	5
30. Teachers have input in planning professional development at this school.	1	2	3	4	5
31. I am confident in my ability to effectively teach the curriculum.	1	2	3	4	5
32. Parents participate in important decisions about their children's education.	1	2	3	4	5
33. There are continuous opportunities for professional development in my school.	1	2	3	4	5
34. I receive useful suggestions for curricular materials from my colleagues in my school/department.	1	2	3	4	5
35. Teachers meet regularly to assess student progress.	1	2	3	4	5
36. Students are attentive to teacher delivered instruction.	1	2	3	4	5
37. Teachers in this school feel valued by the school administration.	1	2	3	4	5
38. This school is clean and well maintained.	1	2	3	4	5
39. I feel pressured to ensure that my students will do well on the state tests.	1	2	3	4	5
40. Teacher initiated innovations in curriculum or instructional delivery are valued at my school.	1	2	3	4	5
41. The curriculum in this school is strongly aligned to state standards.	1	2	3	4	5
42. Parents attend parent-teacher conferences when requested.	1	2	3	4	5
43. Parents are welcome in the classroom.	1	2	3	4	5

	SD	D	N	A	SA
44. I receive useful suggestions for instructional techniques from my colleagues in my school/department.	1	2	3	4	5
45. The staff at this school maintains positive relations with parents.	1	2	3	4	5
46. I would send my own child to this school.	1	2	3	4	5
47. Information about homework and classroom assignments is easy for parents to access.	1	2	3	4	5
48. My principal supports my classroom management decisions.	1	2	3	4	5
49. Instructional materials are available in students' home languages.	1	2	3	4	5
50. Cultural barriers are evident between teachers and parents at this school.	1	2	3	4	5
51. Our school needs additional instructional supplies and/or equipment.	1	2	3	4	5
52. Teachers in my school emphasize higher-level thinking and problem-solving skills in their instruction.	1	2	3	4	5
53. There are ample opportunities to discuss curricular and instructional decisions with the administration in my school.	1	2	3	4	5
54. Teachers in my school use the current State of Connecticut content standards to plan instruction.	1	2	3	4	5
55. One or more colleagues have observed my work and given me meaningful feedback in the last year.	1	2	3	4	5
56. There are ample opportunities to discuss behavioral and disciplinary decisions in my school.	1	2	3	4	5
57. My administrator observed me enough times to make a fair evaluation of my teaching.	1	2	3	4	5

	SD	D	N	A	SA
58. Class size in my school is appropriate for effective instruction.	1	2	3	4	5
59. Professional development in our school is organized around a central theme.	1	2	3	4	5
60. Teachers are able to ask questions and provide feedback about important decisions in this school.	1	2	3	4	5
61. My school administrators listen to teachers' ideas for change in our school.	1	2	3	4	5
62. I know the current state of Connecticut content standards for my subject area(s).	1	2	3	4	5
63. Students clearly understand this school's discipline code.	1	2	3	4	5
64. The school administrators have a positive relationship with the teachers in this school.	1	2	3	4	5
65. There is relevant professional development to improve instruction at my school.	1	2	3	4	5
66. Rules regarding behavior are enforced consistently at my school.	1	2	3	4	5
67. My school administrators have a solid knowledge of the curriculum.	1	2	3	4	5
68. My school has up-to-date technology to assist with student learning.	1	2	3	4	5
69. Discipline problems at my school are handled fairly.	1	2	3	4	5
70. My principal is an effective leader.	1	2	3	4	5

If you were not satisfied with your students' progress, how likely are you to use each of the following strategies?

Please rate your responses on a scale of 1 to 5 where 1 = Definitely not, 2 = Probably not, 3 = Maybe, 4 = Probably, 5 = Definitely.

Strategy Use	DN	PN	M	P	D
1. Change curricular/reading materials	1	2	3	4	5
2. Assess students in different ways	1	2	3	4	5
3. Provide more class time for practice	1	2	3	4	5
4. Offer additional help outside of class	1	2	3	4	5
5. Make instruction more relevant to students' lives	1	2	3	4	5
6. Present the material in a different way	1	2	3	4	5
7. Conduct ongoing or more frequent diagnostic assessments	1	2	3	4	5
8. Refer students for instructional support	1	2	3	4	5
9. Consult with other teachers	1	2	3	4	5
10. Talk to students' parents	1	2	3	4	5
11. Schedule conferences with students	1	2	3	4	5

In a given 45-minute period, how many minutes do you apportion to the following activities?

- Administrative issues   _____
- Direct instruction   _____
- Indirect instruction (such as silent reading or the completion of homework in the classroom)   _____
- Discipline issues   _____

_____
45 minutes

How much time do students in your class(es) spend on homework each night?

❏ Less than ½ hour

❏ More than ½ hour and less than 1 hour

❏ More than 1 hour and less than 2 hours

❏ More than 2 hours and less than 3 hours

❏ More than 3 hours

In the past year, I have had professional development on the following topics:
(Check all that apply).

- **If you check yes-** For each professional development opportunity that you attended, rate the quality of the professional development on a scale of 1-10, where 1 = very poor quality and 10 = Outstanding quality.

Professional Development Opportunity	Attended?	Rating
Differentiating instruction for heterogeneous groups of students		
Teaching English Language Learners (ELL)		
Linking assessment/performance data to instructional strategies		
Math instruction for low-performing students		
Literacy instruction for low performing students		
Science instruction for low performing students		
Analyzing low-performing student data		
Preparing students for standardized tests		
Gifted and talented students		
Students with special needs		
Thinking skills		

Professional Development Opportunity	Attended?	Rating
Instruction for students from lower socioeconomic status backgrounds		
Multicultural/diversity issues		
Student behavior and discipline/ Classroom management		
Increasing parent/community involvement		
Other: _____		

Appendix B: Questions From the Parent Survey

1. Parents have the opportunity to be involved in making important decisions in this school.
2. I feel welcome in my child's school.
3. The curriculum at my child's school is geared towards preparation for the state test.
4. I have regular contact with my child's teachers.
5. There are clear and focused goals for student learning at my child's school.
6. I attend school-wide special events.
7. Students at this school feel welcome and valued regardless of their racial/ethnic background.
8. Teachers communicate with me frequently about my child's progress in school.
9. School staff have invited me to school for meetings and/or events.
10. Parent input is valued by the school administration.
11. I am regularly informed of my child's classroom progress.
12. My child is prepared for the next grade level by the end of the school year.

13. My child's school provides a variety of ways for parents to become involved with the school.
14. I would recommend my child's school to other parents.
15. My phone calls or e-mails are returned promptly by the staff at my child's school.
16. I understand what is expected of my child at school.
17. Information about homework and class assignments is easy for parents to access.
18. The staff at my child's school helps me to understand the results of state tests (like the Connecticut Mastery Tests).
19. The principal at my child's school is an effective leader.
20. I attend parent-teacher conferences.
21. Overall, I am satisfied with my child's school.
22. My child is given challenging work in all classes.
23. Teachers and administrators understand the culture and values of the community.