DOCUMENT RESUME

ED 451 316 UD 034 097

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|---|---|
| TITLE | Impact of Student Attendance, Teacher Certification and Teacher Absence on Reading and Mathematics Performance in Elementary and Middle Schools in New York City. Flash Research Report #3. |
| INSTITUTION | New York City Board of Education, Brooklyn. Div. of Assessment and Accountability. |
| PUB DATE | 2000-11-14 |
| NOTE | 9p.; For Flash Research Reports 1 and ;2, see UD 034 095 and 096. |
| AVAILABLE FROM | New York City Board of Education, Division of Assessment and Accountability, 110 Livingston Street, Room 728, Brooklyn, NY 11201. Web site: http://www.nycenet.edu. |
| PUB TYPE | Reports - Research (143) |
| EDRS PRICE | MF01/PC01 Plus Postage. |
| DESCRIPTORS | *Attendance Patterns; Elementary Secondary Education; *Employee Absenteeism; English (Second Language); *Mathematics Achievement; Poverty; *Reading Achievement; Special Education; Student Characteristics; Students; *Teacher Attendance; *Teacher Certification; Urban Schools |
| IDENTIFIERS | New York |

ABSTRACT

This report examined the extent to which student attendance, teacher certification, and teacher absence explained differences in reading and mathematics achievement among elementary and middle schools in New York City (beyond that explained by such student demographics as receiving free lunch, being an English language learner, and receiving special education services). Multiple regression analysis indicated that student attendance and teacher certification rates were positively and significantly related to student outcomes on mathematics and reading achievement tests, even after factoring out the effects of student demographics. However, average teacher attendance had no significant effects. These results were obtained for both elementary and middle schools. The effect of student attendance was greater than that for percentage of certified teachers in middle schools, but not in elementary schools, where the effects were of the same magnitude. (SM)

# IMPACT OF STUDENT ATTENDANCE, TEACHER CERTIFICATION AND TEACHER ABSENCE ON READING AND MATHEMATICS PERFORMANCE IN ELEMENTARY AND MIDDLE SCHOOLS IN NEW YORK CITY
## FLASH RESEARCH REPORT #3

November 14, 2000

Division of Assessment & Accountability
New York City Board of Education

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# FLASH RESEARCH REPORT #3

## Impact of Student Attendance, Teacher Certification and Teacher Absence on Reading and Mathematics Performance in Elementary and Middle Schools in New York City

## KEY FINDINGS

- As much as 82.5 percent of variation in standardized reading and mathematics test scores is explained by student demographics, student attendance and teacher certification, combined. Teacher attendance does not add to the explanation of test scores.
- After controlling for student demographics, student attendance explained as much as 13.9 percent of variation in students' reading and mathematics test scores. Teacher certification explained as much as an additional 2.1 percent of variation in these scores[a]. The explanatory power for each of these variables is statistically significant.
- The relationship between student attendance and reading and mathematics test scores was stronger than that for certified teachers in middle schools, but about the same in elementary schools.
- A 10 percentage point increase in a school's rate of student attendance was associated with an increase of as much as 4.2 percentage points in test scores. A 10 percent increase in teacher certification was associated with an increase of as much as 3.6 percentage points in achievement outcomes.

## BACKGROUND

Flash Research Reports #1 and #2[b] identified a strong positive relationship between teacher certification and student achievement outcomes over and above the impact of student demographic characteristics. Flash Research Report #3 extends these investigations by examining the combined impact of student attendance, teacher certification and teacher absence on student outcomes in reading and mathematics. The report addresses the following question: to what extent do student attendance, teacher certification and teacher absence explain differences in achievement among schools beyond that explained by the demographics of the students?

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[a]The impact of teacher certification rates is somewhat diminished compared to Flash Research Report #2. In that report, teacher certification was examined after accounting for student demographics alone. In this report, teacher certification is examined after accounting for both student demographics and student attendance.

[b]Flash Research Report #1 examined the impact of the extended-time initiative on student performance and recruitment of certified teachers in Schools Under Registration Review (SURR). The relationship between teacher certification and students' academic performance was further examined in Flash Research Report #2.

## METHODOLOGY

Flash Research Report #3 uses multiple regression analysis to study the amount of variance in student achievement that is explained by student attendance, teacher certification and teacher absence rates over and above the amount of variance explained by student demographic characteristics.

The student demographics considered in these analyses are the percentages of students receiving free lunch, identified as English language learners and receiving special education services. Student attendance is defined as the percentage of days present in comparison to the total number of days present and absent. Teacher absence is defined as the average number of days that teachers were absent. Teacher certification rate is defined as the percentage of certified teachers in the school during the 1999-2000 school year.

Separate multiple regression analyses were conducted for elementary and middle schools on reading test scores in grades 3-7, and mathematics test scores in grades 3, 5, 6, and 7. The percentages of students who met grade performance standards (levels 3 and 4) were regressed separately on the explanatory variables.

## FINDINGS

Flash Research Report #3 indicates that student attendance and teacher certification rates are positively and significantly related to student outcomes but that average attendance has no significant relationship. Tables 1-4 report the results of the multiple regression analyses for achievement at levels 3 and 4 on reading and mathematics tests for elementary and middle schools separately. Tables 1 and 2 show the percentages of variance in reading accounted for by the explanatory variables for elementary and middle schools, respectively. As expected, student demographics (i.e., free lunch, ELL, and special education) explained more than 60 percent of the score variation in each analysis. Beyond student demographics, student attendance rates accounted for an additional 8 percent of the variance in elementary reading test scores and 13.9 percent in middle schools. Percentage of certified teachers accounted for an additional 1.7 and 1.1 percent of reading score variance, respectively. The results for mathematics test scores, presented in Tables 3 and 4, were similar to those for reading.

Tables 5-8 present the results of tests of statistical significance and the relative change in test scores for each unit change in the explanatory variables, i.e. **B** weights. Except for teacher absence, the relationships between test scores and all explanatory variables were statistically significant. The **B** weights in Table 5 indicate that, for each percentage point increase in elementary school student attendance, there was a .29 percentage point increase in the percentage of students meeting or exceeding standards. Beyond that, there was a .28 increase in reading scores for each percentage point increase in certified teachers. By extrapolation, an increase of 10 percentage points in either student attendance or certified teachers would yield about a three percentage point increase in reading scores. The middle school data in Table 6 show a larger impact on reading for 10 percentage point increases in student

attendance (about 4 percentage points) than certified teachers (about 2 percentage points). The data for mathematics in Tables 7 and 8 show similar results to those for reading.

## CONCLUSIONS

Flash Research Report #3 indicates that student attendance and teacher certification rates have significant and meaningful effects on the percentage of students meeting or exceeding standards on tests of reading and mathematics, even after the effects of student demographics are factored out. Teacher attendance showed no significant effects. These results were obtained for both elementary and middle schools. The effect of student attendance was greater than that for the percentage of certified teachers in middle schools, but not in elementary schools, where the effects were of the same magnitude.

**Table 1**
**Results of the Regression of Percent of Elementary School Students Scoring at Levels 3 and 4 in Reading on Student Demographics, Student Attendance, Percent of Certified Teachers, and Teacher Absence**

| Step in the Regression Analysis | Variables Entered | Multiple Correlation R | % Explained Variance $R^2$ | % Additional Explained Variance $R^2$ Change |
|---|---|---|---|---|
| 1 | • Percent Free Lunch<br>• Percent ELL<br>• Percent Special Education | .83 | 70.1 | -- |
| 2 | Percent Student Attendance | .88 | 78.3 | 8.2 |
| 3 | Percent Certified Teachers | .89 | 80.0 | 1.7 |
| 4 | Percent Teacher Days Absent | .89 | 80.0 | 0.0 |

**Table 2**
**Results of the Regression of Percent of Middle School Students Scoring at Levels 3 and 4 in Reading on Student Demographics, Student Attendance, Percent of Certified Teachers, and Teacher Absence**

| Step in the Regression Analysis | Variables Entered | R | $R^2$ | $R^2$ Change |
|---|---|---|---|---|
| 1 | • Percent Free Lunch<br>• Percent ELL<br>• Percent Special Education | .82 | 67.6 | -- |
| 2 | Percent Student Attendance | .90 | 81.4 | 13.9 |
| 3 | Percent Certified Teachers | .91 | 82.5 | 1.1 |
| 4 | Percent Teacher Days Absent | .91 | 82.5 | 0.0 |

**Table 3**
**Results of the Regression of Percent of Elementary School Students Scoring at Levels 3 and 4 in Mathematics on Student Demographics, Student Attendance, Percent of Certified Teachers, and Teacher Absence**

| Step in the Regression Analysis | Variables Entered | Multiple Correlation R | % Explained Variance $R^2$ | % Additional Explained Variance $R^2$ Change |
|---|---|---|---|---|
| 1 | • Percent Free Lunch<br>• Percent ELL<br>• Percent Special Education | .81 | 65.5 | -- |
| 2 | Percent Student Attendance | .86 | 74.1 | 8.5 |
| 3 | Percent Certified Teachers | .87 | 76.2 | 2.1 |
| 4 | Percent Teacher Days Absent | .87 | 76.2 | 0.0 |

**Table 4**
**Results of the Regression of Percent of Middle School Students Scoring at Levels 3 and 4 in Mathematics on Student Demographics, Student Attendance, Percent of Certified Teachers, and Teacher Absence**

| Step in the Regression Analysis | Variables Entered | R | $R^2$ | $R^2$ Change |
|---|---|---|---|---|
| 1 | • Percent Free Lunch<br>• Percent ELL<br>• Percent Special Education | .80 | 63.4 | -- |
| 2 | Percent Student Attendance | .87 | 75.5 | 12.1 |
| 3 | Percent Certified Teachers | .88 | 77.5 | 2.0 |
| 4 | Percent Teacher Days Absent | .88 | 77.6 | 0.1 |

**Table 5**
**Tests of Significance for Variable B Coefficients in Regression of Percent of Elementary Students in Levels 3 and 4 in Reading**

| Variable | B | Standard Error B | T |
|---|---|---|---|
| Percent Free Lunch | -.34 | .02 | -18.31* |
| Percent ELL | -.14 | .04 | -3.23* |
| Percent Special Education | -.29 | .04 | -6.86* |
| Percent Student Attendance | .29 | .02 | 11.68* |
| Percent Certified Teachers | .28 | .04 | 7.30* |
| Average Teacher Days Absent | -.08 | .01 | -.53 (no significant difference) |

*p < .01.

**Table 6**
**Tests of Significance for Variable B Coefficients in Regression of Percent of Middle School Students in Levels 3 and 4 in Reading**

| Variable | B | Standard Error B | t |
|---|---|---|---|
| Percent Free Lunch | -.24 | .04 | -5.48* |
| Percent ELL | -.37 | .08 | -4.52* |
| Percent Special Education | -.50 | .12 | -4.11* |
| Percent Student Attendance | .42 | .04 | 11.04* |
| Percent Certified Teachers | .21 | .07 | 3.24* |
| Average Teacher Days Absent | .01 | .04 | .23 (no significant difference) |

*p < .01.

**Table 7**
**Tests of Significance for Variable B Coefficients in Regression of Percent of Elementary Students in levels 3 and 4 in Mathematics**

| Variable | B | Standard Error B | t |
|---|---|---|---|
| Percent Free Lunch | .-.39 | .02 | -16.76* |
| Percent ELL | .03 | .05 | .63 (no significant difference) |
| Percent Special Education | -.30 | .05 | -5.72* |
| Percent Student Attendance | .33 | .03 | 10.70* |
| Percent Certified Teachers | .36 | .05 | 7.45* |
| Average Teacher Days Absent | -.17 | .19 | -.88 (no significant difference) |

*p < .01.

**Table 8**
**Tests of Significance for Variable B Coefficients in Regression of Percent of Middle School Students in levels 3 and 4 in Mathematics**

| Variable | B | Standard Error B | t |
|---|---|---|---|
| Percent Free Lunch | -.24 | .05 | -4.97* |
| Percent ELL | -.33 | -.08 | -4.11* |
| Percent Special Education | -.38 | .13 | -3.00* |
| Percent Student Attendance | .37 | .04 | 9.01* |
| Percent Certified Teachers | .27 | .07 | 3.81* |
| Average Teacher Days Absent | .03 | .04 | .74 (no significant difference) |

*p < .01.

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