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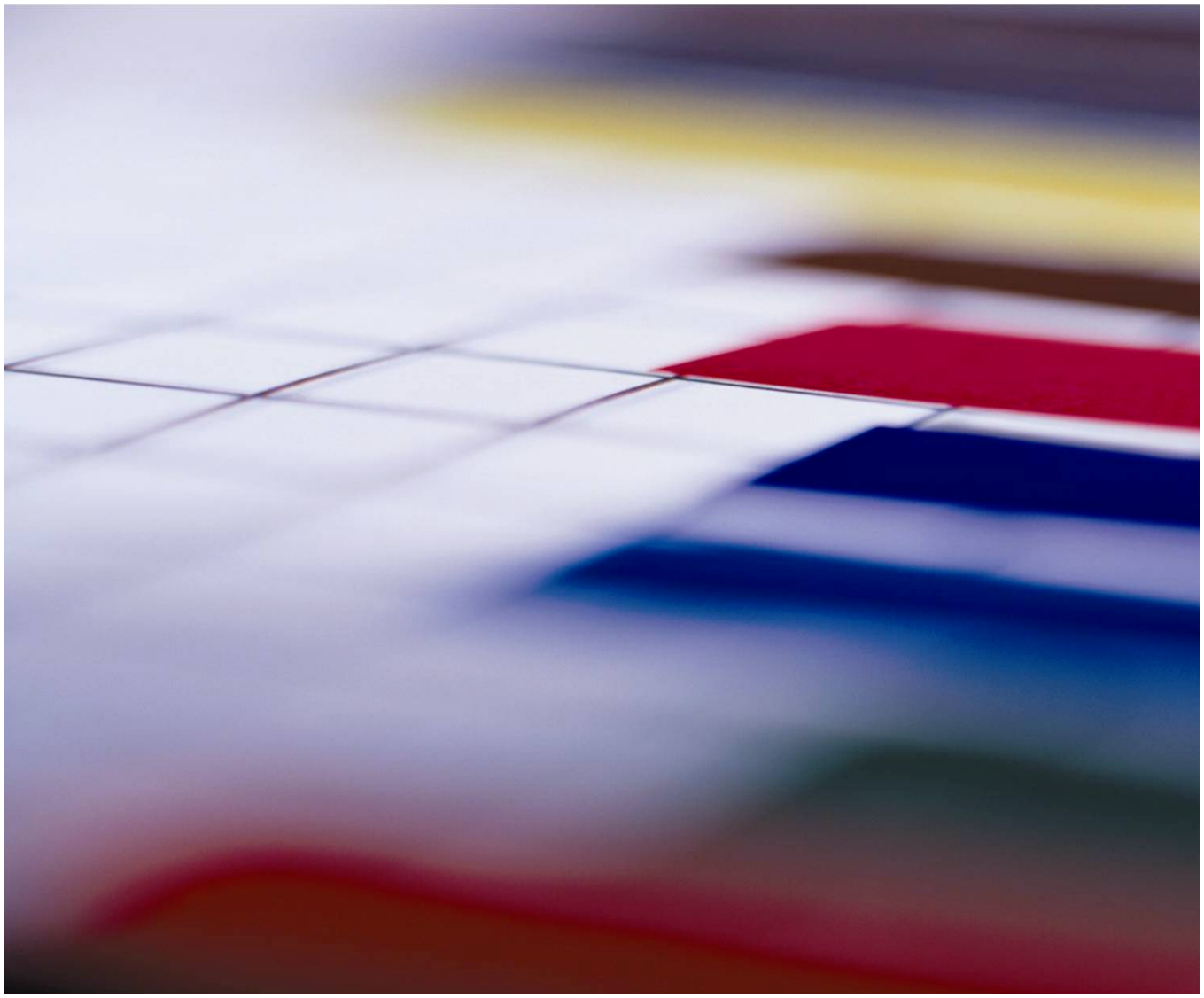
East High Foundation Tutoring Program

Evaluation Report



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East High Foundation Tutoring Program
Executive Summary

Introduction

The overall purpose of this evaluation was to examine educational outcomes for students participating in the 20/20 Vision Tutorial Program at East High School. This program attempts to help middle school students who are low achievers in mathematics succeed academically in their coursework and on the Tennessee Comprehensive Assessment Program (TCAP) through tutoring and remediation work. In 2005-06, nearly 70 seventh and eighth grade students ("Scholars") received tutoring from approximately 40 high-achieving high school sophomores, juniors and seniors.

Research Questions

This preliminary evaluation focuses on the following research questions.

1. What are the impacts of the tutoring program on tutored students' achievement on the mathematics subtest of the TCAP?
2. Which students receive tutoring and how do they compare to the overall East High School student population with regard to poverty, gender, and prior achievement?

Design and Instrumentation

This study examined educational outcomes using both descriptive and inferential (comparative) statistical analyses. The research design compared the 2005-06 TCAP mathematics subtest scores of tutored East High School students (Scholars) to the scores of East High School seventh and eighth grade students who were not tutored (Control group). To increase the precision of the analyses, students' prior mathematics achievement ("pretest" scores) on the TCAP were used as a "covariate" (i.e., baseline measure).

Participants

This study analyzed the TCAP data of 37 seventh grade and 30 eighth grade Scholars. In the Control group, data on 77 seventh grade students and 105 eighth grade students were analyzed.

Procedure

To scientifically and objectively examine program impacts on student achievement, TCAP scores in mathematics from spring 2006 were the primary outcome measure. TCAP analysis examined:

- Scholars' mathematics subtest proficiency levels relative to the prior year and to the year-to-year change.
- Scholars' achievement scores on the mathematics subtest (number of items correct) in spring 2006 compared to their scores in spring 2005.
- Scholars' achievement scores on the mathematics subtest (number of items correct) in spring 2006 compared to those of non-tutored students at East High School.

In addition, seventh and eighth grade students' demographic data were analyzed to determine which students receive tutoring and how they compare to the overall East High School student population with regard to poverty, gender, and prior achievement.

Results

Demographic data showed the Control and Scholar groups to be similar in ethnicity, gender, and meal status. However, Scholars scored significantly higher than Controls prior to participating in the program for both seventh and eighth graders. On the posttest (2006 TCAP), however, after adjusting for prior achievement, the seventh grade Scholars significantly out-performed the Control students. Specifically, the 2005-06 mean scores (adjusted for 2004-05 achievement) were 37.04 for the seventh-grade Scholars and only 30.96 for their Control student counterparts. This difference approximated a full standard deviation, which would be considered a very strong and meaningful educational effect.

For eighth graders, it was not feasible to adjust for prior achievement based on distribution properties. However, comparison between groups suggested the tutoring program was most effective for those students with low prior math achievement.

Two analyses were conducted to assess seventh and eighth grade students' proficiency levels on the 2005-06 TCAP math subtest (below proficient, proficient, and advanced) according to their treatment group (Scholars vs. Controls). Results showed that Scholars obtained high rates of proficiency and that more Scholars grew to advanced levels than did Controls.

Summary of Results and Conclusions

1. Scholars had higher prior (pre-tutoring program) achievement scores than did non-Scholars (Control students) enrolled in the same grades at East High School. Thus, of students in need of tutoring, the lowest performing students seem less likely than others to participate as Scholars. One suggestion would be to concentrate some of the efforts of the foundation's program on the in-school classes of lower performing students, since those students may not seek out the after-school program.
2. Recruitment efforts for future programs might focus, to the extent possible, on the lowest achievers in the grades involved.
3. Following statistical adjustments for prior (sixth-grade) achievement, seventh-grade Scholars significantly outperformed Control students. The difference in group means, which approximated a full standard deviation, is indicative of a strong and educationally meaningful effect.

East High Foundation Tutoring Program
Evaluation Report

Introduction

The overall purpose of this evaluation was to examine educational outcomes for students participating in the 20/20 Vision Tutorial Program at East High School. East High School served grades 7-12 in 2005-06 and is part of the Memphis City Schools system. The East High tutoring program attempts to help middle school students who are low achievers in mathematics succeed academically in their coursework and on the Tennessee Comprehensive Assessment Program (TCAP). The goal of the East High School Foundation for the 20/20 Vision Tutoring Program is to provide high-quality tutoring and remediation work that yields strong and measurable benefits for student participants. In 2005-06, nearly 70 seventh and eighth grade students ("Scholars") were tutored by approximately 40 high-achieving high school sophomores, juniors and seniors. Four Memphis City Schools teachers work with the staff at East High School to train the tutors. Tutoring sessions are conducted during the school year and also in the summer.

Research Questions

This preliminary evaluation focuses on the following research questions.

1. What are the impacts of the tutoring program on tutored students' achievement on the mathematics subtest of the TCAP?
2. Which students receive tutoring and how do they compare to the overall East High School student population with regard to poverty, gender, and prior achievement?

Design and Instrumentation

This study examined educational outcomes using both descriptive and inferential (comparative) statistical analyses. The research design compared the 2005-06 TCAP mathematics subtest scores of tutored East High School students (Scholars) to the scores of East High School seventh and eighth grade students who were not tutored (Control group). The TCAP is a criterion-referenced measure that indicates students' proficiencies based on minimum passing scores for designation as "Proficient," or "Advanced," as opposed to the lower performance levels of "Basic" or "Below Basic." Because these criterion-referenced

performance levels represent broad categories with relatively wide ranges of scores, they are not highly sensitive for program evaluation. Accordingly, while we report proficiency levels for the Scholars and Control group, the primary analysis was conducted on the students' raw scores (i.e., actual number correct). In addition, to increase the precision of the analyses, students' prior mathematics achievement ("pretest" scores) on the TCAP were used as a "covariate" (i.e., baseline measure).

Participants

This study analyzed the TCAP data of 37 seventh grade and 30 eighth grade Scholars. Because of missing TCAP data, one tutored student in each seventh and eighth grade was excluded from the analysis. In the Control group, data on 77 seventh grade students and 105 eighth grade students were analyzed. In the Control group, 9 students in seventh grade and 12 students in eighth grade were excluded from analysis due to missing data. More demographic data are offered in the results section.

Procedure

To scientifically and objectively examine program impacts on student achievement, TCAP scores in mathematics from spring 2006 were the primary outcome measure. While course grades are also indicative of student progress and interest in academic attainment, they are highly subject to variations in teacher standards, class distributions, and possible grading bias. Thus, they were not used in this evaluation. The TCAP analysis examined:

- Scholars' mathematics subtest proficiency levels relative to the prior year and to the year-to-year change.
- Scholars' achievement scores on the mathematics subtest (number of items correct) in spring 2006 compared to their scores in spring 2005.
- Scholars' achievement scores on the mathematics subtest (number of items correct) in spring 2006 compared to those of non-tutored students at East High School.

"Pretest" (2004-05) and "posttest" (2005-06) TCAP mathematics scores of all East High School seventh- and eighth-graders were obtained with assistance from the Office of Research, Evaluation, and Assessment at Memphis City Schools and then analyzed. For the eighth graders, the 2004-05 pretest scores were obtained only for those who attended seventh grade at East High. In the case of the 2005-06 seventh graders, all would have attended sixth grade in 2004-05 at a school (middle or elementary) other than East High, so all sixth grade data were included.

In addition, seventh and eighth grade students' demographic data were analyzed to determine which students receive tutoring and how they compare to the overall East High School student population with regard to poverty, gender, and prior achievement.

Results

Results are reported below for TCAP score comparisons between tutored East High School seventh and eighth grade students and Control group students. Demographic data were analyzed to determine which students receive tutoring. The students' grade level, gender, and meal status by participation status are presented in Table 1. As can be seen from the table, the Scholars were fairly evenly divided in gender. In addition, Control and Scholar groups had similar levels of family income status, with approximately 90% of both groups qualifying for free or reduced-price lunch.

Table 1: Frequencies of Student Demographics

	Scholars		*Control*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*
Grade Level						
7th	37	55.2	77	42.3	114	45.8
8th	30	44.8	105	57.7	135	54.2
Gender						
Female	33	49.3	103	56.6	136	54.6
Male	34	50.7	79	43.4	113	45.4
Meal Status						
Free/Reduced	60	89.6	161	88.5	221	88.8
Full Pay	7	10.4	21	11.5	28	11.2

Number Correct on TCAP

Two separate one-way ANCOVAs were used to examine the differences in seventh and eighth grade students' academic performance based on whether or not they participated in the tutoring program at East High School (Scholars vs. Control).[1] The dependent (outcome) variable was the number of items answered correctly on the 2005-06 TCAP mathematics subtest. The students' prior mathematics achievement on the 2004-05 TCAP was considered as a covariate (baseline).

[1] ANCOVA refers to "Analysis of Covariance," which compares the means of two or more groups after adjusting (controlling) for the influences of individual differences (called "covariates") that significantly relate to achievement. In this case, the covariate was prior achievement (in 2004-05), as described in the narrative.

To determine group equivalence on prior achievement at baseline for each grade level, two separate independent *t*-tests on students' prior math achievement were performed. The results indicated that the mean prior math achievement scores for Scholars were significantly higher than scores for the Control students for both seventh and eighth graders. As seen in Table 2, the 37 seventh grade Scholars' mean baseline math TCAP score was 35.03, compared to the 77 Control group students' mean baseline score of 25.94. For eighth grade students, these scores were 32.43 and 28.48, respectively. Table 2 presents the results of baseline comparisons.[2]

Table 2 Baseline Mathematic Performance Comparison by Grade Level

	Scholars			*Control*					
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**df**	**t**	**p**
7th Grade	37	35.03	6.80	77	25.94	8.79	112	5.54	< .001
8th Grade	30	32.43	8.46	105	28.48	9.00	133	2.15	.03

The findings from the ANCOVA test with adjusted means for seventh grade students are presented in Table A.1 (appendix). Those results showed the following. First, as would be expected, the 2004-05 sixth grade (prior) achievement scores significantly related to the 2005-06 seventh grade achievement scores.[3] Second, and most importantly, following adjustments for prior achievement, the Scholars out-performed the Control students. Specifically, the 2005-06 mean scores (adjusted for 2004-05 achievement) were 37.04 for the seventh-grade Scholars and only 30.96 for their Control student counterparts. This difference approximated a full standard deviation (Cohen's $d = 1.1$), which would be considered a very strong and meaningful educational effect.

[2] Further statistical tests of the properties of the seventh-grade scores and distributions (not reported here) justified usage of the ANCOVA in examining posttest scores.
[3] In more technical language, the prior achievement "covariate" was statistically significant. Thus, adjusting for prior achievement served to provide a more powerful test of group differences.

For eighth graders, preliminary analysis did not justify using ANCOVA (or other comparisons of means) based on properties of the Scholars and Control group score distributions.[4] Therefore, the data analysis examined how eighth graders in the two groups performed on the 2005-06 TCAP math subtest in relation to their prior achievement. The results suggested the tutoring program was most effective for those students with low prior math achievement (interested readers can view the scatterplot in Figure 1 in the Appendix). In other words, Scholars with relatively low seventh grade achievement scores showed the strongest tendency to perform higher than statistically predicted as eighth graders.

Proficiency Level

Two 3x2 frequency analyses were conducted to assess seventh and eighth grade students' proficiency levels on the 2005-06 TCAP math subtest (below proficient, proficient, and advanced) according to their treatment group (Scholars vs. Controls). Results were significant and strong for both seventh grade ($\chi^2 = 23.91$, df = 2, N = 123, $p < .001$, Cramer's V = .46) and eighth grade ($\chi^2 = 7.98$, df = 2, N = 146, $p = .019$, Cramer's V = .24). Table 3 summarizes the findings from the chi-square analysis. Echoing the earlier results that Scholars had higher baseline scores than Control group students, it is interesting to note that none of the tutored seventh grade students had baseline TCAP proficiency levels below proficient, while nearly half (47%) of the Control group had baseline scores below proficient. Despite the differences between Scholars and Controls at baseline, it is to be noted that more Scholars grew to advanced levels than did Controls. The percentage of advanced seventh grade Scholars at baseline (16%) grew to 38% after tutoring, while the 5% of Control students at the advanced level only grew to 8% at the end of their seventh grade testing period. For eighth grade students, only one student scored at the below-proficient level after receiving tutoring, while 28% of Control students scored at this level.

[4] Recall that Scholars scored significantly higher than control group students prior to participating in the program (i.e., when they were seventh graders). Thus, the inability to use ANCOVA (based on violations of required data properties) precluded adjusting for prior achievement, and thus, being able to conduct a fair comparison of eighth-grade 2005-06 scores.

Table 3. Chi-square analysis of students' proficiency levels and participation in tutoring program

2005 (baseline) TCAP						
	Proficiency	***Treatment***	***Control***	***χ2***	***p***	***Cramer's V***
7th Grade	Below Proficient	0	47%	26.11	< 0.001	0.48
	Proficient	84%	48%			
	Advanced	16%	5%			
8th Grade	Below Proficient	13%	32%	4.19	0.123	NA
	Proficient	73%	57%			
	Advanced	13%	11%			

2006 TCAP						
Grade Level	***Proficiency***	***Treatment***	***Control***	***χ2***	***p***	***Cramer's V***
7th Grade	Below Proficient	0	30%	23.91	< .001	.46
	Proficient	62%	62%			
	Advanced	38%	8%			
8th Grade	Below Proficient	3%	28%	7.98	.019	.24
	Proficient	77%	58%			
	Advanced	20%	14%			

Summary of Results and Conclusions

1. Scholars had higher prior (pre-tutoring program) achievement scores than did non-Scholars (Control students) enrolled in the same grades at East High School. Thus, of students in need of tutoring, the lowest performing students seem less likely than others to participate as Scholars. One suggestion would be to concentrate some of the efforts of the foundation's program on the in-school classes of lower performing students, since those students may not seek out the after-school program.
2. Following statistical adjustments for prior (sixth-grade) achievement, seventh-grade Scholars significantly outperformed Control students. The difference in group means, which approximated a full standard deviation, is indicative of a strong and educationally meaningful effect.
3. Although properties of the score distributions precluded comparing the achievement means of eighth-grade Scholars and Control students, correlational analyses indicated stronger program benefits for Scholars having lower prior achievement. On this basis,

recruitment efforts for future programs might focus, to the extent possible, on the lowest achievers in the grades involved.

Appendix

Table A1: Mathematic performance in 7th grade students participating tutoring program: ANCOVA results

Source of Variance	*Mean Square*	*df*	*F*	*p*	*eta²*
Treatment	724.37	1	23.48	< .001	.18
Prior Achievement (Covariate)	4007.31	1	129.91	< .001	.54
Error	30.85	111			
Interaction					
Treatment * Prior Knowledge	2.57	1	.082	.774	NA
Groups	***N***	***M***	***SD***	***Adjusted M***	
Scholars	37	41.51	7.50	37.035	
Control	77	28.81	8.43	30.957	

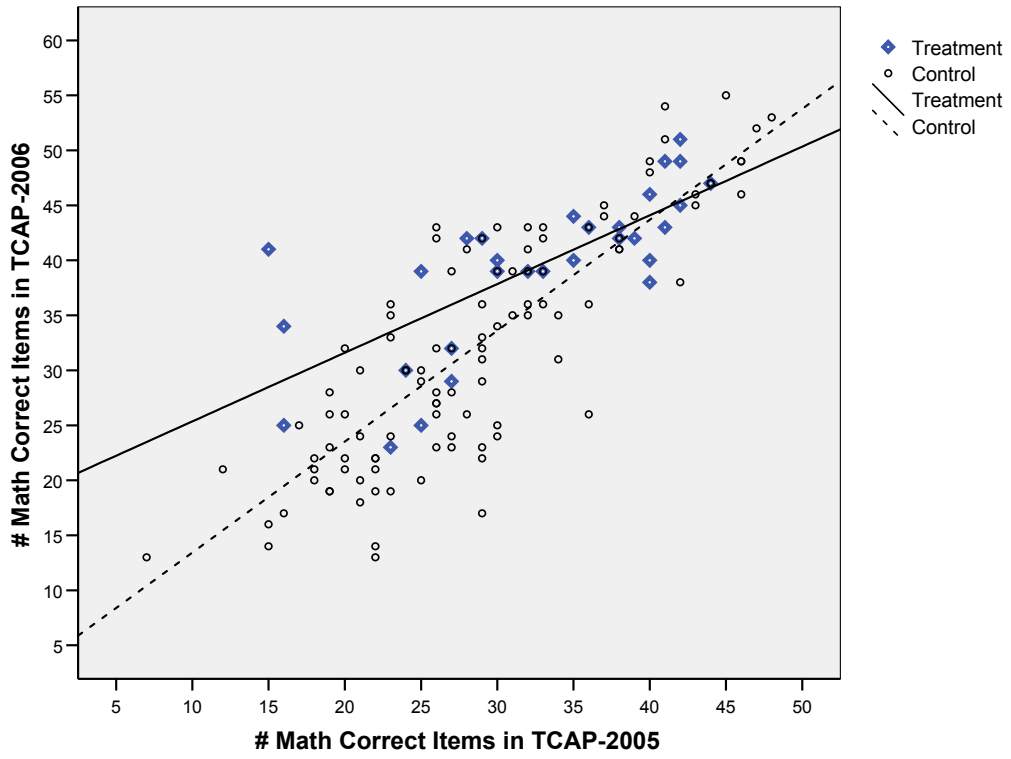

Figure 1: Scatter plot illustrating heterogeneity of regression slopes for 8th grade