



**OKLAHOMA CITY PUBLIC SCHOOLS
PLANNING, RESEARCH, and EVALUATION
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TECHNICAL MEMORANDUM

TO: Mr. Bob Moore, Superintendent
FROM: George Kimball *GHK*
DATE: May 15, 2006
RE: Achievement Analyses – Matched Cohort Groups
A+ Schools vs. Randomly Matched OKCPS Students

Note: The original memorandum contains individual school data that were removed by Jean Hendrickson, Executive Director, OK A+. This is due to the professional practice of Oklahoma A+ Schools® to not provide school-by-school comparisons, believing that the best use of that data is for the school districts themselves to determine. Should specific school questions arise, please direct them to Dr. George Kimball in Oklahoma City Public Schools.

This document summarizes analyses undertaken to address the question of whether students in OKCPS A+ sites outperform their counterparts of equal achievement ability who attend other OKCPS schools across the district.

During the 2004-05 school year there were six A+ school sites in the Oklahoma City Public Schools. Shown below are the sites for which this analysis was conducted (and the school year in which they implemented the A+ program.)

Britton Elementary (2003-04)
Cleveland Elementary (2002-03)
Linwood Elementary (2002-03)
Mark Twain Elementary (2002-03)
Sequoyah Elementary (2002-03)
Van Buren Elementary (2004-05)
Western Village Academy Charter (2002-03)

Spring 2005 achievement scores from the State of Oklahoma Criterion Referenced Tests (CRT's), formally called the Oklahoma Core Curriculum Tests (OCC), from students in grades 3 through 5 attending the above sites were compared to randomly matched samples of cohort students selected from OKCPS sites from across the district. Paired samples t-tests were employed to evaluate the statistical significance of differences between the scores of students in the A+ sites and those of their matched cohorts.

Methodology

Because the various school populations across the district and across schools obviously differ in terms of prior student achievement, socioeconomic status, and a

variety of other predisposing educational influences, simple direct comparisons of average scores of one school versus another are of marginal utility in addressing questions of program effectiveness or outcomes. The more appropriate model for looking at achievement growth across a school year is to produce **an equivalent control group for comparison with students in the targeted sites**. This produces the model that starts with the assumption that you **have two groups of students identically matched on achievement ability at the start of the school year**, e.g., high achieving students are yoked with equally high achieving students from some other school across the district, and initially lower or average achieving students are likewise yoked with students of similar ability. **In addition, the matched cohorts are identical in race, free lunch status, sex, grade, special Ed, and LEP status**. Now you have two groups virtually identical in achievement at the start of the year. Each group receives some “educational treatment” during the course of the school year, and you measure and test the group outcomes at the end of the year to assess between-group differences. It is also important to note that by randomly selecting the matched cohort from any school from across the district, it maximizes the number of schools and teachers involved in the control group helping to control for school effects and teacher effects.

A computer procedure was used to create matched groups from the traditional school population for comparison with the A+ school in grades 3 through 5. For each A+ student, another student who matched on each of seven criteria (Spring 2004 ITBS national results, grade, sex, race/ethnicity, free/reduced lunch status, special education status, and LEP status) was selected from the district's traditional population. Cases for which exact matches could not be found were dropped from the analysis. Students in both the A+ group and their matched cohort had to also have both pre and post scores and had been at their school for the entire school year. Thus, if you were a 3rd grade, black female, eligible for free lunch, with a reading prescore national percentile of the 45th percentile, and non-LEP, and non-Special Ed, if no perfect match could be found from across the district, you were eliminated from the analysis. Separate random matches were made for both Reading and Math.

Again, the nationally normed ITBS scores were utilized as the prescore for matching purposes to build the groups randomly based on prior achievement standing prior to the 2004-05 school year, and the Oklahoma State CRT scores were used for the between-group comparisons on the outcomes. A paired samples t-test was used to evaluate the significance of between-group differences in average State CRT 2005 results for each of the A+ groups with their matched samples from the traditional school populations. Tests were performed for both overall populations and for the individual schools.

Results

Demographics of the Sample.

Table 1 below shows the breakdown by grade of the overall population of the A+ schools in grades 3-5, and the resulting matched cohort group when the conditions

were imposed that a cohort had to be found that matched on all variables before being included in the analyses. See Table 1.

Table 1: Grade

<u>Grade</u>	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
03	355	36.3	171	34.9
04	324	33.1	172	35.1
05	300	30.6	147	30.0
Total	979	100.0	490	100.0

Table 1 shows that the matched cohort group lines up very well with the overall school populations by grade level. The random matched sample is 50.1 percent of the overall population.

Table 2 shows the breakdown by ethnicity. See Table 2.

Table 2: Ethnicity

	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
Asian	37	3.8	2	0.4
Black	279	28.5	110	22.4
Hispanic	351	35.9	224	45.7
Native American	46	4.7	13	2.7
White	266	27.2	141	28.8
Total	979	100.0	490	100.0

Table 2 shows that the matched cohort group is slightly more heavily weighted in Hispanic representation than the overall population and slightly less represented by Blacks, Asians, and Native Americans.

Table 3 shows the breakdown by gender. See Table 3.

Table 3: Gender

	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
Female	471	48.1	249	50.8
Male	508	51.9	241	49.2
Total	979	100.0	490	100.0

Table 3 shows that the matched cohort group lines up very well with the overall school populations by gender. Both are approximately 50/50 male/female.

Table 4 shows the breakdown by eligibility for Free/Reduced price lunch. See Table 4.

Table 4: SES

	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
Low	809	82.7	424	86.5
Other	169	17.9	66	13.5
Total	978	99.9	490	100
Missing	1	0.1	0	0
Total	979	100	490	100

Table 4 shows the groups are very similar to the overall population of these schools with slightly higher eligibility for free/reduced lunch. These numbers are very close to the actual district average of 84% for 2004-05.

Table 5 shows the breakdown of ELL children served by a district bilingual program. See Table 5.

Table 5: Placement Code

	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
Served	295	30.1	196	40.0
Other	684	69.9	294	60.0
Total	979	100.0	490	100.0

Table 5 shows that again the matched cohort group is slightly more weighted on percent of students served, which corresponds with the slightly higher Hispanic population comparison shown in Table 2.

Table 6 shows the breakdown of Special Ed students in the population and sample. See Table 6.

Table 6: Special Ed

	<u>Overall Population</u>		<u>Matched Group</u>	
	Frequency	Percent	Frequency	Percent
No	806	82.3	436	89.0
Yes	173	17.7	54	11.0
Total	979	100.0	490	100.0

Table 6 shows the sample is slightly under represented in percent of special education students served.

Reading Results:

Scores on the Oklahoma Core Curriculum Tests are expressed as OPI scores (Oklahoma Performance Index Scores). The OPI is a scale score set by the Oklahoma State Department of Education. This score is used to determine which level of performance (“Advanced”, “Satisfactory”, “Limited Knowledge”, or “Unsatisfactory”) was achieved in each subject of the Oklahoma Core Curriculum Tests.

Equated item parameters resulting from equating procedures were used to derive the Oklahoma Performance Index (OPI) scores. The OPI scale sets the lower bound of the Satisfactory performance level to 700 and the standard deviation to 70. The scaling process anchors the OPI scale to 700. The lower bound of the Limited Knowledge and Advanced performance levels are not fixed on the scale. Therefore, the lower bound of these performance levels varies across subject tests. The maximum attainable OPI score is 999.

For the purposes of the *No Child Left Behind Act*, and establishing whether a school or district has achieved Adequate Yearly Progress (AYP), under the Act, the four OCC performance levels are collapsed and the metric most often summarized is “percent of students at satisfactory or advanced”. For the purposes of these analyses, between-group comparisons were conducted looking at both groups OPI raw score averages as well as percent of students satisfactory and advanced. Again, for each grade and each subtest an OPI scale score of 700 is the cut point for achieving “satisfactory” performance.

For reading, both the A+ group and the matched cohort comparison group had identical pre-scores with individual children ranging from 1st to 99th percentile nationally on the ITBS, with a mean group average of the 47th percentile nationally.

Figure 1 and Table 7 below show the results of the between-group comparisons on the overall OPI score. See Figure 1 and Table 7.

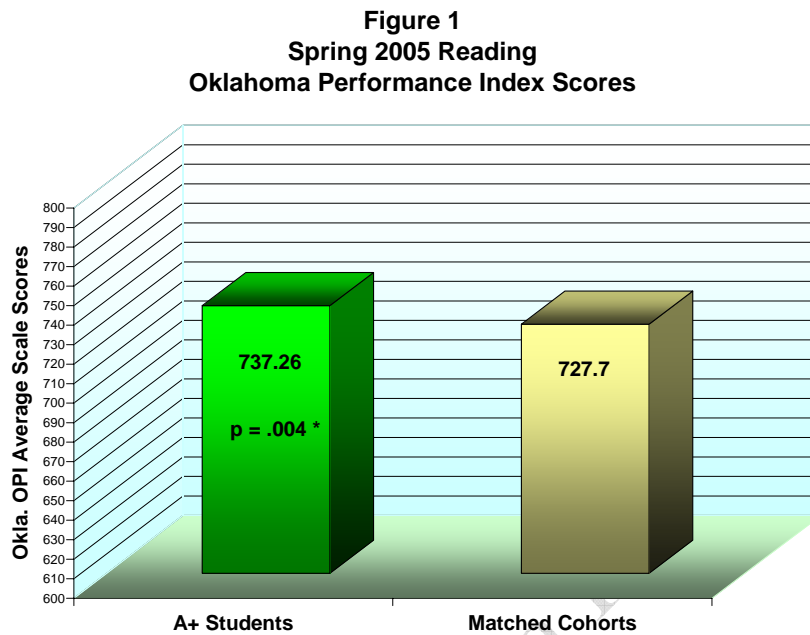
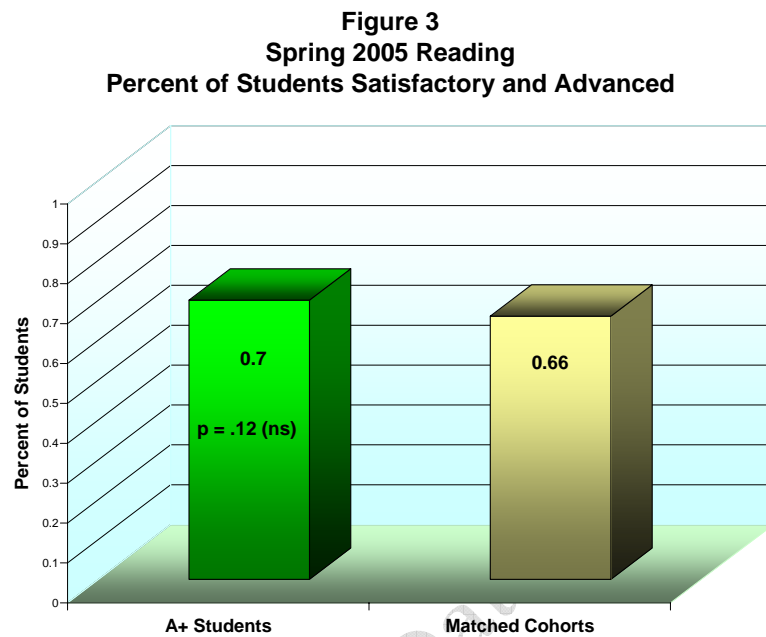


Table 7. Spring 2005 Reading - Oklahoma Performance Index Reading Scores Comparison

<u>Group</u>	<u>N</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean Diff</u>	<u>t value</u>	<u>df</u>	<u>Signif.</u>	<u>Effect Size</u>
A+ OPI	490	520	990	737.26	76.27	9.55	2.923	489	0.004	0.12
Cont. OPI	490	410	979	727.7	78.45					

Figure 1 and Table 7 show that the group of students in the A+ schools significantly outperformed their matched cohort comparison group on the reading scores of the spring, 2005 Oklahoma Core Curriculum tests on the overall Oklahoma Performance Index Scores.

Figure 3 and Table 9 below show the results of the between-group comparisons on the percent of student scoring Satisfactory and Advanced on the State OCC tests (again grades 3-4-5 only). See Figure 3 and Table 9.



Group	N	Mean	Std. Dev.	Mean Diff	t value	df	Signif.	Effect Size
A+ % Sat&Adv	490	0.7	0.459	0.037	1.557	489	0.12	0.08
Cont.%Sat&Adv	490	0.66	0.473					

Figure 3 and Table 9 shows show that the group of students in the A+ schools did outperform their matched cohort comparison group on the reading scores of the spring, 2005 Oklahoma Core Curriculum tests (70% as compared to 66% overall) on the percent of students scoring satisfactory and advanced, but the overall difference was not statistically significant.

Mathematics Results

Figure 5 and Table 11 below show the results of the between-group comparisons in mathematics on their overall OPI score. See Figure 5 and Table 11.

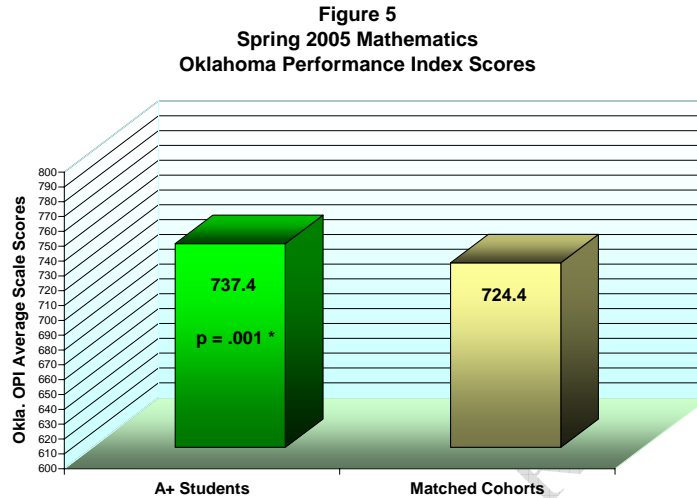


Table 11. Spring 2005 Math - Oklahoma Performance Index Scores Comparison

<u>Group</u>	<u>N</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean Diff</u>	<u>t value</u>	<u>df</u>	<u>Signif.</u>	<u>Effect Size</u>
A+ OPI	478	465	990	737.4	77.35	12.96	3.71	477	0.001	0.17
Cont. OPI	478	452	990	724.44	79.32					

Figure 5 and Table 11 show that the group of students in the A+ schools significantly outperformed their matched comparison control group on the mathematics scores of the spring, 2005 Oklahoma Core Curriculum tests on the overall Oklahoma Performance Index Scores (again grades 3-4-5 only).

Figure 7 and Table 13 below show the results of the between-group comparisons on the percent of student scoring satisfactory and advanced on the State Mathematics OCC tests (again grades 3-4-5 only). See Table 13.

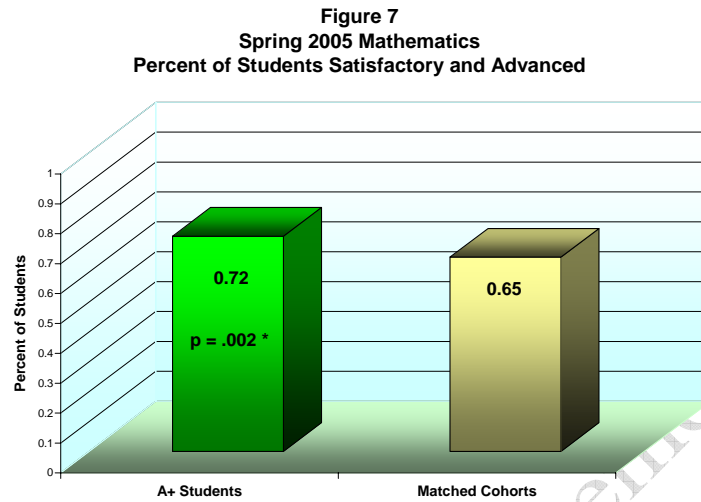


Table 13. Spring 2005 Math - Percent of Students Satisfactory or Advanced

Group	N	Mean	Std. Dev.	Mean Diff	t value	df	Signif.	Effect Size
A+ % Sat&Adv	478	0.72	0.448	0.075	3.139	477	0.002	0.16
Cont.%Sat&AdvI	478	0.65	0.478					

Figure 7 and Table 13 show that the group of students in the A+ schools did significantly outperform their matched cohort comparison group on the mathematics scores of the spring, 2005 Oklahoma Core Curriculum tests (72% as compared to 65% overall) on the percent of students scoring satisfactory and advanced. Although highly significant at the .002 level, the effect size of +.16 is a moderately small effect size.

Achievement Summary

Oklahoma Performance Index Scores (OPI)

Students in the A+ schools significantly outperformed their matched cohort comparison group on the state OPI reading scores of the spring, 2005 Oklahoma Core Curriculum Tests.

In mathematics, students in the A+ schools again significantly outperformed their matched comparison group on the math OPI scores of the spring, 2005 Oklahoma Core Curriculum tests.

Percent of students scoring Satisfactory and Advanced

In reading, the group of students in the A+ schools did outperform their matched cohort comparison group on the percent of students scoring satisfactory and advanced (70% as compared to 66% overall), but the overall difference was not statistically significant. The effect size at one school again is notable, in that the +.49 effect size means that their students achieved almost a half a standard deviation better than their matched counterparts. This was offset by the one school with negative effect size, making the overall comparison yield non-significant statistical differences.

In mathematics, the group of students in the A+ schools did significantly outperform their matched cohort comparison group on the mathematics scores of the spring, 2005 Oklahoma Core Curriculum tests (72% as compared to 65% overall) on the percent of students scoring satisfactory and advanced.

Adequate Yearly Progress

All seven A+ schools made Adequate Yearly Progress under the criteria established under the *No Child Left Behind Act*.

Individual School Data Removed