Washington High School Achievement: A Matched Pairs Examination of Three- and Four-Year High Schools*

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WORKING DRAFT: PLEASE DO NOT CITE OR QUOTE

*This paper was prepared in response to Washington State Board of Education members' questions about the academic performance of Washington high schools. This is the first of two related working papers intended to inform the Board on the academic performance of Washington high schools. Even though these are working papers, any errors and omissions are the responsibility of the author and report will be corrected and updated as is practical. Please contact Andrew J. Parr at andrew.parr@k12.wa.us if you have questions or comments regarding this paper.

Summary and Findings

This is the first installation of a two-part series of working papers providing research on the academic performance of Washington high schools. The research is intended to examine the educational outcomes of different types of high schools, in various geopolitical settings, operating under similar or different local education frameworks. The research presented here focuses wholly on the identification of differences in educational outcomes based on whether a high school is designed under the three- or four-year model.

A matched-pairs comparison of the educational outcomes of three- and four-year high schools was undertaken to evaluate for group mean differences between the two types of high schools. This study examines the academic performance of the students at 15 public high schools serving grades 10 to 12 and 15 public high schools serving grades 9 to 12 for differences in performance. After matching school pairs based on a handful of school criteria, paired samples *t*-tests and Wilcoxon related samples *t*-tests were conducted to assess for statistical differences between the group means. The analyses did not identify statistical differences between the group means on any of the measures. All of the analyses indicated that the academic performance on the selected educational outcome measures was statistically similar when grade levels served was the grouping variable.

While the academic performance was statistically similar, the academic performance was by no means the same and this fact is depicted in Figure 1. The shaded cells in Figure 1 identify whether the three- or four-year high school posted the higher group mean on each of the outcome measures. Interestingly, the three-year high schools posted better outcomes on a little more than one-half of the measures. The results are largely mixed and the key findings are as follows.

1. In the 2014-15 school year, higher proficiency rates on the three content area assessments were posted by the three-year high schools (3-YR HS) for nearly all reportable student groups.

2. In the 2015-16 school year, higher proficiency rates on the ELA and math assessments were posted by the three-year high schools, but the four-year high schools (4-YR HS) posted better rates on the science assessment and the high school graduation outcome measure.

3. From the 2014-15 school year to the 2015-16 school year, the four-year high schools posted greater gains or improvement on the ELA and science proficiency rates and greater improvement on the graduation rate measure.

4. Students groups qualifying for the Free and Reduced Price Lunch (FRL) program posted higher proficiency rates at 3-YR HS but posted lower graduation rates. The FRL student groups show greater improvement at the 4-YR HS.

5. Students with a disability (SWD) groups posted better graduation rates at 4-YR HS and mostly better proficiency rates at 3-YR HS. The SWD student groups' proficiency rates mostly improve more at 3-YR HS but graduation rates improve more at 4-YR HS.

Figure 1: summarizes the performance of all of the student groups on all of the outcome measures reported on in this work.

School Year	Educational Outcome Measure*	All Students	Hispanic Students	White Students	FRL Students	SWD Students
2014-15	ELA	3-YR HS	3-YR HS	3-YR HS	3-YR HS	3-YR HS
	Math	3-YR HS	3-YR HS	3-YR HS	3-YR HS	4-YR HS
	Science	3-YR HS	3-YR HS	3-YR HS	3-YR HS	3-YR HS
	Graduation	4-YR HS	3-YR HS	4-YR HS	3-YR HS	4-YR HS
2015-16	ELA	3-YR HS	3-YR HS	3-YR HS	3-YR HS	3-YR HS
	Math	3-YR HS	3-YR HS	3-YR HS	3-YR HS	3-YR HS
	Science	4-YR HS	4-YR HS	3-YR HS	4-YR HS	4-YR HS
	Graduation	4-YR HS	4-YR HS	4-YR HS	4-YR HS	4-YR HS
Change from 2014-15 to 2015-16	ELA	4-YR HS	4-YR HS	4-YR HS	4-YR HS	3-YR HS
	Math	3-YR HS	3-YR HS	3-YR HS	3-YR HS	3-YR HS
	Science	4-YR HS	4-YR HS	4-YR HS	4-YR HS	4-YR HS
	Graduation	4-YR HS	4-YR HS	4-YR HS	4-YR HS	4-YR HS
The shaded cells indicate which of the high school types (3-YR HS or 4-YR HS) reported a higher group mean on each of the outcome measures. *Note: the ELA, math, and science outcome measures are the percent meeting standard on assessments, while the graduation outcome is the percent graduating using the Five-Year Adjusted Cohort Graduation Rate (ACGR).						

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Washington High School Achievement

A Matched Pairs Examination of Three- and Four-Year High Schools

Introduction

This work was conducted to provide information on possible differences in the educational outcomes for the high schools based on the grade span served. A matched subjects design was undertaken to examine the educational outcomes of three- and four-year high schools. The study used a variety of criteria to match a three-year high school to a four-year high school and then analyze for group mean differences using the paired samples *t*-test. If the schools have similar characteristics and operate in a similar educational arena, differences in educational outcomes might in some manner be attributable to the different high school grade spans.

Research has shown that the likelihood of graduation from high school in four years is much greater if a student passes or earns all credits attempted as a 9th grader. An alarmingly high number of high school 9th graders (nearly one in four of Washington 9th graders in 2016) fail at least one English language arts (ELA) or math course and do not earn the credits necessary for graduation, and this places many 9th grade high school students in the precarious position of not graduating on time, if at all. One underlying premise of this circumstance is that some high school students are not academically or emotionally prepared for the challenges and rigors of high school. Therefore, perhaps another year in the more nurturing environment of a middle school or junior high school might benefit some or all students.

In the 2015-16 school year in all of Washington state, there were 18 public high schools that served students in three grades (10th, 11th, and 12th) and hundreds of public high schools serving students in four grades (9th, 10th, 11th, and 12th). With the operation of so many four-year high schools, one must wonder if the four-year high school model is favored on account of posting higher academic outcomes. Or is it possible that some school districts favor the three-year high school model because of better educational outcomes?

Of the 18 schools identified as serving grades 10-12 in the winter 2017 Index version, three were excluded from this evaluation on account of being identified as some form of alternative high school. The winter 2017 version of the Washington Achievement Index data file is the sole data source used in this analysis. The data file shows that seven of the schools were Title I eligible in the 2015-16 school year, but none of the 3-YR HS were Title I served. Other characteristics about the 3-YR HS and 4-YR HS are tabulated in Appendix A (Figure A1).

Paired Samples t Test

In a matched-pairs, paired samples *t*-test design, schools are paired based on matching criteria and each school is assessed once on the desired outcome measure. The differences for the educational outcomes for each group mean are then compared to establish the level of statistical significance. A commonly accepted number for a moderate size sample is 30 pairs of scores and larger sample sizes are preferred to produce more valid *p*-values. In this statistical analysis, small sample sizes increase the likelihood of a Type I error of reporting a group mean difference when the group means do not differ.

When smaller sample sizes are utilized, the *p*-values become less stable and the assumption of normally distributed data is more likely to be violated. In this circumstance, the researcher is advised to utilize or at least confirm the paired samples *t*-test of significance to the Wilcoxon matched pairs test, the nonparametric equivalent to the paired samples *t*-test. In this work, the *p*-value for the paired sample *t*-test is reported and if a difference is identified, the result is confirmed or not with the Wilcoxon result.

This work follows a logical progression of evaluating the performance of large groups averaged over multiple years on reading/ELA and math combined, then examines the performance of the All Students group on individual measures annually. Finally, the annual performance of smaller student groups is examined for group differences. In other words, the analyses start with large broad groups and get more and more refined in an attempt to identify differences in group performance. The SPSS output is included in Appendix B.

The data tables for each set of analyses are presented in a consistent manner for ease of understanding. Attempts have been made to clearly label all table elements, and where necessary, additional notes are included at the bottom of the table as an explanatory footnote. As is typical for this type of work, the resulting *t*-value and *p*-value are also reported.

- The *t*-value is an estimate of the difference in group distribution measured in units of standard error. As the *t*-value approaches zero, the more likely there is not a significant difference. In other words, larger *t*-values are indicative of larger group differences and a greater likelihood of statistical significance.

- The p-value is best thought of as a measure of statistical significance and ranges from zero to one.
    - A large *p*-value indicates a high probability that the null hypothesis of no difference is true. (That there is no significant difference between the group means.)
    - A small *p*-value indicates a low probability that the null hypothesis of no difference is true. If the *p*-value is small enough (usually set at $p < 0.05$) the null hypothesis of no group difference can be rejected with a measured level of confidence.

A *p*-value of $p < 0.050$ means that there is a less than a five percent chance that a significant difference between the two group means does not exist.

Limitations of this Work

The math performance data reported on here is derived from the Washington Achievement Index used for statewide accountability purposes and has been processed in a manner following predetermined business rules for school accountability. Participation rates on the Smarter Balanced High School math assessment were unusually low in the 2014-15 and 2015-16 school years. This is important because students not participating in the assessment (but who should have) are assigned a score of zero and are coded as not meeting standard or not proficient. Also important on this point, is the likelihood that the characteristics of the students not participating in the assessments differ from those students sitting for the assessments. Further, there is evidence that students who did sit for the assessments may not have tried to do their best because meeting standard on the assessment was not a requirement for high school graduation. For these reasons, there is a strong likelihood that the school level proficiency rates for math are depressed or artificially lowered, but it is impossible to quantify the degree to which rates are depressed from the available data.

The Index accountability business rules exclude student records from the school proficiency rate calculations if the student did not meet the continuously enrolled (CE) criteria. For example, a student could be enrolled for two-thirds of the school year and since this does not meet the CE criteria, the student's performance would not be included in the school level calculations. So, not all students are counted in the school aggregation used here.

The Index does not report on a student group unless assessment records are available for at least 20 CE students assigned to that group. As an example, if assessment records are produced for only 19 students who identify as Asian, the Index will not report the performance of the Asian group but the performance of the Asian students would be rolled up into the All Students group. So again, some student groups with not inconsequential numbers will not be reported upon in the Index.

Another limitation of this work is the small number of schools following the three-year high school model of serving 10th through 12th graders. The small sample size is not optimal for the examination of differences between group means. The effects of this shortcoming has been mitigated through the use of the Wilcoxon test to confirm (or not) any statistically significant results.

All Students Group (ELA and Math Averaged)

Paired samples *t*-tests were conducted to determine whether the percentage of the All Students group meeting standard on the ELA and math assessments differed on the basis of high school grade spans served. Analyses were conducted separately for the combined reading /ELA and math averages for the 2013-14, 2014-15, and 2015-16 school years, and for the combined reading/ELA and math, two-year average for the 2014-14 and 2015-16 school years. The group mean differences were examined for statistical significance.

The results of four separate paired samples *t*-tests are presented in Figure 2. The results show that there are no differences in group performance on the outcome measures based on grade spans served, because the *p*-values for each of the four *t*-tests are greater than 0.05. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar to the performance of students at 4-YR HS. However, it is noteworthy that the reported means for the groups are not the same.

Figure 2: summarizes the results of four *t*-tests for averaged reading/ELA and math proficiency rates over the most recent assessment years.

All Students Group*	Mean (M)**		*t*	*p*
	3-YR HS	4-YR HS		
2-YR Average RM 2015-2016	41.0	37.2	1.045	0.314
2016 RM ALL	57.3	53.6	1.200	0.250
2015 RM ALL	24.7	20.8	0.803	0.435
2014 RM ALL[+]	85.1	85.9	-0.419	0.681
*Note: the results are based on 15 pairs of schools. **Note: the mean values represent the percentage of students meeting standard on the assessments used for school accountability. [+]Note: the 2014 results are much higher than for other years because this was the last statewide administration of the legacy High School Proficiency Exam in reading and math End of Course assessment.				

- The students at 3-YR HS perform approximately 3.7 percentage points higher on the 2016 average reading/ELA and math (combined) proficiency rate.

- The students at 3-YR HS perform approximately 3.9 percentage points higher on the 2015 average reading/ELA and math (combined) proficiency rate

Paired samples *t*-tests were conducted to determine whether the percentage of the All Students group meeting standard on the ELA, math, and science assessments, and high school graduation (5-Year ACGR) differed on the basis of high school grade spans served. Analyses were conducted separately for the 2014-15 and 2015-16 school years and the change from the 2014-15 to the 2015-16 school year, and all were examined for differences. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 3).

- The students at 3-YR HS perform approximately 5.3 percentage points higher on the 2014-15 ELA proficiency rate.

- The students at 3-YR HS perform approximately 2.3 percentage points higher on the 2014-15 math proficiency rate.

- The students at 3-YR HS performed a little higher on the 2014-15 science proficiency rate, but a little lower on the high school graduation measure

Figure 3: summarizes the results of *t*-tests for the content area proficiency rates and graduation rate by year, including change in content area proficiency rates and graduation rate from the 2014-15 school year to the 2015-16 school year for the All Students group.

All Students Group	Mean (M)		*t*	*p*
	3-YR HS	4-YR HS		
2014-15 School Year				
ELA – percent of students proficient	31.3	26.0	0.819	0.427
Math – percent of students proficient	18.0	15.7	0.633	0.537
Science – percent of students proficient	78.2	76.5	0.794	0.440
Graduation Rate – percent of students graduating	91.9	92.3	-0.443	0.665
2015-16 School Year				
ELA – percent of students proficient	81.1	80.1	0.389	0.703
Math – percent of students proficient	33.5	27.1	0.983	0.342
Science – percent of students proficient	78.9	79.8	-0.516	0.614
Graduation Rate – percent of students graduating	91.5	92.6	-0.896	0.386
Change from 2014-15 to 2015-16 School Years				
ELA – percent of students proficient	49.8	54.1	-0.747	0.467
Math – percent of students proficient	15.5	11.5	0.700	0.495
Science – percent of students proficient	0.7	3.2	-1.926	0.075
Graduation Rate – percent of students graduating	-0.3	0.2	-0.792	0.442
*Note: the results are based on 15 pairs of schools.				

For the 2015-16 school year, the *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 3).

- The students at 3-YR HS perform approximately 6.4 percentage points higher on the 2015-16 math proficiency rate.

- The students at 3-YR HS performed a little lower on the 2015-16 science proficiency rate, a little lower on the high school graduation measure, and just a little higher on the ELA measure.

For the change in performance from the 2014-15 school year to the 2015-16 school year, the *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 3).

- The students at 4-YR HS improved approximately 4.3 percentage points more on the ELA proficiency rate and approximately 2.5 percentage points more on the science proficiency rate.

- The students at 3-YR HS improved approximately 4.0 percentage points more on the math proficiency rate but are a little lower on the high school graduation measure.

FRL Students Group

Paired samples *t*-tests were conducted to determine whether the percentage of the FRL students group meeting standard on the ELA, math, and science assessments, and high school graduation (5-Year ACGR) differed on the basis of high school grade spans served. Analyses were conducted separately for the 2014-15 and 2015-16 school years and the change from the 2014-15 to the 2015-16 school year, and all were examined for differences. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 4).

- The FRL student groups at 3-YR HS perform approximately 4.9 percentage points higher on the 2014-15 science proficiency rate.

- The FRL student groups at 3-YR HS performed a little higher on the math proficiency rate, but about the same on the ELA and high school graduation measure.

For the 2015-16 school year, the *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 4).

- The FRL student groups at 3-YR HS perform approximately 1.7 to 2.7 percentage points higher on the 2015-16 ELA and math proficiency rates, and nearly the same on the science proficiency rate.

- The FRL student groups at 3-YR HS performed approximately 2.7 percentage points lower on the high school graduation measure.

For the change in performance from the 2014-15 school year to the 2015-16 school year, the *p*-values indicate that the performance of the FRL student groups at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 4).

- The FRL student groups at 3-YR HS and 4-YR HS improved approximately the same amounts on the ELA and math proficiency rates.

- The FRL student groups at 4-YR HS improved approximately 5.1 percentage points more on the science proficiency rate, and approximately 2.2 percentage points more on the high school graduation measure.

The Wilcoxon matched pairs test was conducted on the high school graduation measure to determine if a group mean difference could be identified because the *p*-value for the initial result from the paired samples *t*-test was approaching the level of statistical significance. The Wilcoxon test yielded a non-significant result (*p* = 0.100) requiring that the null hypothesis not be rejected. The Wilcoxon test affirmed the result of the paired sample *t*-test of no significant group difference.

For the 2015-16 school year, the *p*-values indicate that the academic performance of Hispanic student groups at 3-YR HS is statistically similar but not the same as the performance of Hispanic students at 4-YR HS (Figure 5).

- The Hispanic student groups at 3-YR HS performed a little higher on the 2015-16 ELA and 3.2 percentage points higher on the math proficiency rate.

- The Hispanic student groups at 3-YR HS performed approximately 2.0 percentage lower on the science proficiency rate and approximately 1.7 percentage points lower on the high school graduation measure.

Figure 4: summarizes the results of *t*-tests for the content area proficiency rates and graduation rate by year, including change in content area proficiency rates and graduation rate from the 2014-15 school year to the 2015-16 school year for the FRL student group.

FRL Students Group*	Mean (M)		*t*	*p*
	3-YR HS	4-YR HS		
2014-15 School Year				
ELA – percent of students proficient	23.7	23.2	0.096	0.925
Math – percent of students proficient	12.8	11.2	0.700	0.496
Science* – percent of students proficient	64.3	59.4	1.247	0.233
Graduation Rate* – percent of students graduating	86.9	87.3	-0.198	0.846
2015-16 School Year				
ELA – percent of students proficient	69.4	67.7	0.484	0.636
Math – percent of students proficient	21.4	18.7	0.616	0.548
Science – percent of students proficient	65.2	65.3	-0.047	0.963
Graduation Rate – percent of students graduating	86.2	88.9	-1.392	0.186
Change from 2014-15 to 2015-16 School Years				
ELA – percent of students proficient	44.7	45.1	-0.078	0.939
Math – percent of students proficient	9.8	7.9	0.503	0.623
Science* – percent of students proficient	0.9	6.0	-1.692	0.113
Graduation Rate* – percent of students graduating	-0.7	1.5	-1.834	0.088
*Note: the results are based on 15 pairs of schools. The results for measures without an asterisk (*) are based on 14 pairs of schools.				

Hispanic Student Group

Paired samples t-tests were conducted to determine whether the percentage of the Hispanic students group meeting standard on the ELA, math, and science assessments, and high school graduation (5-Year ACGR) differed on the basis of high school grade spans served. Analyses were conducted separately for the 2014-15 and 2015-16 school years and the change from the 2014-15 to the 2015-16 school year, and all were examined for differences. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 5).

- The Hispanic student groups at 3-YR HS perform approximately 4.4 percentage points higher on the 2014-15 science proficiency rate.

- The Hispanic student groups at 3-YR HS performed approximately 2.3 percentage points higher on the ELA proficiency rate, approximately 1.6 percentage points higher on the math proficiency rate, and about the same on the high school graduation measure.

For the change in performance from the 2014-15 school year to the 2015-16 school year, the *p*-values indicate that the performance of the Hispanic student groups at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 5).

Figure 5: summarizes the results of *t*-tests for the content area proficiency rates and graduation rate by year, including change in content area proficiency rates and graduation rate from the 2014-15 school year to the 2015-16 school year for the Hispanic student group.

Hispanic Student Group	Mean (M)		*t*	*p*
	3-YR HS	4-YR HS		
2014-15 School Year				
ELA – percent of students proficient	23.3	21.0	0.504	0.622
Math – percent of students proficient	12.8	11.2	0.700	0.496
Science* – percent of students proficient	63.2	58.8	0.978	0.345
Graduation Rate – percent of students graduating	89.4	88.9	0.326	0.749
2015-16 School Year				
ELA* – percent of students proficient	68.3	67.9	0.108	0.915
Math* – percent of students proficient	22.7	19.5	0.626	0.542
Science* – percent of students proficient	61.1	63.1	-0.621	0.545
Graduation Rate** – percent of students graduating	87.5	89.2	-0.892	0.389
Change from 2014-15 to 2015-16 School Years				
ELA – percent of students proficient	44.0	47.3	-0.672	0.541
Math – percent of students proficient	11.2	9.0	0.582	0.571
Science* – percent of students proficient	-2.0	4.2	-1.6397	0.184
Graduation Rate* – percent of students graduating	-1.7	0.2	-0.884	0.392
*Note: the results are based on 15 pairs of schools. The results for measures without an asterisk (*) are based on 14 pairs of schools.				

- The Hispanic student groups at the 4-YR HS improved approximately 3.3 percentage points more on the ELA but the 3-YR HS improved 2.2 percentage points more on the math proficiency rates.

- The Hispanic student groups at 4-YR HS improved approximately 6.2 percentage points more on the science proficiency rate, and approximately 1.9 percentage points more on the high school graduation measure.

White Student Group

Paired samples *t*-tests were conducted to determine whether the percentage of the White students group meeting standard on the ELA, math, and science assessments, and high school graduation (5-Year ACGR) differed on the basis of high school grade spans served. Analyses were conducted separately for the 2014-15 and 2015-16 school years and the change from the 2014-15 to the 2015-16 school year, and all were examined for differences. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 6).

- The White student groups at 3-YR HS perform approximately 6.3 percentage points higher on the 2014-15 ELA, 3.0 percentage points higher on the math, and approximately 1.9 percentage points higher on the science proficiency rates.

- The White student groups at 3-YR HS performed a little lower on the high school graduation measure.

Figure 6: summarizes the results of *t*-tests for the content area proficiency rates and graduation rate by year, and including change in content area proficiency rates and graduation rate from the 2014-15 school year to the 2015-16 school year for the White student group.

White Student Group*	Mean (M)		t	p
	3-YR HS	4-YR HS		
2014-15 School Year				
ELA – percent of students proficient	32.6	26.3	0.917	0.375
Math – percent of students proficient	18.8	15.8	0.828	0.422
Science – percent of students proficient	83.1	81.2	1.012	0.329
Graduation Rate – percent of students graduating	92.2	92.9	-0.675	0.510
2015-16 School Year				
ELA – percent of students proficient	83.8	83.2	0.266	0.794
Math – percent of students proficient	34.9	28.2	1.045	0.314
Science – percent of students proficient	83.6	82.8	0.480	0.639
Graduation Rate – percent of students graduating	92.4	93.5	-0.897	0.385
Change from 2014-15 to 2015-16 School Years				
ELA – percent of students proficient	51.2	56.8	-0.850	0.409
Math – percent of students proficient	16.2	12.4	0.671	0.513
Science – percent of students proficient	0.5	1.7	-0.883	0.392
Graduation Rate – percent of students graduating	0.1	0.6	-0.489	0.633
*Note: the results are based on 15 pairs of schools.				

For the 2015-16 school year, the *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 6).

- The White student groups at 3-YR HS performed 6.7 percentage points higher on the 2015-16 math proficiency rates.

- The White student groups at 3-YR HS performed about the same on the ELA and science proficiency rates, and approximately 1.1 percentage points lower on the high school graduation measure.

For the change in performance from the 2014-15 school year to the 2015-16 school year, the *p*-values indicate that the performance of the White student groups at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 6).

- The White student groups at 3-YR HS improved approximately 5.6 percentage points less than the 4-YR HS on the ELA and approximately 1.2 percentage points lower on the science proficiency rate change.

- The White student groups at 3-YR HS improved approximately 3.8 percentage points more on the math proficiency rate, and approximately 0.5 percentage points lower on the high school graduation measure.

SWD Student Group

Paired samples *t*-tests were conducted to determine whether the percentage of the students with a disability (SWD) group meeting standard on the ELA, math, and science assessments, and high school graduation (5-Year ACGR) differed on the basis of high school grade spans served. Analyses were conducted separately for the 2014-15 and 2015-16 school years and the change from the 2014-15 to the 2015-16 school year, and all were examined for differences. The *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 7).

- The SWD student groups at 3-YR HS perform approximately the same on the 2014-15 ELA and math proficiency rates, and approximately 2.0 percentage points higher on the science proficiency rate.

- The SWD student groups at 3-YR HS performed approximately 4.9 percentage points lower on the high school graduation measure.

For the 2015-16 school year, the *p*-values indicate that the performance of students at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 7).

- The SWD student groups at 3-YR HS performed 2.6 percentage points higher on the 2015-16 ELA and 2.1 percentage points higher on the math proficiency rates.

- The SWD student groups at 4-YR HS performed approximately 2.2 percentage points higher on the science proficiency rates, and a 7.2 percentage points higher on the high school graduation measure.

The Wilcoxon matched pairs test was conducted on the high school graduation measure to determine if a group mean difference could be identified because the *p*-value for the initial result from the paired samples *t*-test was statistically significant. The Wilcoxon test yielded a non-significant result ($p = 0.087$) requiring that the null hypothesis not be rejected. The Wilcoxon test failed to confirm the result of the paired sample *t*-test of no significant group difference. Because the Wilcoxon test is arguably the more

appropriate statistical test given the small number of pairs, it is most prudent to not reject the null hypothesis and conclude that the means do not differ.

For the change in performance from the 2014-15 school year to the 2015-16 school year, the *p*-values indicate that the performance of the SWD student groups at 3-YR HS is statistically similar but not the same as the performance of students at 4-YR HS (Figure 7).

- The SWD student groups at 3-YR HS improved approximately 2.1 percentage points more on the ELA and approximately 3.0 percentage points more on the math proficiency rate change.

- The SWD student groups at 4-YR HS improved approximately 4.7 percentage points more on the science proficiency rate, and approximately 2.8 percentage points more on the high school graduation measure.

Figure 7: summarizes the results of *t*-tests for the content area proficiency rates and graduation rate by year, including change in content area proficiency rates and graduation rate from the 2014-15 school year to the 2015-16 school year for the SWD student group.

SWD Student Group	Mean (M)		*t*	*p*
	3-YR HS	4-YR HS		
2014-15 School Year				
ELA** – percent of students proficient	11.5	10.5	0.328	0.748
Math*** – percent of students proficient	5.8	6.6	-0.649	0.528
Science*** – percent of students proficient	25.7	23.7	0.507	0.621
Graduation Rate** – percent of students graduating	77.2	82.1	-1.246	0.235
2015-16 School Year				
ELA*** – percent of students proficient	43.3	40.7	0.474	0.644
Math*** – percent of students proficient	17.7	15.6	0.500	0.626
Science** – percent of students proficient	30.4	32.6	-0.611	0.552
Graduation Rate*** – percent of students graduating	75.4	82.6	-2.292	0.041*
Change from 2014-15 to 2015-16 School Years				
ELA*** – percent of students proficient	32.1	30.0	0.354	0.729
Math – percent of students proficient	12.8	9.8	0.734	0.478
Science*** – percent of students proficient	4.7	9.4	-0.990	0.342
Graduation Rate*** – percent of students graduating	-1.2	1.6	-0.614	0.551
*Note: paired samples *t*-test result is significant at the 0.05 level. The Wilcoxon related samples test did not yield a statistically significant result. **Note: the results are based on 14 pairs of schools. ***The results for these measures are based on 13 pairs of schools.				

WORKING DRAFT: PLEASE DO NOT CITE OR QUOTE

Appendix – A

In addition to the school matching criteria presented in Figure A1, the school matching also included the geopolitical setting of the high school. Ongoing research by the author indicates that the geopolitical setting of the high school is a factor in high school academic performance, so it was deemed important to include such criteria as a factor in creating the matched pairs of schools.

Figure AI: summarizes the school characteristics used to create the matched pairs of high schools.

School Measure*	Range				Mean (*M*)		Standard Deviation (*SD*)	
	3-YR HS		4-YR HS		3-YR HS	4-YR HS	3-YR HS	4-YR HS
	From	To	From	To				
Enrollment	577	1825	432	2203	1398	1701	375.6	506.5
% FRL (School)	8.2	54.5	11.1	55.7	27.9	28.0	12.69	12.96
% FRL (Tested)	6.9	55.1	8.2	52.2	27.0	26.4	12.69	12.99
ELA (N Tested)	132	563	99	515	428	398	127.6	121.6
Grad (N Adj. Cohort)	68	594	90	552	412	387	143.5	115.8
% White (Tested)	53.0	77.9	49.4	81.6	65.2	64.1	8.80	10.65
% Hispanic (Tested)	8.46	41.5	6.3	32.2	15.5	14.8	8.09	7.37
*Note: results are based on 15 pairs of schools.								

Appendix B – SPSS Output

ALL STUDENTS GROUP (RM Combined and Averaged)

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ALL_RM_AVG_2014_HS3	85.11533	15	7.188230	1.855993
	ALL_RM_AVG_2014_HS4	85.86000	15	6.432199	1.660787
Pair 2	ALL_RM_AVG_2015_HS3	24.68067	15	14.430866	3.726034
	ALL_RM_AVG_2015_HS4	20.82800	15	11.313426	2.921114
Pair 3	ALL_RM_AVG_2016_HS3	57.31533	15	10.398583	2.684903
	ALL_RM_AVG_2016_HS4	53.61533	15	12.580747	3.248335
Pair 4	ALL_RM_2YRAVG_1516_HS3	40.99687	15	9.548307	2.465362
	ALL_RM_2YRAVG_1516_HS4	37.22173	15	9.719543	2.509575

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ALL_RM_AVG_2014_HS3 & ALL_RM_AVG_2014_HS4	15	.495	.061
Pair 2	ALL_RM_AVG_2015_HS3 & ALL_RM_AVG_2015_HS4	15	-.028	.922
Pair 3	ALL_RM_AVG_2016_HS3 & ALL_RM_AVG_2016_HS4	15	.473	.075
Pair 4	ALL_RM_2YRAVG_1516_HS3 & ALL_RM_2YRAVG_1516_HS4	15	-.054	.848

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	
Pair 1	ALL_RM_AVG_2014_HS3 - ALL_RM_AVG_2014_HS4	-.744667	6.878679	1.776067	-4.553952	3.064619	-.419	14	.681
Pair 2	ALL_RM_AVG_2015_HS3 - ALL_RM_AVG_2015_HS4	3.852667	18.581919	4.797831	-6.437657	14.142991	.803	14	.435
Pair 3	ALL_RM_AVG_2016_HS3 - ALL_RM_AVG_2016_HS4	3.700000	11.942739	3.083602	-2.913668	10.313668	1.200	14	.250
Pair 4	ALL_RM_2YRAVG_1516_HS3 - ALL_RM_2YRAVG_1516_HS4	3.775133	13.989428	3.612055	-3.971954	11.522221	1.045	14	.314

All Students ELA and Math Separate

For 2014-15

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_ALL_2015_HS3	31.329991	15	20.5015606	5.2934802
	ELA_METPCT_ALL_2015_HS4	25.977002	15	15.3705891	3.9686690
Pair 2	MATH_METPCT_ALL_2015_HS3	18.028249	15	10.5343744	2.7199638
	MATH_METPCT_ALL_2015_HS4	15.679797	15	8.7992724	2.2719624
Pair 3	SCI_METPCT_ALL_2015_HS3	78.229318	15	9.8024885	2.5309917
	SCI_METPCT_ALL_2015_HS4	76.516759	15	8.7778924	2.2664421
Pair 4	GRADPCT_ALL_2015_HS3	91.861096	15	3.4850814	.8998441
	GRADPCT_ALL_2015_HS4	92.347220	15	3.3972366	.8771627

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_ALL_2015_HS3 & ELA_METPCT_ALL_2015_HS4	15	.024	.932
Pair 2	MATH_METPCT_ALL_2015_HS3 & MATH_METPCT_ALL_2015_HS4	15	-.098	.729
Pair 3	SCI_METPCT_ALL_2015_HS3 & SCI_METPCT_ALL_2015_HS4	15	.601	.018
Pair 4	GRADPCT_ALL_2015_HS3 & GRADPCT_ALL_2015_HS4	15	.236	.397

Paired Samples Test

| | | Paired Differences | | | | | | | |
| | | | | | 95% Confidence Interval of the Difference | | | | |
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	ELA_METPCT_ALL_2015_HS3 - ELA_METPCT_ALL_2015_HS4	5.3529888	25.3244165	6.5387362	-8.6712056	19.3771832	.819	14	.427
Pair 2	MATH_METPCT_ALL_2015_HS3 - MATH_METPCT_ALL_2015_HS4	2.3484519	14.3707307	3.7105067	-5.6097935	10.3066973	.633	14	.537
Pair 3	SCI_METPCT_ALL_2015_HS3 - SCI_METPCT_ALL_2015_HS4	1.7125582	8.3523858	2.1565767	-2.9128389	6.3379553	.794	14	.440
Pair 4	GRADPCT_ALL_2015_HS3 - GRADPCT_ALL_2015_HS4	-.4861235	4.2539703	1.0983704	-2.8418937	1.8696467	-.443	14	.665

All Students for 2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_ALL_2016_HS3	81.114959	15	8.3807182	2.1638921
	ELA_METPCT_ALL_2016_HS4	80.088708	15	12.3776440	3.1958939
Pair 2	MATH_METPCT_ALL_2016_HS3	33.514813	15	17.5209320	4.5238852
	MATH_METPCT_ALL_2016_HS4	27.141701	15	17.3431694	4.4779871
Pair 3	SCI_METPCT_ALL_2016_HS3	78.913202	15	8.0414442	2.0762920
	SCI_METPCT_ALL_2016_HS4	79.752170	15	8.2100185	2.1198177
Pair 4	GRADPCT_ALL_2016_HS3	91.545765	15	3.4612380	.8936878
	GRADPCT_ALL_2016_HS4	92.576608	15	3.9072348	1.0088437

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_ALL_2016_HS3 & ELA_METPCT_ALL_2016_HS4	15	.574	.025
Pair 2	MATH_METPCT_ALL_2016_HS3 & MATH_METPCT_ALL_2016_HS4	15	-.038	.894
Pair 3	SCI_METPCT_ALL_2016_HS3 & SCI_METPCT_ALL_2016_HS4	15	.700	.004
Pair 4	GRADPCT_ALL_2016_HS3 & GRADPCT_ALL_2016_HS4	15	.273	.325

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ELA_METPCT_ALL_2016_HS3 - ELA_METPCT_ALL_2016_HS4	1.0262503	10.2180233	2.6382823	-4.6323024	6.6848030	.389	14	.703
Pair 2	MATH_METPCT_ALL_2016_HS3 - MATH_METPCT_ALL_2016_HS4	6.3731121	25.1122514	6.4839554	-7.5335892	20.2798134	.983	14	.342
Pair 3	SCI_METPCT_ALL_2016_HS3 - SCI_METPCT_ALL_2016_HS4	-.8389684	6.2964961	1.6257483	-4.3258518	2.6479149	-.516	14	.614
Pair 4	GRADPCT_ALL_2016_HS3 - GRADPCT_ALL_2016_HS4	-1.0308430	4.4576924	1.1509712	-3.4994307	1.4377448	-.896	14	.386

All students Change from 2015 to 2016

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_ALL_PRO_CHANGE_1516_HS3	49.7847	15	20.36575	5.25841
	ELA_ALL_PRO_CHANGE_1516_HS4	54.1113	15	20.74306	5.35584
Pair 2	MATH_ALL_PRO_CHANGE_1516_HS3	15.4853	15	16.54448	4.27177
	MATH_ALL_PRO_CHANGE_1516_HS4	11.4613	15	15.49525	4.00086
Pair 3	SCI_ALL_PRO_CHANGE_1516_HS3	.683885	15	3.4862850	.9001549
	SCI_ALL_PRO_CHANGE_1516_HS4	3.235411	15	4.5850768	1.1838617
Pair 4	GRAD_ALL_CHANGE_1516_HS3	-.315331	15	1.7880836	.4616812
	GRAD_ALL_CHANGE_1516_HS4	.229388	15	1.7414398	.4496378

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_ALL_PRO_CHANGE_1516_HS3 & ELA_ALL_PRO_CHANGE_1516_HS4	15	.405	.135
Pair 2	MATH_ALL_PRO_CHANGE_1516_HS3 & MATH_ALL_PRO_CHANGE_1516_HS4	15	.036	.899
Pair 3	SCI_ALL_PRO_CHANGE_1516_HS3 & SCI_ALL_PRO_CHANGE_1516_HS4	15	.214	.443
Pair 4	GRAD_ALL_CHANGE_1516_HS3 & GRAD_ALL_CHANGE_1516_HS4	15	-.139	.622

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_ALL_PRO_CHANGE_1516_HS3 - ELA_ALL_PRO_CHANGE_1516_HS4	-4.32667	22.42986	5.79137	-16.74791	8.09458	-.747	14	.467
Pair 2	MATH_ALL_PRO_CHANGE_1516_HS3 - MATH_ALL_PRO_CHANGE_1516_HS4	4.02400	22.25817	5.74703	-8.30216	16.35016	.700	14	.495
Pair 3	SCI_ALL_PRO_CHANGE_1516_HS3 - SCI_ALL_PRO_CHANGE_1516_HS4	-2.55157	5.1305380	1.3246992	-5.3927239	.2896706	-1.926	14	.075
Pair 4	GRAD_ALL_CHANGE_1516_HS3 - GRAD_ALL_CHANGE_1516_HS4	-.5447194	2.6636235	.6877446	-2.0197850	.9303461	-.792	14	.442

FRL STUDENT GROUP

2014-15

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_FRL_2015_HS3	23.675471872973198	14	14.8980090	3.981660390806775
	ELA_METPCT_FRL_2015_HS4	23.205400148987547	14	12.7214527	3.399951248576489
Pair 2	MATH_METPCT_FRL_2015_HS3	12.843469963302125	14	7.7480545	2.070754669982084
	MATH_METPCT_FRL_2015_HS4	11.167023659347707	14	5.2063419	1.391453428384271
Pair 3	SCI_METPCT_FRL_2015_HS3	64.320539715335070	15	11.5858585	2.991455818868968
	SCI_METPCT_FRL_2015_HS4	59.367643836446500	15	9.9465733	2.568194193874796
Pair 4	GRADPCT_FRL_2015_HS3	86.910599	15	5.5104055	1.4227806
	GRADPCT_FRL_2015_HS4	87.341701	15	5.5213241	1.4255998

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_FRL_2015_HS3 & ELA_METPCT_FRL_2015_HS4	14	.135	.646
Pair 2	MATH_METPCT_FRL_2015_HS3 & MATH_METPCT_FRL_2015_HS4	14	.086	.771
Pair 3	SCI_METPCT_FRL_2015_HS3 & SCI_METPCT_FRL_2015_HS4	15	-.015	.957
Pair 4	GRADPCT_FRL_2015_HS3 & GRADPCT_FRL_2015_HS4	15	-.174	.535

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	ELA_METPCT_FRL_2015_HS3 - ELA_METPCT_FRL_2015_HS4	.4700717239	18.240185	4.8748941	-10.061496	11.0016401	.096	13	.925
Pair 2	MATH_METPCT_FRL_2015_HS3 - MATH_METPCT_FRL_2015_HS4	1.6764463039	8.9564107	2.3937014	-3.4948312	6.8477238	.700	13	.496
Pair 3	SCI_METPCT_FRL_2015_HS3 - SCI_METPCT_FRL_2015_HS4	4.9528958788	15.3850919	3.9724136	-3.5670840	13.4728757	1.247	14	.233
Pair 4	GRADPCT_FRL_2015_HS3 - GRADPCT_FRL_2015_HS4	-.4311021	8.4529795	2.1825499	-5.1122062	4.2500019	-.198	14	.846

FRL STUDENT GROUP

2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_FRL_2016_HS3	69.388491	15	11.1946056	2.8904347
	ELA_METPCT_FRL_2016_HS4	67.741529	15	13.8240746	3.5693607
Pair 2	MATH_METPCT_FRL_2016_HS3	21.439308	15	11.0286233	2.8475783
	MATH_METPCT_FRL_2016_HS4	18.651481	15	13.3519358	3.4474550
Pair 3	SCI_METPCT_FRL_2016_HS3	65.224477	15	9.4350833	2.4361280
	SCI_METPCT_FRL_2016_HS4	65.330558	15	8.7134375	2.2497999
Pair 4	GRADPCT_FRL_2016_HS3	86.212827	15	5.7214979	1.4772844
	GRADPCT_FRL_2016_HS4	88.877366	15	4.8650691	1.2561554

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_FRL_2016_HS3 & ELA_METPCT_FRL_2016_HS4	15	.462	.083
Pair 2	MATH_METPCT_FRL_2016_HS3 & MATH_METPCT_FRL_2016_HS4	15	-.026	.927
Pair 3	SCI_METPCT_FRL_2016_HS3 & SCI_METPCT_FRL_2016_HS4	15	.545	.036
Pair 4	GRADPCT_FRL_2016_HS3 & GRADPCT_FRL_2016_HS4	15	.026	.926

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ELA_METPCT_FRL_2016_HS3 - ELA_METPCT_FRL_2016_HS4	1.6469624	13.1661705	3.3994906	-5.6442198	8.9381446	.484	14	.636
Pair 2	MATH_METPCT_FRL_2016_HS3 - MATH_METPCT_FRL_2016_HS4	2.7878272	17.5371684	4.5280774	-6.9239329	12.4995874	.616	14	.548
Pair 3	SCI_METPCT_FRL_2016_HS3 - SCI_METPCT_FRL_2016_HS4	-.1060814	8.6814220	2.2415335	-4.9136927	4.7015298	-.047	14	.963
Pair 4	GRADPCT_FRL_2016_HS3 - GRADPCT_FRL_2016_HS4	-2.6645394	7.4127447	1.9139625	-6.7695806	1.4405018	-1.392	14	.186

FRL STUDENT GROUP

Change from 2015 to 2016

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_FRL_PRO_CHANGE_1516_HS3	44.745995	14	18.2165232	4.8685706
	ELA_FRL_PRO_CHANGE_1516_HS4	45.133738	14	19.5262635	5.2186134
Pair 2	MATH_FRL_PRO_CHANGE_1516_HS3	9.805788	14	8.8519312	2.3657781
	MATH_FRL_PRO_CHANGE_1516_HS4	7.923848	14	10.4222404	2.7854609
Pair 3	SCI_FRL_PRO_CHANGE_1516_HS3	.903937	15	8.6152677	2.2244526
	SCI_FRL_PRO_CHANGE_1516_HS4	5.962914	15	7.7914902	2.0117541
Pair 4	GRAD_FRL_CHANGE_1516_HS3	-.697772	15	3.2591524	.8415095
	GRAD_FRL_CHANGE_1516_HS4	1.535665	15	4.1910225	1.0821174

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_FRL_PRO_CHANGE_1516_HS3 & ELA_FRL_PRO_CHANGE_1516_HS4	14	.521	.056
Pair 2	MATH_FRL_PRO_CHANGE_1516_HS3 & MATH_FRL_PRO_CHANGE_1516_HS4	14	-.048	.870
Pair 3	SCI_FRL_PRO_CHANGE_1516_HS3 & SCI_FRL_PRO_CHANGE_1516_HS4	15	.007	.981
Pair 4	GRAD_FRL_CHANGE_1516_HS3 & GRAD_FRL_CHANGE_1516_HS4	15	.217	.437

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_FRL_PRO_CHANGE_1516_HS3 - ELA_FRL_PRO_CHANGE_1516_HS4	-.3877427	18.5043354	4.9454917	-11.0718279	10.2963425	-.078	13	.939
Pair 2	MATH_FRL_PRO_CHANGE_1516_HS3 - MATH_FRL_PRO_CHANGE_1516_HS4	1.8819400	13.9957897	3.7405321	-6.1989884	9.9628684	.503	13	.623
Pair 3	SCI_FRL_PRO_CHANGE_1516_HS3 - SCI_FRL_PRO_CHANGE_1516_HS4	-5.0589773	11.5775325	2.9893060	-11.4704011	1.3524465	-1.692	14	.113
Pair 4	GRAD_FRL_CHANGE_1516_HS3 - GRAD_FRL_CHANGE_1516_HS4	-2.2334373	4.7177872	1.2181274	-4.8460607	.3791861	-1.834	14	.088

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_H_2015_HS3	23.346598	14	12.2619873	3.2771540
	ELA_METPCT_H_2015_HS4	21.041761	14	14.5553936	3.8900926
Pair 2	MATH_METPCT_H_2015_HS3	12.843470	14	7.7480545	2.0707547
	MATH_METPCT_H_2015_HS4	11.167024	14	5.2063420	1.3914534
Pair 3	SCI_METPCT_H_2015_HS3	63.150672	15	14.5492625	3.7566034
	SCI_METPCT_H_2015_HS4	58.807570	15	14.7445821	3.8070347
Pair 4	GRADPCT_H_2015_HS3	89.368775	14	5.5292377	1.4777509
	GRADPCT_H_2015_HS4	88.902236	14	4.6981163	1.2556244

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_H_2015_HS3 & ELA_METPCT_H_2015_HS4	14	.196	.503
Pair 2	MATH_METPCT_H_2015_HS3 & MATH_METPCT_H_2015_HS4	14	.086	.771
Pair 3	SCI_METPCT_H_2015_HS3 & SCI_METPCT_H_2015_HS4	15	.311	.259
Pair 4	GRADPCT_H_2015_HS3 & GRADPCT_H_2015_HS4	14	.463	.096

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	
Pair 1	ELA_METPCT_H_2015_HS3 - ELA_METPCT_H_2015_HS4	2.3048369	17.0988947	4.5698718	-7.5677709	12.1774448	.504	13	.622
Pair 2	MATH_METPCT_H_2015_HS3 - MATH_METPCT_H_2015_HS4	1.6764463	8.9564107	2.3937015	-3.4948313	6.8477239	.700	13	.496
Pair 3	SCI_METPCT_H_2015_HS3 - SCI_METPCT_H_2015_HS4	4.3431025	17.1958631	4.4399528	-5.1796491	13.8658541	.978	14	.345
Pair 4	GRADPCT_H_2015_HS3 - GRADPCT_H_2015_HS4	.4665386	5.3488745	1.4295469	-2.6218096	3.5548868	.326	13	.749

HISPANIC STUDENT GROUP

2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_H_2016_HS3	68.320570	15	12.5060961	3.2290601
	ELA_METPCT_H_2016_HS4	67.863765	15	15.3809176	3.9713359
Pair 2	MATH_METPCT_H_2016_HS3	22.707501	15	13.4983595	3.4852614
	MATH_METPCT_H_2016_HS4	19.490916	15	15.8153980	4.0835182
Pair 3	SCI_METPCT_H_2016_HS3	61.149422	15	19.1434496	4.9428174
	SCI_METPCT_H_2016_HS4	63.056513	15	21.1542533	5.4620047
Pair 4	GRADPCT_H_2016_HS3	87.534375	14	7.0353985	1.8802893
	GRADPCT_H_2016_HS4	89.181934	14	5.0790927	1.3574446

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_H_2016_HS3 & ELA_METPCT_H_2016_HS4	15	.329	.232
Pair 2	MATH_METPCT_H_2016_HS3 & MATH_METPCT_H_2016_HS4	15	.084	.765
Pair 3	SCI_METPCT_H_2016_HS3 & SCI_METPCT_H_2016_HS4	15	.830	.000
Pair 4	GRADPCT_H_2016_HS3 & GRADPCT_H_2016_HS4	14	.385	.174

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	ELA_METPCT_H_2016_HS3 - ELA_METPCT_H_2016_HS4	.4568043	16.327614	4.2157717	-8.5851268	9.4987354	.108	14	.915
Pair 2	MATH_METPCT_H_2016_HS3 - MATH_METPCT_H_2016_HS4	3.2165851	19.907401	5.1400688	-7.8077661	14.2409363	.626	14	.542
Pair 3	SCI_METPCT_H_2016_HS3 - SCI_METPCT_H_2016_HS4	-1.9070907	11.897758	3.0719879	-8.4958493	4.6816680	-.621	14	.545
Pair 4	GRADPCT_H_2016_HS3 - GRADPCT_H_2016_HS4	-1.6475587	6.911996	1.8473087	-5.6384265	2.3433091	-.892	13	.389

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CHANGE FROM 2015 to 2016

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_H_PRO_CHANGE_1516_HS3	44.009857	14	16.6110793	4.4394977
	ELA_H_PRO_CHANGE_1516_HS4	47.332682	14	21.8889497	5.8500679
Pair 2	MATH_H_PRO_CHANGE_1516_HS3	11.164567	14	9.4808720	2.5338696
	MATH_H_PRO_CHANGE_1516_HS4	8.950794	14	13.8723865	3.7075512
Pair 3	SCI_H_PRO_CHANGE_1516_HS3	-2.001250	15	22.4707551	5.8019240
	SCI_H_PRO_CHANGE_1516_HS4	4.248943	15	12.2462101	3.1619579
Pair 4	GRAD_H_CHANGE_1516_HS3	-1.712107	15	4.9672078	1.2825275
	GRAD_H_CHANGE_1516_HS4	.199322	15	4.7635526	1.2299440

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_H_PRO_CHANGE_1516_HS3 & ELA_H_PRO_CHANGE_1516_HS4	14	.498	.070
Pair 2	MATH_H_PRO_CHANGE_1516_HS3 & MATH_H_PRO_CHANGE_1516_HS4	14	.303	.292
Pair 3	SCI_H_PRO_CHANGE_1516_HS3 & SCI_H_PRO_CHANGE_1516_HS4	15	.645	.009
Pair 4	GRAD_H_CHANGE_1516_HS3 & GRAD_H_CHANGE_1516_HS4	15	-.482	.069

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_H_PRO_CHANGE_1516_HS3 - ELA_H_PRO_CHANGE_1516_HS4	-3.3228249	19.827209	5.2990445	-14.7707146	8.1250649	-.627	13	.541
Pair 2	MATH_H_PRO_CHANGE_1516_HS3 - MATH_H_PRO_CHANGE_1516_HS4	2.2137724	14.231937	3.8036452	-6.0035035	10.4310483	.582	13	.571
Pair 3	SCI_H_PRO_CHANGE_1516_HS3 - SCI_H_PRO_CHANGE_1516_HS4	-6.2501931	17.325006	4.4732973	-15.8444615	3.3440753	-1.397	14	.184
Pair 4	GRAD_H_CHANGE_1516_HS3 - GRAD_H_CHANGE_1516_HS4	-1.9114291	8.375600	2.1625706	-6.5496818	2.7268236	-.884	14	.392

WHITE STUDENTS GROUP

2014-15

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_W_2015_HS3	32.613799	15	22.2568694	5.7466990
	ELA_METPCT_W_2015_HS4	26.334945	15	16.2034887	4.1837228
Pair 2	MATH_METPCT_W_2015_HS3	18.769912	15	10.7909675	2.7862158
	MATH_METPCT_W_2015_HS4	15.801401	15	8.6903309	2.2438338
Pair 3	SCI_METPCT_W_2015_HS3	83.128776	15	8.3533460	2.1568247
	SCI_METPCT_W_2015_HS4	81.158378	15	6.2221947	1.6065638
Pair 4	GRADPCT_W_2015_HS3	92.206861	15	3.2601134	.8417577
	GRADPCT_W_2015_HS4	92.932131	15	3.0705163	.7928039

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_W_2015_HS3 & ELA_METPCT_W_2015_HS4	15	.076	.787
Pair 2	MATH_METPCT_W_2015_HS3 & MATH_METPCT_W_2015_HS4	15	-.005	.985
Pair 3	SCI_METPCT_W_2015_HS3 & SCI_METPCT_W_2015_HS4	15	.497	.059
Pair 4	GRADPCT_W_2015_HS3 & GRADPCT_W_2015_HS4	15	.138	.624

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_METPCT_W _2015_HS3 - ELA_METPCT_W _2015_HS4	6.2788536	26.5122214	6.8454261	-8.4031253	20.9608324	.917	14	.375
Pair 2	MATH_METPCT_ W_2015_HS3 - MATH_METPCT_ W_2015_HS4	2.9685102	13.8913347	3.5867272	-4.7242545	10.6612749	.828	14	.422
Pair 3	SCI_METPCT_W _2015_HS3 - SCI_METPCT_W _2015_HS4	1.9703988	7.5385437	1.9464436	-2.2043075	6.1451052	1.012	14	.329
Pair 4	GRADPCT_W_20 15_HS3 - GRADPCT_W_20 15_HS4	-.7252707	4.1590386	1.0738592	-3.0284695	1.5779281	-.675	14	.510

WHITE STUDENTS GROUP

2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_W_2016_HS3	83.813502	15	8.4610345	2.1846297
	ELA_METPCT_W_2016_HS4	83.171473	15	11.2678350	2.9093425
Pair 2	MATH_METPCT_W_2016_HS3	34.949126	15	17.4788617	4.5130227
	MATH_METPCT_W_2016_HS4	28.166426	15	16.9104432	4.3662577
Pair 3	SCI_METPCT_W_2016_HS3	83.619325	15	7.4925881	1.9345779
	SCI_METPCT_W_2016_HS4	82.843772	15	6.8818089	1.7768754
Pair 4	GRADPCT_W_2016_HS3	92.353247	15	3.8239152	.9873307
	GRADPCT_W_2016_HS4	93.491030	15	2.9802059	.7694859

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_W_2016_HS3 & ELA_METPCT_W_2016_HS4	15	.583	.023
Pair 2	MATH_METPCT_W_2016_HS3 & MATH_METPCT_W_2016_HS4	15	-.069	.808
Pair 3	SCI_METPCT_W_2016_HS3 & SCI_METPCT_W_2016_HS4	15	.623	.013
Pair 4	GRADPCT_W_2016_HS3 & GRADPCT_W_2016_HS4	15	-.027	.924

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_METPCT_W_2016_HS3 - ELA_METPCT_W_2016_HS4	.6420284	9.3517117	2.4146016	-4.5367769	5.8208338	.266	14	.794
Pair 2	MATH_METPCT_W_2016_HS3 - MATH_METPCT_W_2016_HS4	6.7827005	25.1409508	6.4913656	-7.1398940	20.7052950	1.045	14	.314
Pair 3	SCI_METPCT_W_2016_HS3 - SCI_METPCT_W_2016_HS4	.7755538	6.2626774	1.6170163	-2.6926013	4.2437089	.480	14	.639
Pair 4	GRADPCT_W_2016_HS3 - GRADPCT_W_2016_HS4	-1.1377830	4.9106780	1.2679316	-3.8572258	1.5816598	-.897	14	.385

WHITE STUDENTS GROUP

CHANGE 2014-15 to 2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_W_PRO_CHANGE_1516_HS3	51.199703	15	22.7030786	5.8619096
	ELA_W_PRO_CHANGE_1516_HS4	56.836528	15	20.9820167	5.4175334
Pair 2	MATH_W_PRO_CHANGE_1516_HS3	16.179214	15	17.1568399	4.4298770
	MATH_W_PRO_CHANGE_1516_HS4	12.365024	15	15.2980127	3.9499299
Pair 3	SCI_W_PRO_CHANGE_1516_HS3	.490548	15	3.6477486	.9418446
	SCI_W_PRO_CHANGE_1516_HS4	1.685393	15	4.6069208	1.1895018
Pair 4	GRAD_W_CHANGE_1516_HS3	.146387	15	2.4498649	.6325524
	GRAD_W_CHANGE_1516_HS4	.558899	15	1.4398328	.3717632

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_W_PRO_CHANGE_1516_HS3 & ELA_W_PRO_CHANGE_1516_HS4	15	.311	.259
Pair 2	MATH_W_PRO_CHANGE_1516_HS3 & MATH_W_PRO_CHANGE_1516_HS4	15	.082	.771
Pair 3	SCI_W_PRO_CHANGE_1516_HS3 & SCI_W_PRO_CHANGE_1516_HS4	15	.211	.450
Pair 4	GRAD_W_CHANGE_1516_HS3 & GRAD_W_CHANGE_1516_HS4	15	-.370	.174

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	ELA_W_PRO_CHANGE_1516_HS3 - ELA_W_PRO_CHANGE_1516_HS4	-5.63682	25.675281	6.6293292	-19.85532	8.5816719	-.850	14	.409
Pair 2	MATH_W_PRO_CHANGE_1516_HS3 - MATH_W_PRO_CHANGE_1516_HS4	3.81419	22.027620	5.6875072	-8.38429	16.0126801	.671	14	.513
Pair 3	SCI_W_PRO_CHANGE_1516_HS3 - SCI_W_PRO_CHANGE_1516_HS4	-1.19484	5.238301	1.3525235	-4.09571	1.7060294	-.883	14	.392
Pair 4	GRAD_W_CHANGE_1516_HS3 - GRAD_W_CHANGE_1516_HS4	-.412512	3.269309	.8441320	-2.22299	1.3979708	-.489	14	.633

SWD STUDENT GROUP

2014-15

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_SWD_2015_HS3	11.483251	14	7.7915864	2.0823891
	ELA_METPCT_SWD_2015_HS4	10.503129	14	6.9225584	1.8501316
Pair 2	MATH_METPCT_SWD_2015_HS3	5.848152	13	2.3233108	.6443705
	MATH_METPCT_SWD_2015_HS4	6.601276	13	3.6886538	1.0230485
Pair 3	SCI_METPCT_SWD_2015_HS3	25.653380	13	15.1293701	4.1961323
	SCI_METPCT_SWD_2015_HS4	23.704660	13	10.6989283	2.9673488
Pair 4	GRADPCT_SWD_2015_HS3	77.244515	14	10.6198724	2.8382803
	GRADPCT_SWD_2015_HS4	82.063131	14	10.7947442	2.8850167

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_SWD_2015_HS3 & ELA_METPCT_SWD_2015_HS4	14	-.152	.605
Pair 2	MATH_METPCT_SWD_2015_HS3 & MATH_METPCT_SWD_2015_HS4	13	.088	.774
Pair 3	SCI_METPCT_SWD_2015_HS3 & SCI_METPCT_SWD_2015_HS4	13	.468	.107
Pair 4	GRADPCT_SWD_2015_HS3 & GRADPCT_SWD_2015_HS4	14	.086	.769

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_METPCT_SWD_2015_HS3 - ELA_METPCT_SWD_2015_HS4	.9801219	11.1800034	2.9879816	-5.4750198	7.4352637	.328	13	.748
Pair 2	MATH_METPCT_SWD_2015_HS3 - MATH_METPCT_SWD_2015_HS4	-.7531241	4.1818196	1.1598281	-3.2801724	1.7739242	-.649	12	.528
Pair 3	SCI_METPCT_SWD_2015_HS3 - SCI_METPCT_SWD_2015_HS4	1.9487206	13.8561936	3.8430167	-6.4244934	10.3219346	.507	12	.621
Pair 4	GRADPCT_SWD_2015_HS3 - GRADPCT_SWD_2015_HS4	-4.8186163	14.4743747	3.8684394	-13.1758715	3.5386388	-1.246	13	.235

SWD STUDENT GROUP

2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_METPCT_SWD_2016_HS3	43.312237	13	19.4922177	5.4061685
	ELA_METPCT_SWD_2016_HS4	40.691512	13	15.6192103	4.3319895
Pair 2	MATH_METPCT_SWD_2016_HS3	17.691158	13	13.4760159	3.7375743
	MATH_METPCT_SWD_2016_HS4	15.648130	13	11.7016688	3.2454590
Pair 3	SCI_METPCT_SWD_2016_HS3	30.393822	14	12.9691772	3.4661584
	SCI_METPCT_SWD_2016_HS4	32.618395	14	15.3331191	4.0979485
Pair 4	GRADPCT_SWD_2016_HS3	75.437430	13	9.3734020	2.5997140
	GRADPCT_SWD_2016_HS4	82.626003	13	7.8790768	2.1852627

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_METPCT_SWD_2016_HS3 & ELA_METPCT_SWD_2016_HS4	13	.373	.210
Pair 2	MATH_METPCT_SWD_2016_HS3 & MATH_METPCT_SWD_2016_HS4	13	.321	.285
Pair 3	SCI_METPCT_SWD_2016_HS3 & SCI_METPCT_SWD_2016_HS4	14	.548	.043
Pair 4	GRADPCT_SWD_2016_HS3 & GRADPCT_SWD_2016_HS4	13	.149	.626

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ELA_METPCT_SWD_2016_HS3 - ELA_METPCT_SWD_2016_HS4	2.6207247	19.9246670	5.5261083	-9.4196310	14.6610805	.474	12	.644
Pair 2	MATH_METPCT_SWD_2016_HS3 - MATH_METPCT_SWD_2016_HS4	2.0430279	14.7433961	4.0890824	-6.8663172	10.9523731	.500	12	.626
Pair 3	SCI_METPCT_SWD_2016_HS3 - SCI_METPCT_SWD_2016_HS4	-2.2245729	13.6163534	3.6391235	-10.0864214	5.6372755	-.611	13	.552
Pair 4	GRADPCT_SWD_2016_HS3 - GRADPCT_SWD_2016_HS4	-7.1885736	11.3076737	3.1361844	-14.0217325	-.3554148	-2.292	12	.041

SWD STUDENT GROUP

CHANGE 2014-15 TO 2015-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ELA_SWD_PRO_CHANGE_1516_HS3	32.0852604330	13	18.96601811	5.2602269851
	ELA_SWD_PRO_CHANGE_1516_HS4	29.9502510278	13	17.74544994	4.9220179048
Pair 2	MATH_SWD_PRO_CHANGE_1516_HS3	12.8299234999	12	13.87801146	4.0062368268
	MATH_SWD_PRO_CHANGE_1516_HS4	9.80075876790	12	13.20688114	3.8124981922
Pair 3	SCI_SWD_PRO_CHANGE_1516_HS3	4.73729107187	13	6.85389946	1.9009296897
	SCI_SWD_PRO_CHANGE_1516_HS4	9.38664366551	13	13.61575980	3.7763323166
Pair 4	GRAD_SWD_CHANGE_1516_HS3	-1.2105092118	13	10.39197946	2.8822165236
	GRAD_SWD_CHANGE_1516_HS4	1.5964775742	13	7.77461666	2.1562906948

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ELA_SWD_PRO_CHANGE_1516_HS3 & ELA_SWD_PRO_CHANGE_1516_HS4	13	.300	.320
Pair 2	MATH_SWD_PRO_CHANGE_1516_HS3 & MATH_SWD_PRO_CHANGE_1516_HS4	12	.444	.148
Pair 3	SCI_SWD_PRO_CHANGE_1516_HS3 & SCI_SWD_PRO_CHANGE_1516_HS4	13	-.292	.333
Pair 4	GRAD_SWD_CHANGE_1516_HS3 & GRAD_SWD_CHANGE_1516_HS4	13	-.640	.018

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	ELA_SWD_PRO_CHANGE_1516_HS3 - ELA_SWD_PRO_CHANGE_1516_HS4	2.135009	21.745639	6.03115	-11.005749	15.27576	.354	12	.729
Pair 2	MATH_SWD_PRO_CHANGE_1516_HS3 - MATH_SWD_PRO_CHANGE_1516_HS4	3.029164	14.293473	4.12617	-6.052475	12.11080	.734	11	.478
Pair 3	SCI_SWD_PRO_CHANGE_1516_HS3 - SCI_SWD_PRO_CHANGE_1516_HS4	-4.649352	16.935882	4.69716	-14.883603	5.58489	-.990	12	.342
Pair 4	GRAD_SWD_CHANGE_1516_HS3 - GRAD_SWD_CHANGE_1516_HS4	-2.80698	16.48900	4.573227	-12.771193	7.1572194	-.614	12	.551