



A Study of the Efficacy of Apex Learning Digital Curriculum in the Performance Based Diploma Program Year 1

Sarasota County Schools

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Introduction

Sarasota County Schools (SCS) uses Apex Learning Comprehensive Courses to provide customized, self-paced coursework designed to meet the needs of high school students participating in the Performance Based Diploma (PBD) Program. The Performance Based Diploma Program, an alternative education program implemented on-site in each high school, serves students who have not achieved success in the traditional classroom and are at risk of dropping out of high school or not graduating at the end of four years. The goal of PBD is to give at-risk students the opportunity to master course content at their own pace, earn course credits, and graduate college and career-ready instead of dropping out of school.

Students participating in PBD complete Apex Learning Comprehensive Courses for initial credit or credit recovery at home or in a high school computer lab supported by certified teachers dedicated to the PBD program. Apex Learning Comprehensive Courses provide computerized direct instruction of content aligned to the Florida Next Generation Sunshine State Standards in subjects including English language arts (ELA), mathematics, science, social studies, and many electives. PBD employs a feature of Apex Learning digital curriculum called mastery-based learning. District and school administrators set mastery-based learning at 70%, requiring a student to pass all graded assignments and tests at 70% or above before progressing to the next unit of instruction. Teachers monitor student progress and work with students individually and in small groups to facilitate learning. Students complete proctored Apex Learning tests in the computer lab and are unable to access tests from home.

In the 2013–2014 school year, Florida administered end-of- course (EOC) assessments to evaluate mastery of the Next Generation Sunshine State Standards in Algebra I, Geometry, Biology, and U.S. History. The FCAT 2.0 Reading Retake was also administered to students who previously failed the initial FCAT 2.0 Grade 10 Reading assessment.

This study examined the impact of using Apex Learning Comprehensive Courses on EOC and FCAT 2.0 Reading Retake performance on assessments administered during 2013–2014. The achievement of students using Apex Learning courses that lead to an EOC assessment was compared to similar students completing courses in traditional classroom environments. The achievement of students using Apex Learning English language arts (ELA) courses prior to taking the FCAT 2.0 Reading Retake exam was compared to similar students who also failed the initial FCAT Grade 10 Reading exam but completed ELA courses in traditional classroom environments.

A total of 335 students who completed 374 Apex Learning courses leading to an EOC or FCAT Reading Retake assessment were included in the study. SCS students in Apex Learning courses:

- Have an average eighth-grade pre-test ability equivalent to the 21st percentile in relation to SCS district norms
- Are mostly white (58%) and male (58%)
- Eighteen percent have a disability
- Completed 97% of their coursework with an average quality of work of 79%

Located in the appendix, table 2 provides detailed demographic and prior achievement characteristics of students included in the study using Apex Learning courses and the comparison group. Table 5 shows average usage statistics for Apex Learning courses completed by students in the analytic sample by EOC and FCAT Reading Retake assessment.

Results

What is the impact of Apex Learning Comprehensive Courses on credits earned?

SCS students earned a total of 2,945 credits using Apex Learning Comprehensive Courses. Overall, 78.2% of students who attempted a course earned credit. The percent of credits earned for courses attempted ranged from 69.1% to 83.6% by subject. Additionally, 99.5% of students who completed Apex Learning Comprehensive Courses earned credit. Table 1 below shows the number and percent of credits attempted and earned for attempted and completed courses by subject. Table 3 in the appendix shows Apex Learning course usage characteristics for students who completed courses.

Table 1: Apex Learning attempted and completed courses: credits attempted and earned								
	Attempted Courses					Completed Courses		
	Courses Attempted ¹	Courses Completed ²	Credits Attempted	Credits Earned		Credits Attempted	Credits Earned	
Subject	N	%	N	N	%	N	N	%
English	1,676	79.7%	842.5	668.0	79.3%	669.5	668.0	99.8%
Math	2,032	69.3%	1,020.5	705.5	69.1%	707.0	705.5	99.8%
Science	1,218	80.5%	609.5	490.5	80.5%	490.5	490.5	100.0%
Social Studies	1,707	83.9%	1,293.0	1,081.0	83.6%	1,093.5	1,081.0	98.9%
Subjects Combined	6,633	77.7%	3,765.0	2,945.0	78.2%	2,960.5	2,945.0	99.5%

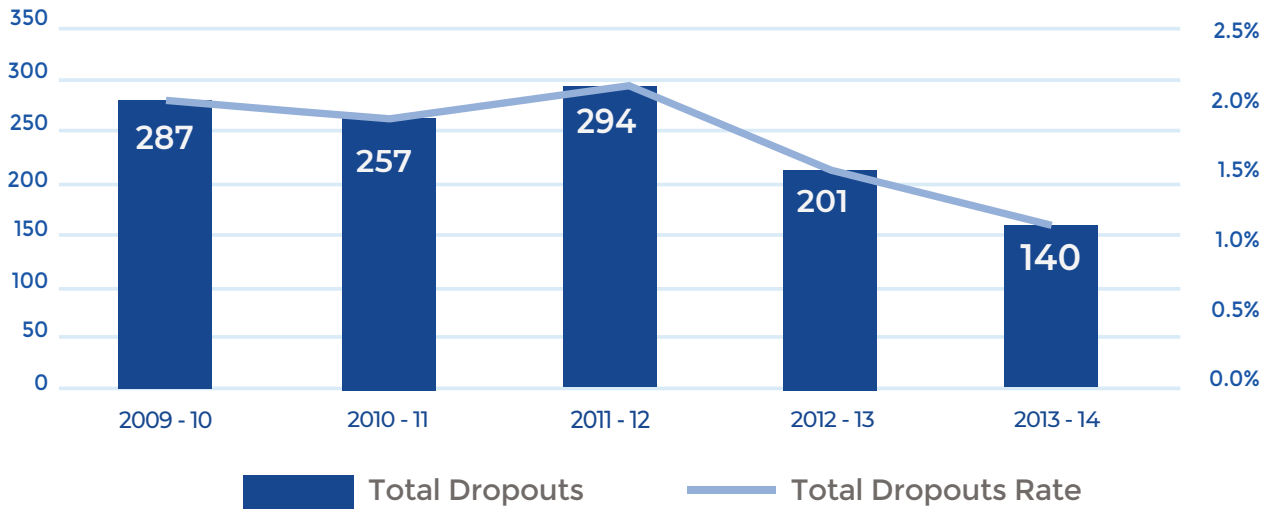
¹ Courses attempted include all courses in a given subject including those not leading to an EOC or FCAT 2.0 Reading Retake exam. Semester-long courses are worth 0.5 credits. Year-long courses are worth 1 credit.

² Courses are designated completed when teacher enters a final grade into the learning management system.

How has the dropout rate changed since implementing Apex Learning Comprehensive Courses in the Performance Based Diploma program?

Since implementing Apex Learning Comprehensive Courses in 2010–2011, the district dropout rate has decreased by 49%. The total number of students who dropped out of school decreased by 51% from 287 in school year 2009–2010 to 140 in 2013–2014.

Sarasota County Schools dropout statistics



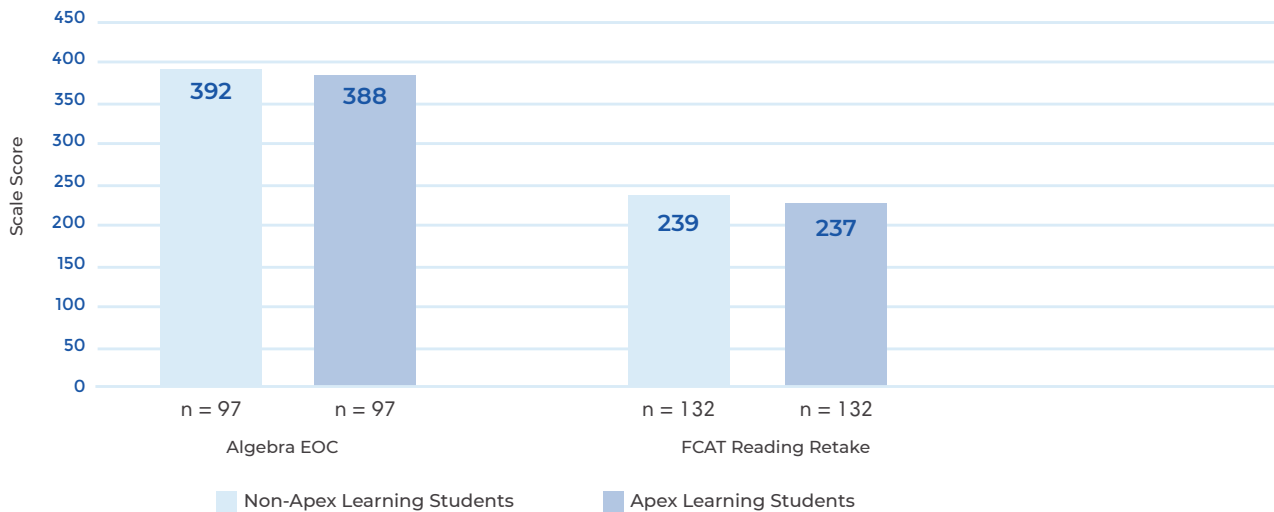
Source: Florida Department of Education Archives

Do students completing Apex Learning Comprehensive Courses perform the same as or better on EOC and FCAT 2.0 Reading Retake assessments than similar students not using Apex Learning Comprehensive Courses?

The achievement of students using Apex Learning is not significantly different than students enrolled in traditional classroom settings for EOC exams that require a passing score to be eligible for graduation. These exams include Algebra I EOC and the FCAT 2.0 Reading Retake assessments ($p > .05$) (graph 2).

Graph 2:

Average scale scores for EOC exams requiring a passing score for graduation

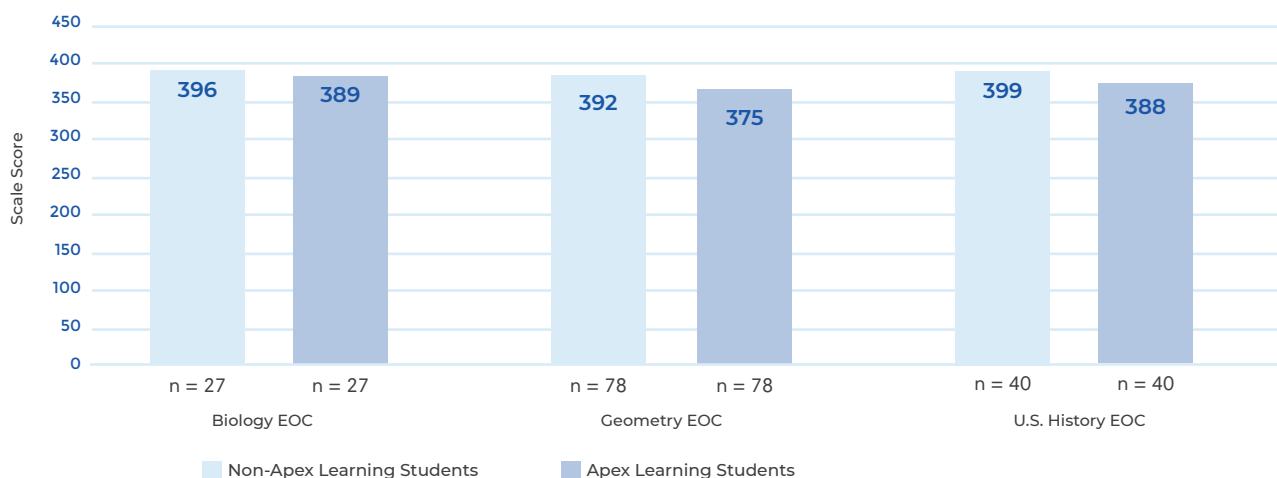


sig.p>.05
Means adjusted for pretest ability, minority, gender, limited English proficiency, disability, grade level, and school.

For EOC exams that do not require a passing score for graduation, the achievement of students using Apex Learning compared to students enrolled in traditional classroom settings is mixed. Graph 3 shows the average scale score by exam. The achievement of students using Apex Learning is not significantly different for Biology ($p > .05$); but is lower for Geometry and U.S. History ($p < .05$).

Graph 3:

Average scale scores for EOC exams not requiring a passing score for graduation



†sig. $p < .05$
 Means adjusted for pretest ability, minority, gender, limited English proficiency, disability, grade level, and school.

Discussion

The results of the analysis were confounded by two factors. First, selection-history bias was inherent in the research design. Although both groups have similar eighth-grade academic ability and demographic characteristics, students in the Apex Learning group have been identified as at risk of dropping out of high school. Characteristics of being at risk of dropping out associated with lower academic achievement include failing previous classes, lacking credits needed to graduate on time, and difficult life circumstances (E. M. Allensworth, July 2007). These characteristics were not able to be controlled with the available data, therefore the scores of students using Apex Learning digital curriculum are underestimated. Even so, the difference between student achievement in Algebra I, Biology, and FCAT 2.0 Reading Retake scores is not statistically significant.

The second issue that may have confounded the results involves student motivation for taking the exam. Students were required to pass the Algebra I EOC and FCAT 2.0 Grade 10 Reading Retake assessments in order to graduate with a diploma. Students were not required to pass the remaining three EOC exams in order to graduate. Instead, scores on the Biology, Geometry, and U.S. History EOC assessments were averaged into the course grade, accounting for a total of 30% of the final course grade. Students could achieve a less than passing score on the Biology, Geometry, and U.S. History exams and complete the course with a passing grade leading to course credit needed for graduation.

As a result of selection-history bias and motivation for taking the exam, the impact of Apex Learning Comprehensive Courses leading to Geometry and U.S. History EOC assessments could not be estimated with the data provided.

Conclusion

SCS uses Apex Learning Comprehensive Courses as curriculum in the PBD Program, an alternative education program for students at risk of dropping out of high school. Students in this program have failed previous classes, lack credits needed to graduate on time, and experience difficult life circumstances that make earning a high school diploma in a traditional classroom environment challenging. The goal of PBD is to graduate students at risk of dropping out, increasingly college and career ready. Since implementing Apex Learning Comprehensive Courses in SY 2010–2011, the district dropout rate has decreased by half.

In SY 2013–2014, students in the PBD Program earned 2,945 credits for successfully completing 78% of attempted Apex Learning Comprehensive Courses. More than 99% of students who completed Apex Learning Comprehensive Courses achieved a passing grade and earned credit needed for graduation. Although at risk of dropping out of high school, students in the PBD program performed at the same level on EOC exams required for graduation (Algebra I EOC and FCAT 2.0 Reading Retake) as students with similar eighth-grade prior ability and demographic characteristics who were not identified as being at risk of dropping out of high school.

Study Description

Study Design

This quasi-experimental study used a case-control group design. The effectiveness of Apex Learning Comprehensive Courses was evaluated by comparing the achievement of students who used the digital curriculum to similar students who completed coursework in a traditional classroom environment.

The study design is limited due to selection bias that exists due to differences in participant history: students in the Apex Learning group have been identified as at risk of dropping out of high school due to lack of credits as a result of previous course failure and/or difficult personal circumstances. Furthermore, the data available did not allow for poverty to be controlled. Significant negative differences between groups are likely related to selection-history bias and not the intervention.

Participants

Students included in the study completed at least one subject-area EOC or FCAT 2.0 Reading Retake assessment during SY2013 – 2014 and the eighth-grade Florida Comprehensive Assessment Test (FCAT). Table 1 in the appendix shows the demographic and prior-ability characteristics of the Apex Learning and comparison groups.

Data Preparation

Two steps were completed to create the final analytical dataset. The steps included joining the files provided by SCS and Apex Learning and generating a matched comparison group for each assessment.

Joining the Files

SCS provided assessment data including EOC scale scores, performance levels, and eighth-grade FCAT scale scores. The files included the following demographic variables: limited English proficiency (LEP) and disability indicators, gender, student grade level, school identifier, reported race, and birthday. Eighth-grade FCAT subject area results were used as a measure of prior ability for each assessment.

Assessment data were provided for all high school students in the district who completed an assessment during SY2013 – 2014 and for all students who completed an eighth-grade FCAT in SY2009 – 2010 through SY2012 – 2013. For each assessment, scale scores were pooled across administrations for a given school year and were transformed into standardized z-scores. Student records for each EOC and FCAT 2.0 Reading Retake assessment were appended with the appropriate subject area Grade 8 FCAT score (e.g. FCAT Math appended to Algebra 1 EOC). Student records with both pre-and post-test scores were included in the final assessment data file.

Apex Learning provided course records for all students enrolled in any Apex Learning course in SCS prior to July 2014. The data file included school name, classroom name, course track, course title, number and percent of activities completed, total minutes used, quality of work, and overall course percent correct metrics.

The Florida Department of Education EOC Corresponding Course List was used to identify Apex Learning courses that lead to an EOC assessment. Apex Learning English language arts courses were selected as courses that lead to an FCAT 2.0 Reading Retake exam. Apex Learning course records for enrollments that completed 75% or more of course activities were joined to each assessment file.

Generating a comparison group

For each assessment file, case-control matching and sampling without replacement was used to generate a comparison group to match Apex Learning users by prior ability and demographic characteristics.

Analysis

Analysis of covariance was used to compare the average achievement of students using Apex Learning courses to the comparison group of students not using Apex Learning, controlling for pretest ability, race/ethnicity, gender, LEP status, disability status, and student grade level. School was fitted as a random effect to control for

Outcomes Measures

Two types of assessments were used as outcome measures. EOC assessments measure student content mastery in four courses including Algebra 1, Biology, Geometry, and U.S. History. Assessments were administered in the fall, winter, spring, and summer of SY2013 – 2014. FCAT 2.0 Reading Retake assessments measure the Next Generation Sunshine State Standards for Grade 10 reading. Reading Retake exams were administered in the fall and spring of SY2013 – 2014. Students are required to pass the Algebra I EOC and FCAT 2.0 Grade 10 Reading Retake assessment in order to graduate. Results of the Biology, Geometry, and U.S. History EOC assessments are averaged into the course final grade.

Works Cited

E. M. Allensworth, & J. Q. Easton (July 2007). What Matters for Staying On-Track and Graduating in Chicago Public High Schools : A Close Look at Course Grades, Failures, and Attendance in the Freshman Year. Chicago, IL: Consortium on Chicago School Research at University of Chicago. Retrieved on 7/20/15 from http://solaris.techlab360.org/sites/default/files/document_library/07%20What%20Matters%20Final.pdf

Appendix

Table 2. Demographic characteristics and academic achievement by group								
Demographic Characteristics	Comparison Group		Apex Learning Group		Total			
	N	%	N	%	N			
Student Count	374	100%	374	100%	748			
9th Grade	16	4%	16	4%	32			
10th Grade	103	28%	106	28%	209			
11th Grade	177	47%	151	40%	328			
12th Grade	78	21%	101	27%	179			
Female	156	42%	156	42%	312			
Male	217	58%	217	58%	434			
Unknown	1	0%	1	0%	2			
Asian	2	1%	0	0%	2			
Black	55	15%	59	16%	114			
Hispanic	82	22%	61	16%	143			
Native American	2	1%	2	1%	4			
Multi-racial	16	4%	27	7%	43			
Unknown	1	0%	0	0%	1			
White	216	58%	225	60%	441			
LEP-Y	3	1%	5	1%	8			
Disability-Y†	69	18%	69	18%	138			
Pre-Test Scores by EOC or FCAT Retake Exam								
Exam	Pretest Z-Scores	N	Mean	StdDev	N	Mean	StdDev	N
Algebra 1 EOC	Gr8 FCAT Math	97	-0.9	0.7	97	-1.0	0.8	194
Biology EOC	Gr8 FCAT Science	27	-0.6	1.0	27	-0.5	0.9	54
FCAT Reading Retake	Gr8 FCAT Reading	132	-0.9	0.8	132	-0.9	0.7	264
Geometry EOC	Gr8 FCAT Math	78	-0.8	0.8	78	-0.8	1.0	156
US History EOC	Gr8 FCAT Reading	40	-0.5	0.7	40	-0.5	0.6	80
EOC or FCAT Retake Exam								
Scale Scores		N	Mean	StdDev	N	Mean	StdDev	N
Algebra 1 EOC		97	393	21	97	388	24	194
Biology EOC		27	397	28	27	389	26	54
FCAT Reading Retakes		132	237	17	132	234	15	264
Geometry EOC		78	386	26	78	371	28	156
US History EOC		40	402	26	40	387	26	80

†Excluding gifted designation

Table 3. Apex Learning completed courses: usage by subject

		Number of Days to Completion	Activity Complete Percent	Quality of Work
Subject	N	Mean	Mean	Mean
English	1,335	91.2	96.4	82.1
Math	1,409	112.3	97.4	78.7
Science	981	85.3	97.1	82.5
Social Studies	1,432	84.7	96.0	83.8
Total	5,157	93.4	96.7	81.8

Table 4. Apex Learning analytic sample¹: completion and usage by assessment

		Completed Course ²	Number of Days to Completion	Activity Complete Percent	Quality of Work
Exam	N	%	Mean	Mean	Mean
Algebra	97	95%	92	97	78
Biology	27	96%	140	98	83
FCAT G10 Reading Retakes	132	98%	97	96	80
Geometry	78	99%	107	98	76
U.S. History	40	100%	104	99	85
Total	374	98	108	98	80

¹The analytic sample contains enrollments that completed 75% or more course activities and have both pre- and post-test scores.
²Courses are designated completed when teacher enters a final grade into the learning management system.

Table 5. Parameter estimates: Algebra 1 EOC

Dependent Variable: Scale Score

Parameter		B	Std. Error	t	Sig.
Intercept		386.73	31.63	12.23	0.00
FCAT Gr8 Reading (Pretest)		16.52	2.22	7.44	0.00
Minority_YES		2.89	2.91	0.99	0.32
Disability_Yes		-10.62	3.47	-3.06	0.00
LEP_YES	0 ^b				
Gender_MALE		-3.50	2.76	-1.27	0.21
StudentGrade		1.30	2.51	0.52	0.61
Analytic_Sample=Comparison Group		3.71	3.81	0.97	0.33
Analytic_Sample=Apex Learning Group	0 ^b				

^bThis parameter is set to zero because it is redundant.

Table 6. Parameter estimates: Biology EOC					
Dependent Variable: Scale Score					
Parameter		B	Std. Error	t	Sig.
Intercept		428.85	39.28	10.92	0.00
FCAT Gr8 Reading (Pretest)		20.25	3.56	5.69	0.00
Minority_YES		-10.36	5.39	-1.92	0.06
Disability_Yes		-10.01	6.49	-1.54	0.13
LEP_YES	0 ^b				
Gender_MALE		1.31	5.57	0.24	0.82
StudentGrade		-1.90	3.44	-0.55	0.59
Analytic_Sample=Comparison Group		7.29	5.91	1.23	0.22
Analytic_Sample=Apex Learning Group	0 ^b				

^bThis parameter is set to zero because it is redundant.

Table 7. Parameter estimates: FCAT 2.0 Reading Retake					
Dependent Variable: Scale Score					
Parameter		B	Std. Error	t	Sig.
Intercept		205.07	16.16	12.69	0.00
FCAT Gr8 Reading (Pretest)		11.06	1.10	10.55	0.00
Minority_YES		-0.68	1.74	-0.39	0.70
Disability_Yes		-4.27	2.87	-1.49	0.14
LEP_YES		-5.06	5.42	-0.93	0.35
Gender_MALE		2.27	1.75	1.30	0.20
StudentGrade		3.46	1.19	2.91	0.00
Analytic_Sample=Comparison Group		2.13	1.72	1.24	0.22
Analytic_Sample=Apex Learning Group	0 ^b				

^bThis parameter is set to zero because it is redundant.

Table 8. Parameter estimates: Geometry EOC					
Dependent Variable: Scale Score					
Parameter		B	Std. Error	t	Sig.
Intercept		357.56	39.58	9.03	0.00
FCAT Gr8 Reading (Pretest)		15.49	2.20	7.04	0.00
Minority_YES		-2.87	4.64	-0.62	0.54
Disability_Yes		-7.02	4.53	-1.55	0.12
LEP_YES	0 ^b				
Gender_MALE		5.28	3.79	1.39	0.17
StudentGrade		4.39	3.23	1.36	0.18
Analytic_Sample=Comparison Group		17.26	4.12	4.19	0.00
Analytic_Sample=Apex Learning Group	0 ^b				

^bThis parameter is set to zero because it is redundant.

Table 9. Parameter estimates: U.S. History EOC					
Dependent Variable: Scale Score					
Parameter		B	Std. Error	t	Sig.
Intercept		391.50	49.84	7.86	0.00
FCAT Gr8 Reading (Pretest)		24.21	3.80	6.37	0.00
Minority_YES		-2.19	4.93	-0.44	0.66
Disability_Yes		-1.99	5.67	-0.35	0.73
LEP_YES		0.03	13.48	0.00	1.00
Gender_MALE		4.92	4.74	1.04	0.30
StudentGrade		2.29	4.25	0.54	0.59
Analytic_Sample=Comparison Group		11.43	4.61	2.48	0.02
Analytic_Sample=Apex Learning Group	0 ^b				

^bThis parameter is set to zero because it is redundant.



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Contact

Apex Learning

1215 Fourth Ave., Suite 1500

Seattle, WA 98161

Phone: 1 (206) 381-5600

Fax: 1 (206) 381-5601

ApexLearning.com