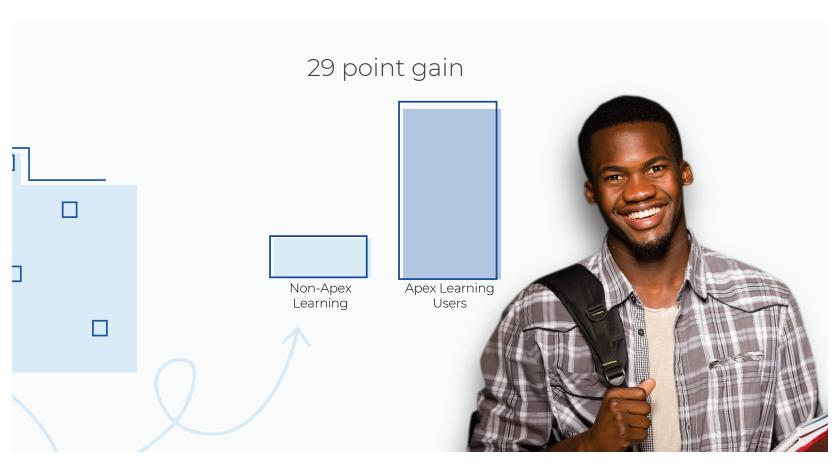


A Study of the Efficacy of Apex Learning Digital Curriculum: Year 3

Sarasota County Schools, FL

September 2017



Executive Summary

Sarasota County Schools uses Apex Learning Comprehensive Courses as core curriculum in an alternative education program serving high school students who need flexible schedules to complete courses and earn credits required to graduate. Students who participate in the program have failed previous classes, lack credits needed to graduate on time, and/or experience difficult life circumstances that make earning a high school diploma in a traditional classroom environment challenging.

This study examined the impact of Apex Learning Comprehensive Courses on the number of credits earned by program participants and end-of-course performance on Florida accountability end-of-course (EOC) assessments administered during the 2015–2016 school year. The achievement of program participants using Apex Learning Comprehensive Courses for credit recovery and original credit leading to an EOC assessment was compared to students completing district courses in traditional classroom environments for original credit. To evaluate end-of-course performance, the data was analyzed in two ways: by average scale scores and by odds of achieving proficiency.

The results suggest that program participants completing Apex Learning Comprehensive Courses achieved similar or better average scores than the comparison group of students on all EOC assessments: Algebra I, Algebra II, Biology, Geometry, and U.S. History (Figure 1). On the Algebra I assessment, the average scale score of students using Apex Learning Courses was 29 points greater than the average score of students completing courses in traditional classrooms. The difference between groups is equivalent to a 23 percentile point gain on the Algebra I EOC for students using Apex Learning Courses.

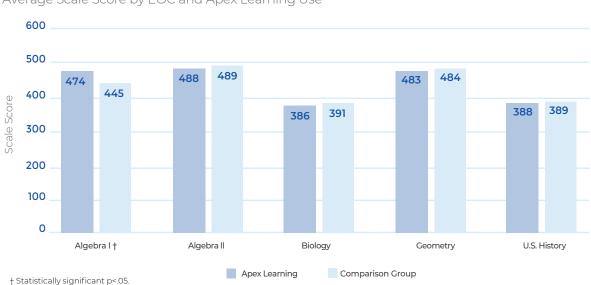


Figure 1:

Average Scale Score by EOC and Apex Learning Use

Additionally, the odds of demonstrating proficiency were three times greater for students using Apex Learning Courses than students in the comparison group on the Algebra I EOC, and 1.5 times greater on the Biology EOC. For the U.S. History EOC, the odds of demonstrating proficiency were the same for students using Apex Learning and students in the comparison group.

P 02 ApexLearning.com

Introduction

Sarasota County Schools (SCS) uses Apex Learning Comprehensive Courses to provide self-paced curriculum designed to meet the needs of high school students participating in the Performance Based Diploma (PBD) Program. The Performance Based Diploma Program is offered on-site in each high school but offers students a flexible schedule to complete courses and earn credits needed to graduate on time. Students served in the alternative education program are at-risk of dropping out of high school, not graduating at the end of four years, and/or have not achieved success in traditional classrooms. The goal of PBD is to give at-risk students the opportunity to master course content at their own pace and schedule, earn course credits, and graduate college- and career-ready instead of dropping out of school.

Students participating in the PBD program complete Apex Learning Comprehensive Courses for initial credit or credit recovery in a high school computer lab and at home, supported by certified teachers dedicated to the PBD program. Apex Learning Comprehensive Courses provide 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 electives. PBD program administrators employ a feature of Apex Learning digital curriculum called mastery-based learning. Program administrators set mastery at 70%, requiring students to pass all computer-scored 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. PBD participants complete proctored Apex Learning tests in the computer lab and are unable to access tests from home

In the 2015–2016 school year, the Florida Department of Education administered EOC assessments to evaluate mastery of Algebra I, Algebra II, Geometry, Biology, and U.S. History state standards. This study examined the impact of using Apex Learning Comprehensive Courses on the number of credits earned and EOC performance for assessments administered during the 2015–2016 school year. The achievement of PBD participants using Apex Learning Comprehensive Courses for original credit and credit recovery leading to an EOC assessment was compared to comparable students completing courses for original credit only in traditional classroom environments.

Figure 2. 2015–2016 District Demographic Characteristics

| District PK-12 Enrollment | 57,316 |
|----------------------------|----------------------|
| Urban Locale | Suburban, Small City |
| American Indian/AK Native | <1% |
| Asian | 2% |
| Black / African American | 9% |
| HI/Pacific Islander | <1% |
| White | 65% |
| Hispanic | 19% |
| Multiracial | 5% |
| Free/Reduced Meals | 49% |
| _imited English Proficient | 5% |
| Students with Disabilities | 11% |
| Title I Schools | 25% |

P 03 ApexLearning.com

¹Sarasota County Schools 2015–16 Demographic Characteristics. Retrieved from http://www.fldoe.org/accountability/data-sys/edu-infoaccountability-services/pk-12-public-school-data-pubs-reports/archive.stml on 06/19/2017.

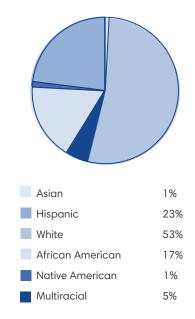
Three hundred ninety-two (392) Apex Learning enrollments for Courses leading to an EOC assessment were included in the study. Students using Apex Learning Courses included in the study sample:

- Had an average 8th grade pretest ability equivalent to the 27th percentile in relation to district norms
- Included students who have a learning disability (19%)
- Completed course activities with an average quality of work score of 81%

Located in the appendix, Tables 2 through 4 provide detailed demographic and academic characteristics of students included in the study sample by group (Apex Learning use and comparison group). Tables 5 and 6, also located in the appendix, show the average Apex Learning Course use statistics of students in the PBD program and those included in the analytic sample respectively.

Figure 3

Apex Learning Users Included in the Study



Results

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

During the 2015–2016 school year, 1,465 students participating in the PBD program attempted 5,965 Apex Learning Course enrollments. Eighty-three percent (83%) of enrollments (4,937 out of 5,965) were completed by 1,292 students with a passing grade, earning a total of 2,888.5 course credits. The percent of credits earned for Courses attempted ranged from 78.9% to 86.5% by subject. Table 1 shows the number and percent of enrollments withdrawn, completed, and passed; total credits attempted; and percent earned by subject. Table 5 in the appendix shows Apex Learning Course usage characteristics for enrollments completed by PBD participants.

P 04 ApexLearning.com

| Table 1. Attempted Enrollments and Credits by Subject | | | | | | | | | | |
|---|-----------|-------|---------|-----------------------------|-------|------------------|-----------|---------|--------------------|-------|
| | | Е | nrollme | ents ¹ | | | | Cre | edits ⁴ | |
| | Attempted | Withd | rawn | Completed ² Pass | | sed ³ | Attempted | Ear | ned | |
| Subject | Count | Count | % | Count | % | Count | % | Sum | Sum | % |
| Electives | 40 | 7 | 17.5% | 33 | 82.5% | 33 | 82.5% | 40.0 | 33.0 | 82.5% |
| English | 1,413 | 294 | 20.8% | 1,119 | 79.2% | 1,117 | 79.1% | 717.5 | 566.0 | 78.9% |
| Math | 1,847 | 333 | 18.0% | 1,514 | 82.0% | 1,512 | 81.9% | 963.0 | 780.0 | 81.0% |
| Science | 1,129 | 153 | 13.6% | 976 | 86.4% | 976 | 86.4% | 566.5 | 489.0 | 86.3% |
| Social Studies | 1,536 | 241 | 15.7% | 1,295 | 84.3% | 1,293 | 84.2% | 1,179.5 | 1,020.0 | 86.5% |
| Total | 5,965 | 1,028 | 17.2% | 4,937 | 82.8% | 4,931 | 82.7% | 3,466.5 | 2,888.5 | 83.3% |

¹Enrollments include all courses in each subject including those not leading to an EOC.

Do students in the PBD program completing Apex Learning Comprehensive Courses for original credit or credit recovery perform the same or better on EOCs as similar students completing courses for original credit in traditional classrooms?

Students using Apex Learning Courses achieved greater or similar average scores on the five tested subject areas: Algebra I, Algebra II, Biology, Geometry, and U.S. History.

On the Algebra I EOC, students using Apex Learning Courses gained 29 scale score points compared to similar students completing courses for initial credit in traditional classrooms (F = 10.57, p < .00, g = .64; Figure 4). The difference in Algebra I achievement between Apex Learning users and the comparison group is equivalent to a 23 percentile point gain for students using Apex Learning Courses.

On the Algebra II, Biology, Geometry, and U.S. History assessments, students using Apex Learning Courses demonstrated similar average achievement as students completing courses for initial credit in traditional classrooms (p > .05).

The average scale score by EOC for each group is displayed in Figure 4. Table 7, located in the appendix, shows the estimated average scale score, difference between average achievement, and effect size of the difference between groups by EOC.

P 05 ApexLearning.com

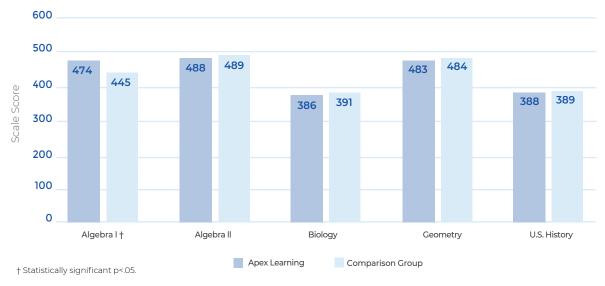
²Courses were designated completed (1) when the teacher entered a final grade into the learning management system, or (2) 90% or more course activities were completed and the enrollment was withdrawn. For courses meeting the second criteria, the Quality of Work score was used as the final grade.

³ Courses completed with a final grade greater than or equal to 60% were designated passing. The final grade is assigned by the teacher

 $and \ considers \ computer-scored \ and \ teacher-scored \ activities. The \ mastery-based \ learning \ feature \ applies \ to \ computer-scored \ activities \ only.$

⁴ Semester-long courses are worth 0.5 credits. Year-long courses are worth 1 credit.





In addition, the odds of demonstrating proficiency were 3 times greater for students using Apex Learning Courses than students in the comparison group on the Algebra I EOC (OR = 5.76, p < .00) and 1.5 times greater on the Biology EOC (OR = 5.20, p < .00). For the U.S. History EOC, the odds of demonstrating proficiency were the same for students using Apex Learning and students in the comparison group (OR = -.98, p < .05). Conversely, the odds of demonstrating proficiency on the Algebra II and Geometry EOCs were greater for students completing courses for original credit in traditional classrooms than for students in the PBD program. Table 8 located in the appendix shows the odds and odds ratio for achieving a performance level of proficient or above on each EOC by Apex Learning use.

P 06 ApexLearning.com

Conclusion

Sarasota County Schools uses Apex Learning Courses as core curriculum in the Performance Based Diploma 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, or experience difficult life circumstances that make earning a high school diploma in a traditional classroom environment challenging. During the 2015–2016 school year, participants attempted 5,965 Apex Learning Course enrollments, completed 82.7% (4,391/5,965) with a passing score, and earned 83.3% of attempted credits needed for graduation.

This study compared the average achievement of PBD participants completing Apex Learning Comprehensive Courses leading to an EOC assessment to a sample of comparable students completing courses for initial credit in traditional classroom environments. On the Algebra I EOC, PBD participants completing Apex Learning Comprehensive Courses scored an additional 29 scale score points above the average score of the comparison group. The effect of Apex Learning Courses on Algebra I achievement is equivalent to a 23 percentile point gain for the average program participant. On the Algebra II, Geometry, Biology, and U.S. History EOCs, students using Apex Learning Courses achieved similar average scores as comparable students. In addition, the odds of demonstrating proficiency were 3 times greater for students using Apex Learning Courses than students in the comparison group on the Algebra I EOC, and 1.5 times greater on the Biology EOC. For the U.S. History EOC, the odds of demonstrating proficiency were the same for students using Apex Learning and students in the comparison group.

Study Description

Study Design

This quasi-experimental observational study used a matched control group design. The effectiveness of Apex Learning digital curriculum was evaluated by comparing the achievement of dropout prevention program participants completing Apex Learning Comprehensive Courses for original credit and credit recovery to students completing coursework for original credit in traditional classroom environments. Thus, the study design may be limited by selection bias due to differences inherent in participant history.

Sample Formation

Students in Grades 9–12 who completed at least one EOC assessment during the 2015–2016 school year and the 8th grade Florida Comprehensive Assessment Test (FCAT) during the last seven years were eligible to be included in the study. The analytic sample included students who completed an Apex Learning Course leading to an EOC (treatment group) and a group of students who did not use Apex Learning digital curriculum matched by prior ability (comparison group).

P 07 ApexLearning.com

Data Preparation

Joining the files

SCS provided 14,861 rows of data containing demographic characteristics and assessment results for all Algebra I, Algebra II, Geometry, Biology, and U.S. History NGSSS EOCs completed by high school students during the 2015–2016 school year. An additional 53,766 rows of data containing FCAT Grade 8 reading, math, and science results for assessments administered between the 2009 and 2015 school years were provided as a measure of prior ability. A standardized z-score was calculated for each school year and assessment generating a pretest or outcome measure. The standardized z-score was calculated by subtracting the district mean from the student score and dividing the result by the standard deviation for each assessment and school year.

Prior ability measures were joined to outcome measures. FCAT Grade 8 math scores were joined to Algebra I, Algebra II, and Geometry EOC records; FCAT Grade 8 science scores to Biology; and FCAT Grade 8 reading scores to U.S. History. Seventy percent (70%) of EOCs matched with a corresponding Grade 8 FCAT score, providing a total of 10,375 records in the district data file. Each record contained the following information: (1) assessment data: Grade 8 scale scores, z-scores, and achievement levels; and EOC scale scores, z-scores, and achievement levels; and (2) 2015–2016 demographic data: local student identifier, school name, grade level, date of birth, gender, reported race/ethnicity, limited English proficiency flag, and learning disability flag.

Apex Learning provided course records for all students in the district who attempted an Apex Learning Comprehensive Course between August 1, 2015 and July 30, 2016. The data file included a local student identifier, school name, classroom name, course track, course title, product name, number and percent of activities completed, total minutes used, a quality of work score (number of scored activities answered correctly divided by the total number of scored activities completed), and overall course percent correct score (number of scored activities answered correctly divided by the total number of scored activities contained in the course). A total of 5,965 enrollments were attempted and 4,937 enrollments were completed.

Creating the sampling frame

District records were merged with and appended to the Apex Learning file of attempted enrollments by assessment and Apex Learning course. Apex Learning enrollments that did not complete a course leading to an EOC were removed from the file. A course was considered completed if either condition was met: (1) a final grade was entered into the Apex Learning management system thereby completing the enrollment, or (2) the student completed 90% of the coursework and was withdrawn without receiving a final grade. A mediating variable, named High School Retention, was created to account for the number of years between taking the 8th grade assessment and current grade level as an attempt to control for the number of grade levels a student may have retained in high school. Seven hundred twenty-seven Apex Learning enrollments completed courses leading to an EOC. Fifty-four percent (54%; 392/727) of completed Apex Learning enrollments leading to an EOC were successfully matched to district record containing demographic and matched assessment records.

P 08 ApexLearning.com

Generating a comparison group

Multiple matching techniques were used to generate a sample of students not using Apex Learning digital curriculum to serve as a comparison group. Case control random selection was used to generate a comparison group of students matching Apex Learning users for Algebra I, Algebra II, Geometry, and U.S. History EOC assessments. Hand matching was used to generate a comparison group for Algebra II and Biology EOC assessments. Sampling without replacement was used to generate all comparison groups. For each EOC assessment, matching was conditioned on prior ability only, as attempts to match with prior ability and demographic characteristics failed. An independent-samples Mann–Whitney U test suggested that there was no relationship between group assignment and prior ability independent of demographic characteristics. Tables containing demographic characteristics and prior ability measures of students in the analytic sample are included in the appendix.

Analysis

For each EOC assessment, the following analyses were performed to determine the effect of Apex Learning use on student achievement. First, an exploratory two-way ANCOVA was conducted to identify significant interactions between group assignment and each factor including: pretest ability, minority status, gender, age, limited English proficiency, learning disability, grade level, and number of high school retentions controlling for demographic and prior ability main effects. In all cases, school was fitted as a random effect to control for possible interactions between treatment group and scho

Significant interactions were included in the models used to investigate the impact of Apex Learning Courses on EOC assessment outcome measures. A linear mixed model was run to produce the parameter estimates used to calculate the adjusted average EOC scores controlling for demographic, prior ability, and significant interactions. Pretest ability, minority flag, gender, age, limited English proficiency flag, special education program participation flag, high school retention, and significant interactions were fitted as main effects. School was fitted as a random effect. An F-test was used to determine the significance of the difference between adjusted average scores by treatment group. Hedge's g was used to estimate the effect size of the mean difference.

A binary linear logistic model was run to produce the parameter estimates used to calculate the adjusted odds of achieving proficiency or above on each EOC assessment controlling for demographic, prior ability, and significant interactions. Pretest ability, minority flag, gender, age, limited English proficiency flag, special education program participation flag, high school retentions, school by treatment group, and significant interactions specific to each EOC assessment were fitted as main effects. A Wald Chi-Square was used determine if the adjusted odds ratio (OR) was statistically significant. The OR was reported as the effect size.

Outcome Measures

Outcome measures used in this study include scale scores generated by Florida state EOC assessments in five subjects: Algebra I, Algebra II, Biology, Geometry, and U.S. History. EOCs were administered in the fall, winter, spring, and summer of the 2015–2016 school year. Students were required to pass the Algebra I EOC to graduate. Results of the Algebra II, Biology, Geometry, and U.S. History EOC assessments were averaged into the course final grade.

P 09 ApexLearning.com

Appendix

| Table 2. Demographic Characteristics by Group | | | | | | | | |
|---|---------------------|-------|--------|------|--------|--|--|--|
| | | Group | | | | | | |
| | | Cor | ntrol | Apex | Users | | | |
| | | N | % | N | % | | | |
| Sample Size | Student Enrollments | 392 | 100.0% | 392 | 100.0% | | | |
| Grade | 9th Grade* | 33 | 8.4% | 12 | 3.1% | | | |
| | 10th Grade* | 185 | 47.2% | 103 | 26.3% | | | |
| | 11th Grade* | 138 | 35.% | 148 | 37.8% | | | |
| | 12th Grade* | 36 | 9.2% | 129 | 32.9% | | | |
| Gender | Female* | 212 | 54.1% | 157 | 40.1% | | | |
| | Male* | 180 | 45.9% | 235 | 59.9% | | | |
| Race | Asian | 5 | 1.3% | 2 | 0.5% | | | |
| | Black | 54 | 13.8% | 67 | 17.1% | | | |
| | Hispanic | 85 | 21.7% | 92 | 23.5% | | | |
| | Native American | 1 | 0.3% | 2 | 0.5% | | | |
| | Multi-racial | 15 | 3.8% | 20 | 5.1% | | | |
| | White | 232 | 59.2% | 209 | 53.3% | | | |
| Limited English Proficiency | No | 387 | 98.7% | 383 | 97.7% | | | |
| | Yes* | 5 | 1.3% | 9 | 2.3% | | | |
| Specific Learning Disability | No* | 250 | 63.8% | 317 | 80.9% | | | |
| | Yes* | 142 | 36.2% | 75 | 19.1% | | | |

^{*}Significantly different p<0.5.

| Table 3. Standardized Prior Ability Statistics by EOC and Apex Learning Use | | | | | | | | |
|---|-----------------------|-------|---------|-----------|-------|-------|------|--|
| | | | Group | | | | | |
| | | | Control | | , | | | |
| EOC | Prior Ability Measure | Count | Mean | Std. Dev. | Count | Mean | Std. | |
| | | | | | | | Dev. | |
| Algebra I | Grade 8 Math | 45 | -1.06 | 0.93 | 45 | -1.17 | 0.89 | |
| Algebra II | Grade 8 Math | 41 | 22 | 0.75 | 41 | 23 | 0.80 | |
| Biology | Grade 8 Science | 56 | 60 | 0.98 | 56 | 48 | 0.99 | |
| Geometry | Grade 8 Math | 125 | 84 | 0.69 | 125 | 70 | 0.73 | |
| U.S. History | Grade 8 Reading | 125 | 23 | 0.86 | 125 | 39 | 0.85 | |

P 10 ApexLearning.com

| Table 4. Unadjusted Standardized Statistics by EOC and Apex Learning Use | | | | | | | | | |
|--|-------|---------|-----------|-------|-------|-----------|--|--|--|
| | Group | | | | | | | | |
| | | Control | | | | | | | |
| EOC | Count | Mean | Std. Dev. | Count | Mean | Std. Dev. | | | |
| Algebra I | 45 | 62 | 1.03 | 45 | 36 | 0.94 | | | |
| Algebra II | 41 | 63 | 1.12 | 41 | -1.03 | 0.95 | | | |
| Biology | 56 | 57 | 0.97 | 56 | 80 | 0.93 | | | |
| Geometry | 125 | 79 | 0.82 | 125 | 86 | 0.95 | | | |
| U.S. History | 125 | 21 | 0.95 | 125 | 72 | 0.87 | | | |

| Table 5. Average Apex Learning Use Statistics: PBD Program Completed Enrollments by Subject | | | | | | | | |
|---|--------------------------|-------------------|--------------------|-------------------------|--------------------------|--|--|--|
| | Enrollemnts ¹ | Days ² | Hours ³ | Activities Completed | Quality of Work Score | | | |
| Subject | Count | Mean | Mean | Mean | Mean | | | |
| Electives | 33 | 63.06 | 13.55 | 99% | 83 | | | |
| English | 1,119 | 90.88 | 16.92 | 89% | 79 | | | |
| Math | 1,514 | 84.32 | 19.20 | 96% | 80 | | | |
| Science | 976 | 75.76 | 14.89 | 98% | 80 | | | |
| Social Studies | 1,295 | 85.34 | 15.47 | 97% | 83 | | | |
| Total | 4,937 | 84.24 | 16.82 | 95% | 81 | | | |

¹ Enrollments: 90% or more course activities complete or designated completed by the teacher in the learning management system.

 $^{^3}$ Hours: Course on-line use only'; time spent off-line completing teacher-scored activities and tests not included.

| Table 6. Average Apex Learning Use Statistics: Analytical Sample Enrollments by EOC | | | | | | | | |
|---|--------------------------|-------------------|--------------------------------------|------|--------------------------|--|--|--|
| | Enrollemnts ¹ | Days ² | Days ² Hours ³ | | Quality of Work Score | | | |
| EOC | Count | Mean | Mean | Mean | Mean | | | |
| Algebra I | 45 | 154 | 28.0 | 95% | 82 | | | |
| Algebra II | 41 | 124 | 31.1 | 97% | 80 | | | |
| Biology | 56 | 159 | 34.8 | 99% | 81 | | | |
| Geometry | 125 | 150 | 39.3 | 96% | 75 | | | |
| U.S. History | 125 | 126 | 24.4 | 97% | 85 | | | |

¹ Enrollments: 90% or more course activities complete or designated completed by the teacher in the learning management system.

P 11 ApexLearning.com

² Days: Number of days between first and last access dates.

 $^{^{\}rm 2}$ Days: Number of days between first and last access dates.

³ Hours: Course on-line use only'; time spent off-line completing teacher-scored activities and tests not included.

| Table 7. Estimated Mean, Paired Difference, and Effect Size Statistics by EOC and Apex Learning Use | | | | | | | | | | |
|---|-------------------|--------|------------|--------|----------------------------|--------|-------|-------|---------|--|
| | | | | | 95% Confidence Interval | | | | | |
| EOC | | Mean | Std. Error | df | Lower | Upper | F | Sig. | Hedge's | |
| Algebra I ª | Apex Learning Use | 474.25 | 14.45 | 61.47 | 445.35 | 503.14 | | | | |
| | Comparison Group | 444.74 | 13.33 | 45.73 | 417.91 | 471.58 | | | | |
| | Mean Difference | 29.51 | 9.08 | 76.47 | 11.43 | 47.58 | 10.57 | 0.00* | 0.64 | |
| Algebra II ^b | Apex Learning Use | 487.84 | 6.91 | 6.85 | 471.42 | 506.26 | | | | |
| | Comparison Group | 488.55 | 8.64 | 19.85 | 470.52 | 506.58 | | | | |
| | Mean Difference | -0.71 | 8.63 | 71.60 | -17.92 | 16.50 | 0.01 | 0.94 | 0.02 | |
| Biology ^c | Apex Learning Use | 386.37 | 9.73 | 103.00 | 367.07 | 405.67 | | | | |
| | Comparison Group | 390.66 | 9.96 | 103.00 | 370.91 | 410.41 | | | | |
| | Mean Difference | -4.29 | 4.63 | 103.00 | -13.47 | 4.88 | 0.86 | 0.36 | 0.16 | |
| Geometry ^d | Apex Learning Use | 482.66 | 4.37 | 240.00 | 474.05 | 491.27 | | | | |
| | Comparison Group | 484.09 | 4.82 | 240.00 | 474.60 | 493.58 | | | | |
| | Mean Difference | -1.43 | 2.91 | 240.00 | -7.16 | 4.29 | 0.24 | 0.62 | 0.06 | |
| U.S. History ^e | Apex Learning Use | 388.49 | 9.91 | 239.00 | 368.97 | 408.01 | | | | |
| | Comparison Group | 394.17 | 9.85 | 239.00 | 374.78 | 416.57 | | | | |
| | Mean Difference | -5.68 | 3.25 | 239.00 | -12.09 | 0.73 | 3.05 | 0.08 | 0.24 | |

Dependent Variable: Scale Score.

P 12 ApexLearning.com

^a Covariates in the Algebra I model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, treatment by age.

^b Covariates in the Algebra II model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, treatment by retained, and treatment by prior ability.

^c Covariates in the Biology model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention.

^d Covariates in the Geometry model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention.

^e Covariates in the U.S. History model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, and treatment by disability.

^{*}Significantly different p < .01.

| Table 8. Estimated Odds and Odds Ratio Statistics by EOC and Apex Learning Use | | | | | | | | |
|--|-------------------|---------|------------|--|-------|-----------|------|--|
| | | | | 95% Wald ConfidenceInterval for Difference | | Wald Chi- | | |
| EOC | | Odds/OR | Std. Error | Lower | Upper | Square | Sig. | |
| Algebra I ^a | Apex Learning Use | 3.22 | 1.80 | -0.30 | 6.74 | | | |
| | Comparison Group | -2.54 | 2.68 | -7.79 | 2.70 | | | |
| | Odds Ratio (OR) | 5.76 | 1.45 | 2.92 | 8.61 | 15.78 | 0.00 | |
| Algebra II ^b | Apex Learning Use | 24.88 | 1.19 | 22.55 | 27.22 | | | |
| | Comparison Group | 36.85 | 1.39 | 34.12 | 39.58 | | | |
| | Odds Ratio (OR) | -11.97 | 1.95 | -15.79 | -8.14 | 37.67 | 0.00 | |
| Biology ^c | Apex Learning Use | 14.12 | 0.91 | 12.35 | 15.90 | | | |
| | Comparison Group | 8.93 | 0.97 | 7.03 | 10.83 | | | |
| | Odds Ratio (OR) | 5.20 | 0.67 | 3.89 | 6.50 | 60.65 | 0.00 | |
| Geometry ^d | Apex Learning Use | -2.09 | 1.44 | -4.90 | 0.73 | | | |
| | Comparison Group | 1.49 | 1.48 | -1.41 | 4.38 | | | |
| | Odds Ratio (OR) | -3.58 | 0.65 | -4.85 | -2.30 | 30.23 | 0.00 | |
| U.S. History ^e | Apex Learning Use | 5.38 | 0.83 | 3.75 | 7.00 | | | |
| | Comparison Group | 6.36 | 0.79 | 4.82 | 7.89 | | | |
| | Odds Ratio (OR) | -0.98 | 0.55 | -2.05 | 0.10 | 3.17 | 0.08 | |

Dependent Variable: Scale Score.

P 13 ApexLearning.com

^a Covariates in the Algebra I model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, treatment by age.

^b Covariates in the Algebra II model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, treatment by retained, and treatment by prior ability.

^c Covariates in the Biology model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention.

^d Covariates in the Geometry model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention

^e Covariates in the U.S. History model include: school, minority status, gender, disability, limited English proficiency, prior ability, age, high school retention, and treatment by disability.



Where opportunity thrives™

An industry leader with deep expertise in digital curriculum, Apex Learning works closely with school districts across the country to implement proven solutions that increase on-time graduation rates and create opportunities for student success in school and beyond. The company is driven by the understanding that supporting the needs of all students – from struggling to accelerated – strengthens schools and creates stronger communities, brighter futures and a more equitable world. Apex Learning is accredited by AdvancED and its courses are approved for National Collegiate Athletic Association eligibility. Apex Learning, where opportunity thrives. For more information, visit http://www.apexlearning.com.

Contact

Apex Learning

1215 Fourth Ave., Suite 1500 Seattle, WA 98161 Phone: 1 (206) 381-5600 Fax: 1 (206) 381-5601 ApexLearning.com