

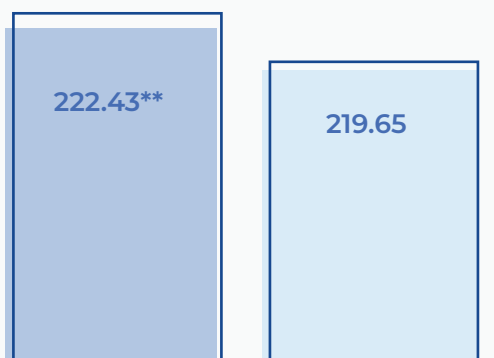


Apex Learning Courses and MAP Growth

Matanuska-Susitna Borough School District, AK

June 2020

Average Spring RIT Score by
MAP Growth Test



Language (n)=76

■ Apex Learning ■ Comparison Group



Executive Summary

Matanuska-Susitna Borough School District (Mat-Su) uses Apex Learning digital curriculum to extend opportunities for students to complete high school courses for original credit and credit recovery.

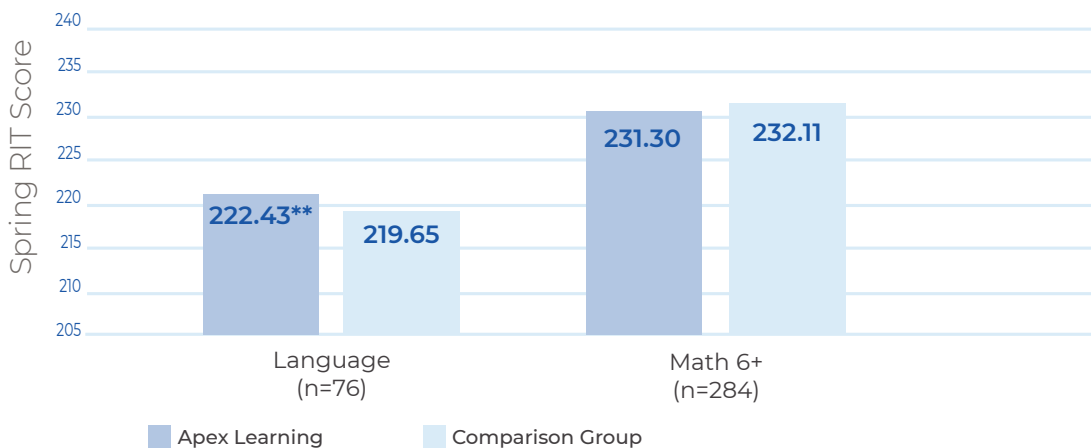
This study examines the relationship between Apex Learning ELA and math Courses use and spring performance on the NWEA Measures of Academic Progress (MAP) Growth tests for students enrolled in grade levels 9 and 10. The quasi-experimental study compares the achievement of students completing Apex Courses to a matched group of students completing traditional teacher-led district courses for original credit.

Key Findings

Students completing Apex Courses performed as well as or better than students participating in traditional classroom instruction on the spring administration of MAP Growth tests.

- On the Language test, the average RIT score for Courses users was 2.78 points greater than the scores of comparable non-users ($p=.04$). The effect size difference is equivalent to a 19-percentile point gain ($d=.50$).
- On the Math 6+ test, Courses users achieved similar scores as comparable non-users ($p=.32$).

Figure 1
Average Spring RIT Score by MAP Growth Test



Note: *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Note: Average scores adjusted to control for grade level, prior achievement, and demographic characteristics.

Asterisks (*) denote the level of confidence we have in the results. One (*) indicates a Sig. $p\leq.10$ meaning we have 90% or greater confidence in the results. Two (**) represent Sig. $p\leq.05$, a 95% confidence level, and three (***) represent Sig. $p\leq.01$, a 99% confidence level.

Introduction

Matanuska-Susitna Borough School District (Mat-Su), the second largest school district in Alaska, serves 19,000 students across an area larger than West Virginia. iTech, the division of online learning, uses Apex Courses to extend opportunities for students to complete high school courses for credit recovery and original credit. Students using Courses for original credit complete coursework from home with online teacher support. Courses used for credit recovery are completed from home or through supervised summer credit recovery programs offered on campus. Assessments are proctored by teachers either in person or through video conferencing software.

This research addresses the question: Do high school students who complete Apex Courses perform at the same level or better than students enrolled in traditional teacher-led courses offered by the district on NWEA Measures of Academic Progress (MAP) Growth tests administered in the spring?

Mat-Su high schools administer MAP Growth Language and Math¹ tests in the fall and spring. Students in 9th and 10th grades are required to complete at least one Language and Math test per year. Students included in this study completed both the fall and spring administrations of the MAP Growth test in the same school year.

This quasi-experimental study compared the spring achievement of students using Apex Courses online to a matched sample of students completing traditional teacher-led courses on the MAP Growth Language and Math 6+ assessments. Students in the Apex Learning group completed ELA and math Courses containing a district course number. Of 416 enrollments, 86% were used for original credit and 3% for credit recovery. The remaining enrollments were not flagged by use. Students in the comparison group completed district courses for original credit. Students in the comparison group were matched to students using Apex Courses by initial ability (fall MAP RIT scores), school year, and demographic characteristics including minority, FRL, IEP, and English language proficiency status. Tables 5 and 6, located in the appendix, report the demographic characteristics and prior ability scores (fall RIT scores) for students in each group.

Figure 2

Demographic Characteristics: Mat-Su School District

Student Enrollment	18,761
American Indian/Alaska Native	15.20%
Asian	2.30%
Black	1.80%
Hispanic	2.80%
Native Hawaiian/Pacific Islander	1.30%
Two or More Races	4.80%
White	71.80%
Female	47.30%
Male	52.70%
Students with Disabilities (Section 504 Only)	2.00%
Students with Limited English Proficiency	3.60%
Free and Reduced-price Lunch (FRPL)	34.40%

Source: Civil Rights Data Collection 2015, Ed.gov

¹ Mat-Su administers MAP Growth Math 6+ and MAP Growth Math Course Specific tests for Algebra I, Geometry, and Algebra II. The sample size of students with complete data was not large enough to evaluate outcomes on Math Course Specific tests.

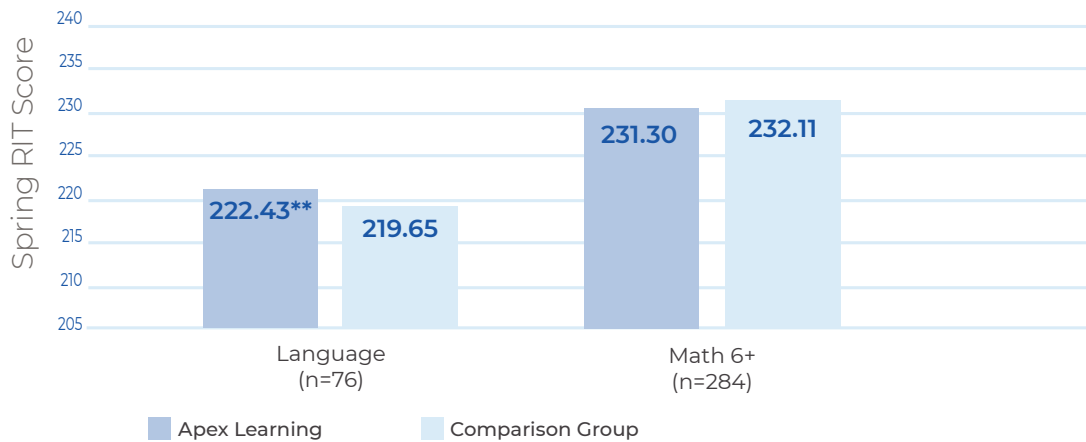
Results

Students completing Apex Courses achieved similar or better average scores than students completing traditional teacher-led courses on MAP Growth tests administered in the spring.

Figure 3 shows the overall average Language and Math 6+ scores for the Apex Learning and comparison groups.

- The average Language RIT score for students completing Apex Courses for ELA was 2.78 points greater than comparable non-users ($p=.04$). The effect size of the difference is equivalent to a 19-percentile point gain ($d=.50$) suggesting 69% of Courses users achieved the same or higher score than the average student enrolled in traditional teacher-led classrooms.
- On the Math 6+ test, students completing Apex Courses for math achieved similar average RIT scores as students enrolled in traditional teacher-led classrooms ($p=.33$, $d=-.10$).

Figure 3
Average Spring MAP Growth Test RIT Score



Note: Star denotes statistically significant p-values. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Average scores adjusted to control for prior achievement and demographic characteristics

Asterisks (*) denote the level of confidence we have in the results. One (*) indicates a Sig. $p\leq.10$ meaning we have 90% or greater confidence in the results. Two (**) represent Sig. $p\leq.05$, a 95% confidence level and three (***) represent Sig. $p\leq.01$, a 99% confidence level.

Figure 4 shows the average RIT scores for each MAP Growth test by grade level.

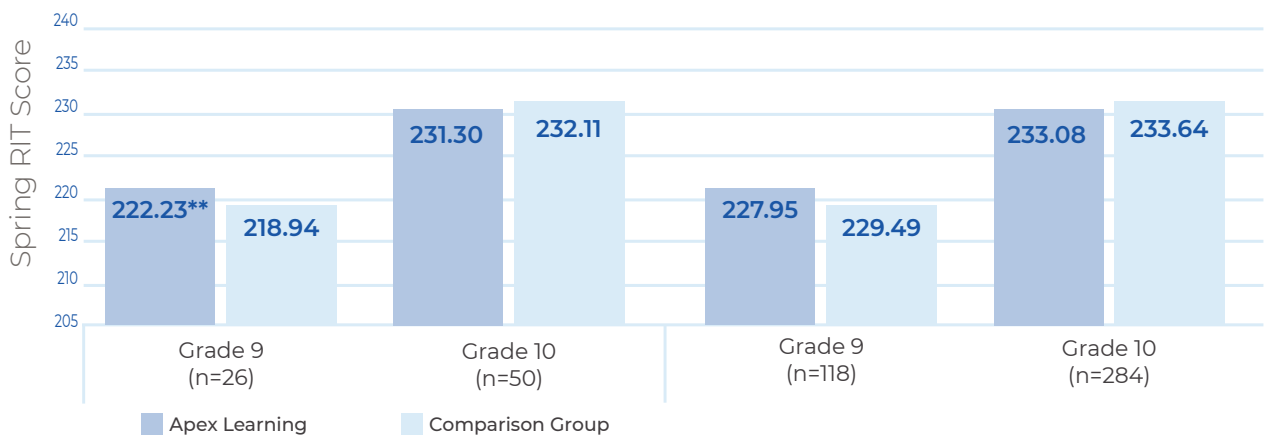
MAP Growth Language

- For students in 9th grade, the average Language score for students using Apex Courses was 3.29 points greater than comparable non-users ($p=.10$). Although the sample size of students in each group is small ($n=13$), the effect size of the difference is large ($d=.81$) and equivalent to a 29-percentile point gain.
- For students in 10th grade, students using Apex Courses achieved similar average scores as students enrolled in traditional teacher-led classrooms ($p=.22$, $d=.39$).

MAP Math 6+

- In both grades 9 and 10, students using Apex Courses achieved similar average scores as students enrolled in traditional teacher-led classrooms (9th grade: $p=.25$, $d=-.22$; 10th grade: $p=.58$, $d=-.07$).

Figure 4



Note: Star denotes statistically significant p-values. *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Average scores adjusted to control for prior achievement and demographic characteristics

Asterisks (*) denote the level of confidence we have in the results. One (*) indicates a Sig. $p\leq.10$ meaning we have 90% or greater confidence in the results. Two (**) represent Sig. $p\leq.05$, a 95% confidence level and three (***) represents Sig. $p\leq.01$, a 99% confidence level.

Conclusion

Mat-Su iTech uses Apex Courses to extend opportunities for students to complete high school courses for original credit and credit recovery. This study compared the average achievement of 9th and 10th grade students who completed Apex Courses online to the average achievement of students completing traditional teacher-led district courses on the spring MAP Growth assessments.

Findings suggest:

- Across grade levels, students using Apex ELA Courses outperformed students completing traditional teacher-led courses for original credit on the MAP Growth Language test by 2.72 RIT score points—a gain equivalent to 19-percentile points. Apex Courses users in 9th grade outperformed non-users by 3.29 points, while 10th grade users demonstrated similar achievement as non-users.
- Students using Apex Courses for math performed at similar levels as students completing traditional district courses on the MAP Growth Math 6+ test for each grade level and grade levels combined.

Data and Methodology

Outcome Measures

This study examines the impact of Apex Courses for ELA and math on NWEA MAP Growth Language and Math 6+ tests. MAP Growth tests are computer adaptive formative assessments that measure student achievement and growth over time. Each test generates a vertically aligned scale score called a RIT score that is interpretable across grade levels.

Data

Mat-Su provided a file containing student-level demographic information (gender, race/ethnicity, free/reduced price lunch, special education program, and English language learner indicators) and NWEA MAP Growth RIT scores for tests administered in the fall and spring for students enrolled in 9th and 10th grades in the 2016-2017 through 2018-2019 school years. The file contained 8,767 records with complete demographic information and both fall and spring RIT scores.

Apex Learning provided student-level Courses data for enrollments used in school years 2016-2017 through 2018-2019. The Apex records included course subject and title, classroom name, total time used, percent of activities completed, quality of work, and final grade fields. Apex ELA and math Course enrollments were merged with the district records by matching cases by student ID number, school year, and subject. Apex Foundations I enrollments were dropped from the file because Foundations I Courses cover content below 6th grade level. Of the remaining high school Course enrollments, 495 contained complete demographic and achievement data and included a district course number in the classroom name. Eighty-five percent (419/495) of these enrollments were completed. Enrollments were completed if the teacher entered a valid final grade into the LMS or the student completed 80% or more learning activities and was not assigned a final grade. Three completed Algebra I Course enrollments with Algebra I tests scores were dropped from the file leaving 416 records prior to aggregation.

Multiple enrollments for a given subject were aggregated across student ID numbers by school year and test resulting in 239 total enrollments. The final analytical sample of students completing Apex Courses included 38 Language test takers and 201 Math 6+ test takers across grade levels.

Methodology

This analysis examined the effectiveness of Apex Courses use by comparing the achievement of Courses users to a comparison group of comparable students enrolled in traditional teacher-led district courses. A comparison group of comparable students estimates how students using Courses would have performed on spring MAP Growth tests if they had completed traditional teacher-led district courses. A comparison group of students that very closely matches Courses users was generated using propensity score modeling for each MAP Growth test and grade level combination. Propensity modeling assigns each student a score that predicts the likelihood that a student would be assigned to the Apex Learning group if group assignment was based on prior ability and demographic characteristics alone. Courses users and non-users with matching propensity scores are identified as a pair. Comparability of each Apex Learning and comparison group was assessed using independent samples t-tests for initial ability as measured by the fall RIT score and two sample tests of proportions for school year and demographic variables including gender, minority status, special education participation, English language learner status, and free or reduced lunch eligibility. Tables 5 and 6, located in the appendix, report the demographic and prior ability characteristics of students in each group.

Student-level analysis was conducted for each MAP Growth test and each test and grade level combination. Linear regression was used to evaluate the relationship between Courses use and the average spring RIT score for each MAP Growth test overall and by grade level controlling for prior ability and demographic characteristics. Tables 4 and 5, located in the appendix, report the adjusted mean difference, p-value, and standardized effect size (Cohen's d) for each comparison. Group differences equal to or greater than .20 standard deviations (Cohen's $d \geq .20$) for which we are at least 90% confident (p -values $\leq .10$) are reported as being significant (Wasserstein, et. al., 2019).

References

- Civil Rights Data Collection (2015). Retrieved from Ed.gov on 6/01/2020.
- Kraft, Matthew. (2019). Interpreting Effect Sizes of Education Interventions. (EdWorkingPaper: 19-10). Retrieved from Annenberg Institute at Brown University: <https://doi.org/10.26300/8pjp-2z74>.
- Ronald L. Wasserstein, Allen L. Schirm & Nicole A. Lazar (2019) Moving to a World Beyond " $p < 0.05$ ", *The American Statistician*, 73:sup1, 1-19, DOI: 10.1080/00031305.2019.1583913. Retrieved from <https://www.tandfonline.com/doi/pdf/10.1080/00031305.2019.1583913?needAccess=true> on 9/23/2019.
- What Works Clearing House Procedures Handbook Version 4.0. Retrieved from WWC on 10/31/2019.

Appendix

			Comparison Group		Apex Learning	
			Count	Column N %	Count	Column N %
Language 9	Sample Size		13	100.00%	13	100.00%
	School Year	SY 16-17	2	15.38%	2	15.38%
		SY 17-18	4	30.77%	6	46.15%
		SY 18-19	7	53.85%	5	38.46%
	Gender	F	9	69.23%	7	53.85%
		M	4	30.77%	6	46.15%
	FRL	No	7	53.85%	6	46.15%
		Yes	6	46.15%	7	53.85%
	IEP	No	12	92.31%	12	92.31%
		Yes	1	7.69%	1	7.69%
	EL	No	13	100.00%	12	92.31%
		Yes	0	0.00%	1	7.69%
	Minority	No	6	46.15%	6	46.15%
		Yes	7	53.85%	7	53.85%
	Race	American Indian or Alaska Native	4	30.77%	4	30.77%
		Asian	0	0.00%	1	7.69%
		Black or African American	0	0.00%	0	0.00%
Hispanic or Latino		1	7.69%	2	15.38%	
Multi-ethnic		2	15.38%	0	0.00%	
White		6	46.15%	6	46.15%	
Language 10	Sample Size		25	100.00%	25	100.00%
	School Year	SY 16-17	10	40.00%	9	36.00%
		SY 17-18	8	32.00%	8	32.00%
		SY 18-19	7	28.00%	8	32.00%
	Gender	F	10	40.00%	9	36.00%
		M	15	60.00%	16	64.00%
	FRL	No	12	48.00%	13	52.00%
		Yes	13	52.00%	12	48.00%
	IEP	No	24	96.00%	24	96.00%
		Yes	1	4.00%	1	4.00%
	EL	No	25	100.00%	24	96.00%
		Yes	0	0.00%	1	4.00%
	Minority	No	16	64.00%	14	56.00%
		Yes	9	36.00%	11	44.00%
	Race	American Indian or Alaska Native	6	24.00%	6	24.00%
		Asian	0	0.00%	0	0.00%
		Black or African American	0	0.00%	1	4.00%
Hispanic or Latino		2	8.00%	4	16.00%	
Multi-ethnic		1	4.00%	0	0.00%	
White		16	64.00%	14	56.00%	

Mathematics 9	Sample Size		59	100.00%	59	100.00%
	School Year	SY 16-17	5	8.47%	5	8.47%
		SY 17-18	34	57.63%	34	57.63%
		SY 18-19	20	33.90%	20	33.90%
	Gender	F	28	47.46%	31	52.54%
		M	31	52.54%	28	47.46%
	FRL	No	38	64.41%	35	59.32%
		Yes	21	35.59%	24	40.68%
	IEP	No	46	77.97%	41	69.49%
		Yes	13	22.03%	18	30.51%
	EL	No	57	96.61%	55	93.22%
		Yes	2	3.39%	4	6.78%
	Minority	No	41	69.49%	41	69.49%
		Yes	18	30.51%	18	30.51%
	Race	American Indian or Alaska Native	12	20.34%	8	13.56%
		Asian	2	3.39%	3	5.08%
		Black or African American	0	0.00%	1	1.69%
		Hispanic or Latino	0	0.00%	5	8.47%
		Multi-ethnic	4	6.78%	1	1.69%
		White	41	69.49%	41	69.49%
Mathematics 10	Sample Size		142	100.00%	142	100.00%
	School Year	SY 16-17	40	28.17%	40	28.17%
		SY 17-18	67	47.18%	65	45.77%
		SY 18-19	35	24.65%	37	26.06%
	Gender	F	64	45.07%	67	47.18%
		M	78	54.93%	75	52.82%
	FRL	No	76	53.52%	75	52.82%
		Yes	66	46.48%	67	47.18%
	IEP	No	114	80.28%	112	78.87%
		Yes	28	19.72%	30	21.13%
	EL	No	137	96.48%	140	98.59%
		Yes	5	3.52%	2	1.41%
	Minority	No	94	66.20%	91	64.08%
		Yes	48	33.80%	51	35.92%
	Race	American Indian or Alaska Native	28	19.72%	20	14.08%
		Asian	3	2.11%	4	2.82%
		Black or African American	2	1.41%	4	2.82%
		Hispanic or Latino	9	6.34%	17	11.97%
		Multi-ethnic	6	4.23%	6	4.23%
		White	94	66.20%	91	64.08%

Table 2: Unadjusted MAP Growth RIT Scores by Group			N	Mean	Std Dev	Median	Min	Max
Language 9	Fall	Comparison Group	13	219.15	12.00	221.00	197.00	232.00
		Apex Learning	13	219.54	11.24	223.00	197.00	232.00
	Spring	Comparison Group	13	219.54	13.31	220.00	194.00	241.00
		Apex Learning	13	223.00	8.64	223.00	206.00	234.00
Language 10	Fall	Comparison Group	25	221.32	10.31	225.00	193.00	242.00
		Apex Learning	25	220.92	13.29	225.00	191.00	242.00
	Spring	Comparison Group	25	224.00	10.07	225.00	195.00	245.00
		Apex Learning	25	226.36	8.93	228.00	208.00	246.00
Mathematics 9	Fall	Comparison Group	59	225.73	14.91	224.00	201.00	269.00
		Apex Learning	59	225.76	14.85	224.00	202.00	269.00
	Spring	Comparison Group	59	230.14	16.39	228.00	203.00	279.00
		Apex Learning	59	228.51	16.96	227.00	199.00	284.00
Mathematics 10	Fall	Comparison Group	142	230.60	17.37	231.00	179.00	267.00
		Apex Learning	142	230.47	17.40	229.50	188.00	270.00
	Spring	Comparison Group	142	234.39	19.58	234.50	179.00	278.00
		Apex Learning	142	233.68	18.00	232.00	192.00	277.00

Table 3: Apex Courses Use Metrics by MAP Growth Test and Grade Level				
	N	Total Hours	Percent of Activities Completed	Quality of Work
		Mean	Mean	Mean
Language 9	13	48.11	60.80%	79.37%
Language 10	25	33.30	72.74%	77.92%
Mathematics 9	59	58.33	90.65%	76.51%
Mathematics 10	142	62.93	91.07%	75.05%

Table 4: Linear Regression Coefficients by MAP Growth Test Overall

Test		Unstandardized Coefficients B	t	Sig.	Partial Correlations	Partial Eta Squared	Cohen's d	Percentile Point Difference
Language	Treatment	2.786	2.059	.043**	.244	.060	.503	19
	Grade	3.278	2.220	.030	.262	.069	.542	
	Fall RIT Score	.606	8.842	.000	.734	.539	2.160	
	Male	-1.370	-.974	.334	-.118	.014	-.238	
	Minority	2.371	1.668	.100	.200	.040	.408	
	FRL	-1.276	-.927	.357	-.113	.013	-.227	
	IEP	-5.782	-1.683	.097	-.201	.041	-.411	
	EL	.256	.059	.953	.007	.000	.014	
	(Constant)	57.777	2.866	.006				
Mathematics	Treatment	-.812	-.992	.322	-.050	.002	-.100	-4
	Grade	.001	.001	.999	.000	.000	.000	
	Fall RIT Score	.949	33.292	.000	.859	.738	3.359	
	Male	.722	.874	.383	.044	.002	.088	
	Minority	.154	.172	.864	.009	.000	.017	
	FRL	-.176	-.203	.839	-.010	.000	-.021	
	IEP	-2.253	-2.059	.040	-.103	.011	-.208	
	EL	-.672	-.282	.778	-.014	.000	-.028	
	(Constant)	15.865	1.525	.128				

Stars denote statistical significance: ***p<.01, **p<.05, *p<.10,

Cohen's d≥.20 substantially important.

Table 5: Linear Regression Coefficients by MAP Growth Test and Student Grade Level

Test		Unstandardized Coefficients B	t	Sig.	Partial Correlations	Partial Eta Squared	Cohen's d	Percentile Point Difference
Language 9	Treatment	3.288	1.732	.100*	.378	.143	.816	29
	Fall RIT Score	.864	8.483	.000	.894	.800	3.999	
	Male	-1.864	-.843	.410	-.195	.038	-.398	
	Minority	-.404	-.170	.867	-.040	.002	-.080	
	FRL	1.186	.564	.580	.132	.017	.266	
	IEP	-1.668	-.401	.693	-.094	.009	-.189	
	EL	.474	.090	.929	.021	.000	.042	
	(Constant)	30.591	1.378	.185				

Language 10	Treatment	2.220	1.247	.219	.189	.036	.385	15
	Fall RIT Score	.485	5.232	.000	.628	.395	1.615	
	Male	-.659	-.362	.719	-.056	.003	-.112	
	Minority	2.592	1.411	.166	.213	.045	.436	
	FRL	-2.920	-1.569	.124	-.235	.055	-.484	
	IEP	-7.925	-1.495	.142	-.225	.051	-.461	
	EL	.915	.136	.892	.021	.000	.042	
	(Constant)	117.976	5.628	.000				
Mathematics 9	Treatment	-1.540	-1.153	.252	-.109	.012	-.220	-9
	Fall RIT Score	.996	20.215	.000	.888	.788	3.855	
	Male	-.087	-.064	.949	-.006	.000	-.012	
	Minority	-2.502	-1.682	.095	-.158	.025	-.321	
	FRL	1.282	.895	.373	.085	.007	.171	
	IEP	-2.548	-1.571	.119	-.148	.022	-.300	
	EL	.760	.234	.815	.022	.000	.045	
	(Constant)	6.098	.538	.592				
Mathematics 10	Treatment	-.563	-.551	.582	-.033	.001	-.066	-3
	Fall RIT Score	.937	26.396	.000	.846	.716	3.178	
	Male	1.053	1.019	.309	.061	.004	.123	
	Minority	1.038	.924	.356	.056	.003	.111	
	FRL	-.807	-.743	.458	-.045	.002	-.089	
	IEP	-2.373	-1.646	.101	-.099	.010	-.198	
	EL	-.143	-.042	.966	-.003	.000	-.005	
	(Constant)	18.219	2.135	.034				

Stars denote statistical significance: ***p<.01, **p<.05, *p<.10,
Cohen's d≥.20 substantially important.



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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>.

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