Impact of Vocabulary.com Usage on Student Achievement
Case Study Brief: Margate Middle School
Broward County Public Schools, Florida

Abstract

This case study brief documents findings from a landmark study investigating the impact of Vocabulary.com usage on student achievement. Utilizing a secondary data analysis methodology, we examined achievement score data from teachers in a Title 1 middle school in Florida, in which some teachers utilized Vocabulary.com with their students and some did not. We looked specifically at the change on the state standardized English Language Arts (ELA) exams for the same students over a two-year period.

Key findings include: Students using Vocabulary.com had higher year over year growth on the FSA ELA exam than students not using Vocabulary.com. For example, 7th grade students using Vocabulary.com had an average change in their mean FSA ELA scaled score of 9.62 from 2016 to 2017 while similar students not using the product had an average scaled score change of only 4.94.

"Vocabulary is a vital building block to success in school and life."

Jessica Slusser, Director, Getting Smart

Introduction

Increasingly, schools and districts are realizing that to ensure that all students are well-prepared to thrive in a global information-intensive society, students need rich learning experiences that support the development of future ready skills. Central to the development of these future ready skills is the ability to "build and retain word knowledge and develop strategies that help them access complex text.[i]" The development of a strong foundation in vocabulary is also inherently tied to students' abilities to scale their learning to higher levels. This has important ramifications for K-12 schools focused on closing the achievement gaps within their student population. Research indicates that students with stronger vocabulary are more comfortable building connections between academic concepts and leveraging those connections to expand their reservoir of words and knowledge. Students with less robust vocabulary have more difficulties closing that aspect of the achievement gap because they do not have the word scaffolding to do it on their own. Therefore, the closing of the "vocabulary gap" as described by Jessica Slusser is as much about leveling the academic playing field as it is about preparing students with college and career ready skills. For many schools and districts, vocabulary development is a new social justice issue because of the potential strong impact a rich foundation in vocabulary can have on student achievement and future success in college and career.

Technology has long held the promise of leveling the playing field by helping schools achieve equity in student access to high quality instructional materials. Correspondingly, school district leaders are highly interested in the effective use of digital tools, content and resources to support student learning. Per the 2017 Speak Up Research Project national findings, 96% of district administrators consider the effective use of instructional technology in school as important for students' future success.[ii] At the same time, administrators identify

several challenges associated with the use of instructional technology, notably, how to evaluate the impact of digital tools on student outcomes. This case study brief and the originating research study aims to address that K-12 education challenge by providing both a replicable model and key findings about the impact of technology on student learning and the development of college and career ready skills.

About this study

At the request of Vocabulary.com, Project Tomorrow®, the internationally recognized education nonprofit organization, designed and implemented a large-scale, secondary data analysis study to examine potential correlations between the effective use of the Vocabulary.com product and student achievement and growth as measured by state standardized tests. Broward County Public Schools in Florida was invited to participate in the study based upon their implementation of Vocabulary.com in their middle and high schools. The study focused on the use and non-use of Vocabulary.com at 12 schools within the district. In total, 14,200 individual student records from students that took their state standardized tests in both the 2015/16 and 2016/17 school years were examined. This case study brief specifically examines the correlational findings between the use of Vocabulary.com and student achievement at one of the study schools, Margate Middle School.

About Margate Middle School

Margate Middle School is a (Science, Technology, Engineering and Mathematics) S.T.E.M. magnet school within Broward County Public Schools in southeast Florida. The school serves a diverse student population of approximately 1,251 students in grades 6-8. The demographics breakdown of the student population by race is: 55.5% African-American/Black, 34.8% Caucasian, 23.9% Hispanic/Latinx, 3.2% Asian, 1.8% Native Indian, .39% Native Pacific and 4.2% Multi-Racial backgrounds. Over 80% of the students participate in the federally funded free or reduced lunch program and the school is recognized as a Title 1 school.

Based upon the 2016/17 school year, Margate Middle Schools lags other middle schools in the Broward County district and the state of Florida in terms of student proficiency in English Language Arts (ELA) as measured on the Florida Standard Assessments (FSA). While over 52% of the grade 7 and grade 8 students statewide (52% and 55% respectively) and over 54% of the grade 7 and grade 8 students within Broward County (54% and 57% respectively) had a passing score on the FSA in English in spring 2017, only 40% of the grade 7 students and 48% of the grade 8 students at Margate Middle School passed the FSA ELA exam.

Margate Middle School has a strong cultural and programmatic focus on college and career readiness and according to school principal Ernest Toliver, Margate strives to be "on the cutting edge of 21st century learning." To address that goal, in spring 2015, the school adopted Vocabulary.com as a digital learning tool to support students' vocabulary acquisition.   Reflecting a strong commitment to product usage and the adoption of the tool by many of the English Language Arts teachers, Margate Middle School won the nationwide Vocabulary Bowl for middle schools with the largest number of new words mastered nationwide by their students for both the 2016/17 and 2017/18 school years.[iii]

The demographics of the school, the lagging FSA scores in English Language Arts, and the school's intensive use of Vocabulary.com were key factors in the identification of Margate Middle School for inclusion in this overall large-scale study, and as the feature of this case study brief.

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Summary of key findings from the secondary data analysis: Margate Middle School
Analysis of the student data relative to teachers' usage of Vocabulary.com indicates a relationship between usage and achievement. While many factors may contribute to increases in student achievement, particularly on state standardized tests, we believe that the consistency of these findings warrant special attention as a contributing factor to the student outcomes.

1. Across both grade 7 and grade 8, students in classes where their teacher used Vocabulary.com with fidelity as indicated by heavy or high usage as defined by Project Tomorrow, achieved higher mean scaled scores in spring 2017 on the FSA ELA exams and greater growth from 2016 to 2017 than their peers in classes where their teachers did not use Vocubulary.com.
2. This pattern was consistent when the student data was disaggregated for African-American and Hispanic/Latinx students.
3. Additionally, student growth from spring 2016 to spring 2017 where the spring 2016 mean scaled scores were similar between Vocabulary.com using classes and non-using classes also indicate higher achievement for student with access to Vocabulary.com.

Detailed review of the key study findings
Project Tomorrow analyzed the FSA ELA records from 1,073 students at Margate Middle School for this study. To support a valid sampling for analysis and to isolate variables, it was important that we segment the study population into cohorts that would be comparable to each other. To do that we undertook several key steps:

o Categorization of the 14 English Language Arts teachers at the school based upon their usage of Vocabulary.com into three categories: heavy users defined as those teachers at the school who were ranked as in the top 20% of teachers using Vocabulary.com, high users were identified as teachers with an average of 10 or more words mastered by their students per month, and non-users as teachers who were not using Vocabulary.com within their classroom instruction.
o Identification of teachers and subsequently classes where the class average scaled score in 2016 equated to an achievement level of 1 (inadequate), 2 (below satisfactory) or 3 (satisfactory) using information provided by the Florida Department of Education.[iv]
o Focus on students in regular English classes and Intensive Reading classes. This required that we eliminate data from students in advanced English classes.
o Mean scaled scores were weighted based upon the number of students in the class.

Table 1 provides descriptives on the categorization of the teachers and the numbers of students in the respective grades by teacher and includes the 2016 FSA ELA weighted scaled score mean for each category of teachers by usage level and grade level.

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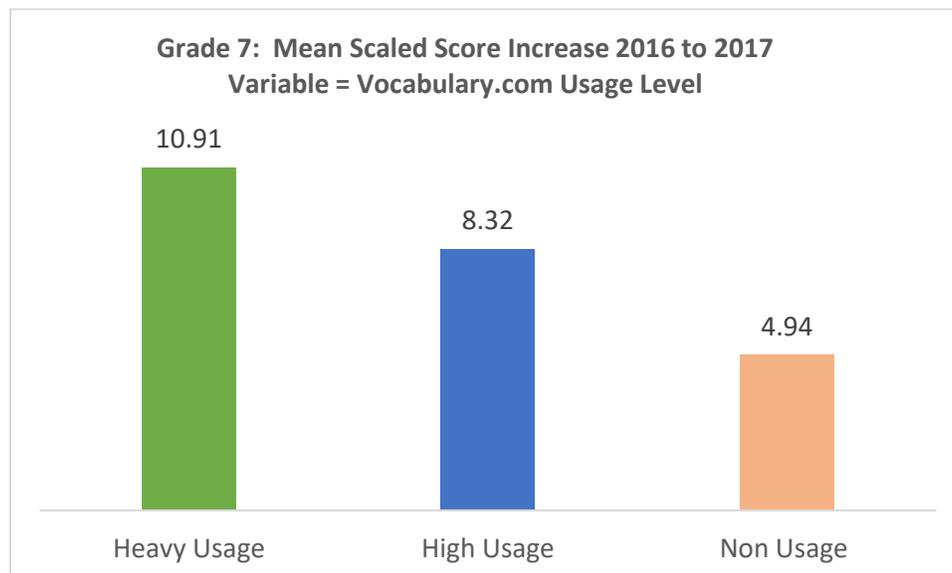# Broward County Public Schools, Florida

Table 1: Study Participants - Teachers and Students at Margate Middle School

Grade level in spring 2017	Categorization of teachers' usage of Vocabulary.com	Number of teachers	Number of students	Weighted 2016 FSA ELA Scaled Score Mean
Grade 7	Heavy user	2	112	304.97
	High user	2	119	305.63
	Non-user	2	153	304.09
Grade 8	Heavy user	2	127	314.76
	High user	2	130	314.47
	Non-user	2	141	310.67

The compatibility of the comparative classes provided an excellent starting point for examining the impact of the use of Vocabulary.com on student achievement at Margate Middle School.

Two key findings were revealed though this comparative analysis. First, classes where teachers used Vocabulary.com had a higher mean scaled score on the spring 2017 FSA ELA than classes where teachers were not using the product within their classroom instruction. For example, 8th grade students in classes with heavy or high levels of product usage had a weighted scaled score mean of 325.45. Their 8th grade peers in classes not using the product averaged a scaled score of 316.53 on the 2017 FSA ELA exam. Similar results are noted for grade 7 students as well. More representative of the impact of Vocabulary.com on student achievement however is the ELA growth evident by comparing the 2016 and 2017 scores for the same students. Charts 1 and 2 below document the change in scaled scores in one year relative to the use of Vocabulary.com.

Chart 1: Grade 7 Students' Change in Scaled Scores on FSA ELA by Teacher Usage of Vocabulary.com – Spring 2016 to Spring 2017
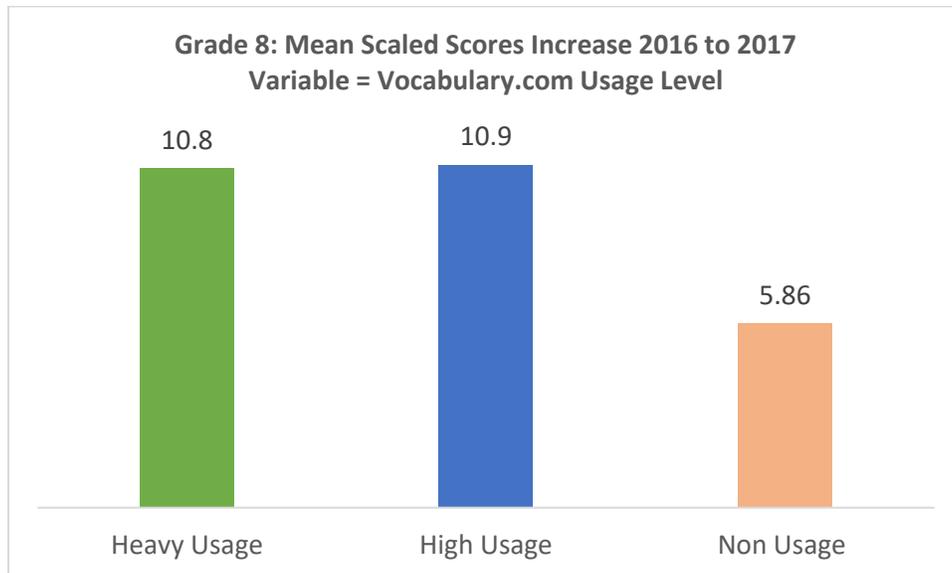

Grade 7: Mean Scaled Score Increase 2016 to 2017
Variable = Vocabulary.com Usage Level

Heavy Usage: 10.91
High Usage: 8.32
Non Usage: 4.94

Grade 7	2016 Weighted Mean Scaled Score	2017 Weighted Mean Scaled Score	Growth from 2016 to 2017 – same students
Teacher = heavy user of Vocubulary.com	304.97	315.188	10.91
Teacher = high user of Vocabulary.com	305.63	313.95	8.32
Teacher = non user of Vocabulary.com	304.09	309.03	4.94

Chart 2: Grade 8 Students' Change in Scaled Scores on FSA ELA by Teacher Usage of Vocabulary.com – Spring 2016 to Spring 2017

Grade 8: Mean Scaled Scores Increase 2016 to 2017
Variable = Vocabulary.com Usage Level

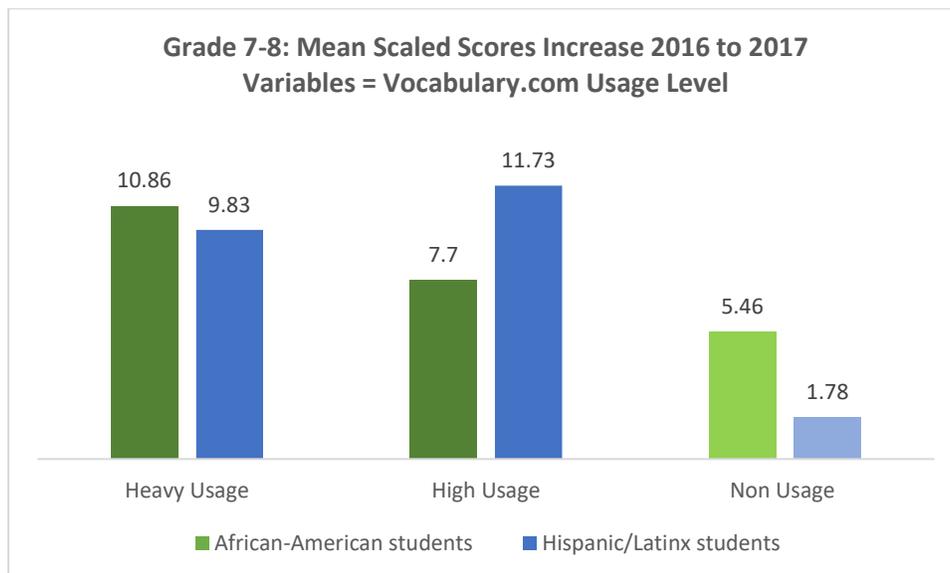| Grade 8	2016 Weighted Mean Scaled Score	2017 Weighted Mean Scaled Score	Growth from 2016 to 2017 – same students
Teacher = heavy user of Vocubulary.com	314.76	325.56	10.80
Teacher = high user of Vocabulary.com	314.47	325.34	10.90
Teacher = non user of Vocabulary.com	310.67	316.53	5.86

The consistency of the higher year over year growth for students in the grade 7 and grade 8 classes where Vocabulary.com was part of the instructional mix is significant. For example, students in grade 7 classes where Vocabulary.com was used heavily by the teacher to transform the learning experience had two times the amount of growth (10.91) as students who did not have access to the product (4.94). It is also noteworthy that the 8th grade students who used Vocabulary.com within their ELA classes scored at a Level 2 on the FSA exam, moving up from their Level 1 status in 2016. Students who did not use Vocabulary.com scored at the FSA Level 1 status of inadequate for both 2016 and 2017.

As a frame of context, the mean scaled score growth for 2016 to 2017 statewide was 6 points comparing 2016 grade 6 students with 2017 grade 7 students. The similar mean scaled score growth for grade 8 students in 2017 was 7 points statewide. As indicated earlier, while many factors contribute to student achievement and growth, the scale of the growth as exhibited in this special analysis combined with the consistency of the findings underscores the importance of these findings regarding the impact of Vocabulary.com on students' achievement on state standardized tests.

This pattern of higher achievement on the spring 2017 FSA ELA exam and higher growth from 2016 to 2017 was consistent for students identifying as African-American or Hispanic as well. Chart 3 displays similar data as illustrated in Charts 1 and 2 but specifically for these sub-groups of students at Margate Middle School.

Chart 3: African-American & Hispanic/Latinx Students' Change in Scaled Scores on FSA ELA by Teacher Usage of Vocabulary.com - Spring 2016 to Spring 2017

Grade 7-8: Mean Scaled Scores Increase 2016 to 2017
Variables = Vocabulary.com Usage Level

	African-American students	Hispanic/Latinx students
Heavy Usage	10.86	9.83
High Usage	7.7	11.73
Non Usage	5.46	1.78

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Within both student populations at Margate, African-American students (471 in the study) and Hispanic/Latinx students (197 in the study), the access to Vocabulary.com in their class instruction had a significant impact on their scaled score growth from spring 2016 to spring 2017. Compared to their peers in classes where the product was not available for student use, African-American students in heavy usage classrooms saw growth in their scaled scores of almost 11 points. The African-American students in non-using classes saw growth of only 5.46 points in their scaled scores from 2016 to 2017. The contrast was sharpest for Hispanic/Latinx students in Intensive Reading courses across both 7th and 8th grades. Those students who had access to Vocabulary.com saw their average scaled scores on the FSA ELA jump from 317.70 to 327.62, growth of 9.9 scaled score points, propelling them to Level 2 proficiency. Their peers in the non-using classes saw growth of only 2.03 points, from 306.58 in 2016 to 308.60 in 2017.

To further examine the impact of the use of Vocabulary.com on student achievement and growth, we conducted a special analysis to review product efficacy for students starting at the same achievement level in similar learning environments. This focus on a similar "starting point" provides additional validity to the data analysis. To set up this analysis, Project Tomorrow examined the Regular English classes in Grade 8. Two teachers were identified based upon their spring 2016 FSA ELA scores as being within a 1-point range of each other. One teacher (Teacher A) was a heavy user of Vocabulary.com; the other teacher (Teacher B) was a non-user. Table 2 identifies the participating teachers for this special analysis and includes the comparable "starting point" data from both sets of classes.

**Table 2: Participants for Starting Point Analysis on the Impact of Vocabulary.com**

Teacher	Vocabulary.com Usage Level	Grade / Course	Number of students	Weighted Mean Scaled Score for Class – Spring 2016
Teacher A	Heavy user	Gr 8 Regular English	68	309.34
Teacher B	Non-user	Gr 8 Regular English	70	309.54

The "starting point" elements for this evaluation include the comparable number of students, course type, grade level and weighted mean scaled score average from spring 2016 across the classes of these two teachers. By isolating these variables, we are able to focus on analysis on the impact of Vocabulary.com usage in the classes. Following the pattern identified with the analysis across all grades and courses and the demographic focus on African-American and Hispanic/Latinx students, the students in the class using Vocabulary.com demonstrated higher growth than their peers without that access even when starting at the same mean scaled score from 2016. Chart 4 illustrates the growth for the students in both teachers' classes as the change from the average score in spring 2016 to the average score in spring 2017.

Chart 4: Grade 8 Regular English Students' Change in Scaled Scores on FSA ELA by Teacher Usage of Vocabulary.com – Spring 2016 to Spring 2017

Grade 8 Regular English: Mean Scaled Score Increase 2016 to 2017
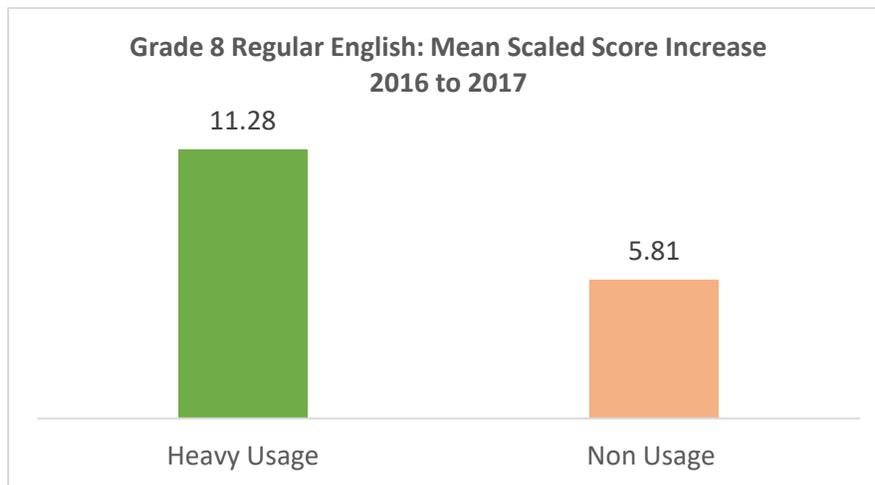
The student growth in the classes where the teacher was using Vocabulary.com (from 309.34 to 320.62; 11.28 points) was almost twice the growth of the students in the classes without the product access (309.54 to 315.36; 5.81 points). Given the isolation of various variables in this analysis, these findings again document the impact of Vocabulary.com on students' year over year growth on the FSA ELA assessment.

As noted earlier, this case study brief is part of a larger study conducted by Project Tomorrow with a goal to investigate the impact of the use of Vocabulary.com on student achievement. The resulting analysis of the Margate Middle School student data relative to teachers' usage of Vocabulary.com indicates a relationship between usage and achievement. While many factors may contribute to increases in student achievement, particularly on state standardized tests, we believe that the consistency of these findings warrant special attention as a contributing factor to the student outcomes.

Appendix

Overview of study methodology
To complete the secondary data analysis, Broward County Public Schools provided Project Tomorrow with FSA records for students who were members of two specific cohorts. Cohort 1 was comprised of students who took the FSA ELA exam in spring 2016 as 6th graders and then again as 7th graders in spring 2017. Cohort 2 included students who took the FSA ELA exam in spring 2016 as 7th graders and then again as 8th graders in spring 2017. Students' racial/ethnic/cultural heritage was also indicated in the data. The student records were aggregated by school, teacher and ELA course taken during that school year (Advanced English, Regular English, Intensive Reading). Project Tomorrow's analysis used aggregated course and teacher mean scaled scores from the 2016 and 2017 FSA ELA exams. To understand the relationship with Vocabulary.com usage, Project Tomorrow utilized data provided by Vocabulary.com to identify the level of usage of the product by teachers at the study schools. Using data that identified teacher usage based upon the average number of students using the product and the average number of words mastered in total and on average by student, Project Tomorrow created a typology of usage that was used to identify teachers as heavy, high, low or non-users of the product. Student achievement and growth on the FSA ELA tests were analyzed relative to teachers' usage patterns by grade level as well as course type. Examination of differences for students who identified as African-American and Hispanic/Latinx was also undertaken. The data provided includes basic descriptive statistics.

About Project Tomorrow (www.tomorrow.org)
Project Tomorrow's mission is to support the effective implementation of research-based STEAM learning experiences for students in K-12 schools. Project Tomorrow is particularly interested in the role of digital tools, content and resources in supporting students' development of college and career ready skills. For the past 15 years, the organization has focused efforts on national research projects and the design and implementation of evaluation, efficacy and feedback studies examining the impact of digital tools or technology-enabled learning models in the classroom.

About Vocabulary.com
Vocabulary.com is a platform for systematic, lasting vocabulary improvement that goes beyond rote memorization to truly teach all the meanings and subtle nuances of words. Used in over 42,000 schools in the US, Vocabulary.com easily integrates with any curriculum and automatically adapts to each student's individual ability. The heart of Vocabulary.com is an adaptive learning game that is backed by the world's smartest dictionary. Each week, over 8 million students, teachers, and life-long learners across the globe use Vocabulary.com to master words, build a better vocabulary, and improve literacy.

[i] http://www.gettingsmart.com/2016/02/have-you-heard-of-the-vocabulary-gap/
[ii] www.tomorrow.org/speakup
[iii] https://www.vocabulary.com/articles/announcements/teamwork-tenacity-propel-margate-middle-to-vocabulary-bowl-win/; https://www.vocabulary.com/articles/announcements/for-margate-middle-school-grit-and-effort-pay-off-once-again/
[iv] http://www.fldoe.org/core/fileparse.php/5663/urlt/ELA-MathFSAFS1617.pdf