



# Engagement with Penda Learning Boosts Science Scores in Miami-Dade County Public Schools

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## OVERVIEW

Miami-Dade County Public Schools (M-DCPS) utilized Penda Learning's science platform as instructional support in select middle schools within its Education Transformation Office (ETO). The instructional support provided both supplemental content and science intervention for 8th grade science curricula in the form of digital online instructional activities assigned to students weekly to boost student performance as measured by the Florida Grade 8 Statewide Science Assessment (SSA). The FL SSA measures student achievement of the Next Generation Sunshine State Science Standards.

The purpose of the study was to determine if a relationship existed between Penda Learning data metrics and student performance on the FL Grade 8 SSA. Analysis of results from the three-month study illuminated patterns of practice in student usage and mastery of science content.

## METHODOLOGY

Penda Learning usage metrics and student performance outcomes of 1,176 students who took the 2019 FL Grade 8 SSA were paired and analyzed to determine if there was a relationship between the time students were engaged in Penda Learning's science platform and performance on the FL Grade 8 SSA.

Penda Learning usage data collected over the three-month study period was reviewed and analyzed based on the following criteria:

1. The number of hours students were engaged in Penda Learning's science platform
2. The number of science activities in which students **attempted** mastery of Penda Learning science content
3. The number of science activities in which students **demonstrated** mastery of Penda Learning science content

Hours of student engagement within Penda Learning were analyzed and sorted based on emergent patterns of time engaged in Penda Learning's science platform. That data was sorted into six distinct groups of time: one hour or fewer, two to four hours, four to six hours, six to eight hours, eight to 10 hours, and greater than 10 hours.

Penda Learning student performance data was disaggregated based on the total number of science activities a student attempted and the total number of science activities a student mastered during the three-month study period. Penda Learning performance data was sorted into two performance groups: attempted, defined as achieving 79% or below on an assigned science activity, and mastered, defined as achieving 80% or above on an assigned science activity.

M-DCPS provided 2019 FL Grade 8 SSA scores aggregated by school for all students who took the SSA and were assigned Penda Learning science activities. All student data was anonymized, and student performance data scores were averaged for each school.

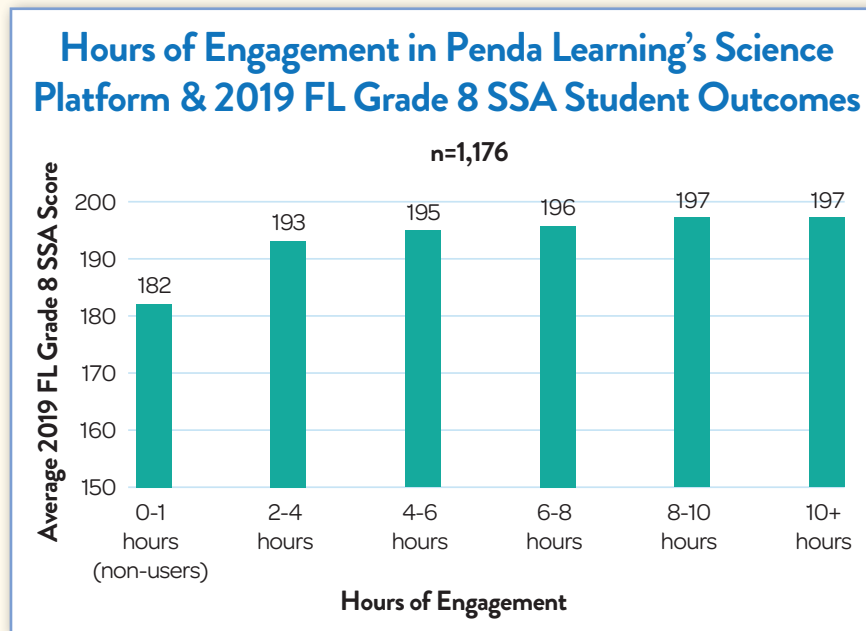
## RESULTS

Analysis of 1,176 students who used Penda Learning’s science platform over the three-month study period indicated positive trends between Penda usage metrics and performance outcomes on the 2019 FL Grade 8 SSA. Results of the analysis are discussed using division-level and school-level data.

### Is there a relationship between student hours of engagement in Penda Learning’s science platform and student outcomes on the 2019 FL Grade 8 SSA?

The number of hours students were engaged in the Penda Learning science platform were compared to students’ 2019 FL Grade 8 SSA scores to determine if a relationship existed. Performance outcomes of 1,176 students who took the 2019 FL Grade 8 SSA and were assigned science activities on Penda Learning’s science platform were included in the analysis. Hours of engagement were sorted into six usage groups of time. Data was analyzed at the division and school level.

#### A Division-level Perspective

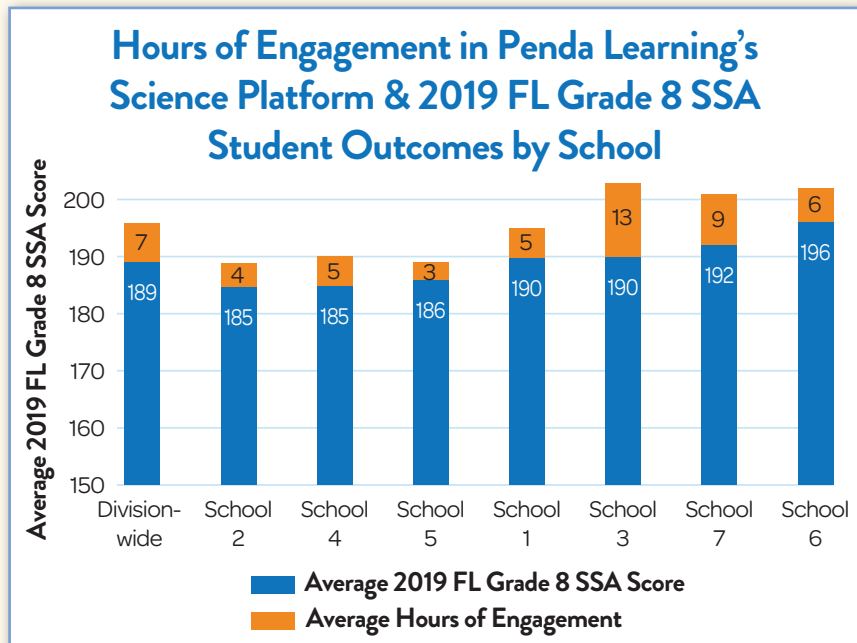


**Figure 1.** A change in average 2019 FL Grade 8 SSA scores was observed among the Penda Learning usage (hours of engagement) sub-groups. The non-user group, students who averaged one hour of engagement or less in Penda Learning’s science platform, experienced the lowest 2019 FL Grade 8 SSA scores of all sub-groups. When comparing 2019 FL Grade 8 SSA average scores of non-users and students who averaged between two to four hours of engagement, the average 2019 FL Grade 8 SSA scores increased by 11 points. When comparing 2019 FL Grade 8 SSA average scores of non-users to students who had on average eight to ten hours of engagement over the three-month period, 2019 FL Grade 8 SSA average scores increased by 15 points. Equally important, assessment scores increased as hours of engagement in Penda Learning’s science platform increased.



## A School-level Perspective

2019 FL Grade 8 SSA scores were paired with hours of engagement for all students assigned at least one science activity on Penda Learning's science platform. School-level data was analyzed to determine if a relationship existed between student hours of engagement in Penda Learning's science platform and student outcomes on the 2019 FL Grade 8 SSA across all participating schools. Assessment scores were averaged by school, and hours of engagement were rounded to the nearest full hour.



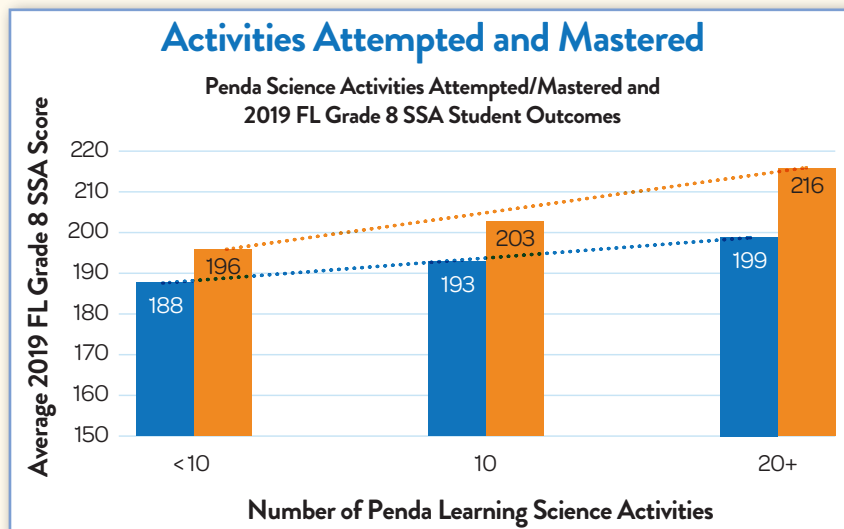
**Figure 2.** Paired 2019 FL Grade 8 SSA outcomes and Penda Learning usage data indicated variation in hours of engagement and 2019 FL Grade 8 SSA outcomes at the school level. The 2019 Grade 8 SSA average scores for schools 2, 4, and 5, students who engaged with Penda Learning's science platform on average for five hours or less, fell below the division-wide average of 189. Average 2019 FL Grade 8 SSA scores for students in schools who engaged in Penda Learning's science platform on average for six or more hours were above the division average of 189. Schools 3, 6 and 7 experienced 2019 FL Grade 8 SSA average scores of 190, 192 and 196 respectively. Average 2019 Grade 8 SSA scores were higher in schools who were engaged in Penda Learning's science platform for six or more hours during the study period when compared to schools who used Penda Learning's science platform for five hours or less.



### Is there a relationship between student performance on Penda Learning science activities and student outcomes on the 2019 FL Grade 8 SSA?

Penda Learning student performance data was analyzed to determine if a relationship existed between student performance on Penda Learning science activities and student outcomes on the 2019 FL Grade 8 SSA. Penda Learning student performance data was sorted into two performance sub-groups and labeled attempted, defined as achieving 79% or below on an assigned science activity, and mastered, defined as achieving 80% or above on an assigned science activity. Performance data was further sorted into three predominant sub-groups observed in the data based on the number of activities students either attempted or mastered. Students who took the 2019 FL Grade 8 SSA and attempted at least one science activity were included in the analysis.

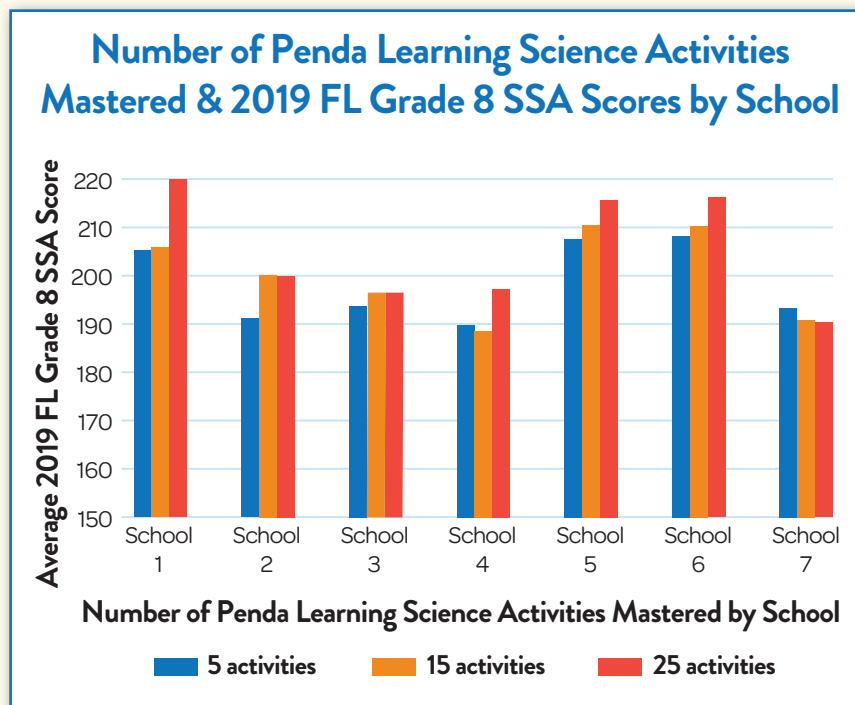
### A Division-level Perspective



**Figure 3.** Differences in averaged scores on the 2019 FL Grade 8 SSA were observed across all Penda Learning performance sub-groups. Average 2019 FL Grade 8 SSA scores increased across all Penda Learning performance groups based on the number of activities attempted and mastered. As the number of Penda Learning science activities attempted by students increased, the number of Penda Learning science activities mastered by students increased. Additionally, as the number of Penda Learning science activities attempted by students increased, 2019 FL Grade 8 SSA outcomes increased. Most substantial, as the number of Penda Learning science activities mastered by students increased, 2019 FL Grade 8 SSA average scores increased.

## A School-level Perspective

Penda Learning student performance data was analyzed for each school to determine if there was a relationship between students who mastered Penda Learning science content and outcomes on the 2019 FL Grade 8 SSA. Penda Learning performance data was sorted into three sub-groups based on the number of activities students mastered in each school. Performance sub-groups of five activities mastered, 15 activities mastered, and 25 activities mastered were created to provide a range of mastered activities for comparison and were found at each of the schools. Students who mastered five, 15 and 25 Penda Learning science activities exclusively and took the 2019 FL Grade 8 SSA were included in the analysis.



**Figure 4.** Analysis of 2019 FL Grade 8 SSA scores and the number of activities a student mastered by school revealed a large variation across the Penda Learning performance sub-groups and across schools. In six of the seven schools analyzed, average 2019 FL Grade 8 SSA school scores were highest for students who mastered 25 Penda Learning science activities. In five of the seven schools, average FL 2019 Grade 8 SSA scores increased for the performance sub-group of 15 activities mastered.

## CONCLUSION

The purpose of the study was to determine if there was a relationship between Penda Learning usage and performance metrics and performance on the 2019 Florida Grade 8 SSA. Student performance data sets from M-DCPS and Penda Learning were paired to observe data patterns to answer the following questions:

1. *Is there a relationship between student hours of engagement in Penda Learning's science platform and student outcomes on the 2019 FL Grade 8 SSA?*
2. *Is there a relationship between student performance on Penda Learning science activities and student outcomes on the 2019 FL Grade 8 SSA?*

Analysis of the division-wide paired data of 2019 FL Grade 8 SSA outcomes and Penda Learning usage data indicated a positive relationship between hours of engagement in Penda Learning's science platform and student performance on the 2019 FL Grade 8 SSA. It was also found that average 2019 FL Grade 8 SSA scores increased as student hours of engagement increased.

At the school level, the relationship between Penda Learning usage and 2019 FL Grade 8 SSA outcomes suggested a positive trend in the relationship between student hours of engagement and student outcomes during the three-month study period. Schools where, on average, students had six or more usage hours of engagement in Penda Learning's science platform experienced higher 2019 FL Grade 8 SSA scores when compared to schools where, on average, students had five or fewer hours of engagement. Furthermore, average 2019 FL Grade 8 SSA scores increased as student hours of engagement increased.

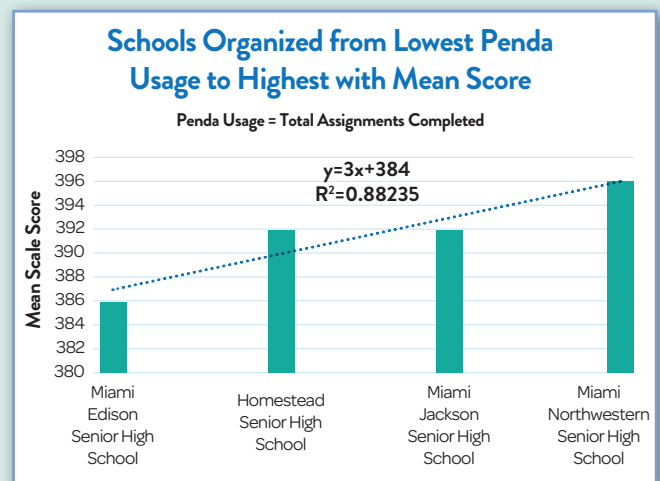
There was a positive relationship between Penda Learning performance data and performance on the 2019 FL Grade 8 SSA. Student outcomes were paired with Penda Learning performance sub-groups based on the number of activities students either attempted (scoring 79% or below) or achieved mastery on (scoring 80% or above). Average 2019 FL Grade 8 SSA outcomes trended upward with the number of activities students attempted and the number of activities they achieved mastery in using Penda Learning's science platform. Furthermore, it was observed that average 2019 FL Grade 8 SSA performance scores increased as the number of activities a student either attempted or mastered increased. This observation was a key finding suggesting that engagement, regardless of performance in Penda Learning, increased averaged 2019 FL Grade 8 SSA outcomes at the conclusion of the three-month study period.

## PENDA LEARNING IMPROVES HIGH SCHOOL SCORES, TOO!

Several years before M-DCPS' middle schools began using Penda Learning, four of the district's high schools utilized the platform with the hopes of improving biology EOC results. In the 2016-2017 school year, high school Biology I students logged 6,312.5 task hours within Penda Learning. During that time they mastered 10,564 activities — most of which were completed outside of school hours.

Biology I teacher-users received weekly automated assignments for students via Penda's Pacing Assistance Service. Weekly automated Class Mastery Reports were sent to teachers by email for progress monitoring and monthly School Administrator Reports were sent to select school administrators. Much emphasis was placed on planning and providing data-driven instruction using the Penda reports, creating intervention groups within Penda, and differentiating instruction for various levels of learners within a classroom.

At the end of the course, data was reviewed to determine whether Penda Learning usage correlated with higher EOC scores — and it did! When correlating Penda usage to Mean Scale Score performance, three out of four schools increased their Mean Scale Score from 2016 to 2017, and there was a 3.6% average net increase across the school year for all schools. In addition, when correlating Penda usage to Level 3 and Above performance, again, three out of four schools increased their percent of Level 3 and Above from 2016-2017, in this case with a 7.6% average net increase.



## ABOUT THE RESEARCHER

Dr. Brenda Conway is an experienced assessment and evaluation professional currently serving with Spotsylvania County Public Schools, VA. Dr. Conway independently examined Penda Learning usage metrics and Miami-Dade County Public Schools student performance outcomes.

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## ABOUT PENDA LEARNING

Penda Learning is an effective science intervention tool rooted in efficacy that supports Response to Intervention (RtI), data-driven instruction, and differentiated instruction. Built by educators for educators, Penda Learning creates standards-based content for grades 4 – 10, built on a highly engaging student gaming platform. Districts and schools partner with Penda Learning by providing their custom scope and sequence documents. Penda Learning’s Pacing Assistance Service (PAS) automatically aligns standards-based activities to district/school scope and sequence without any effort needed by district or school staff. Penda Learning’s PAS feature then automatically assigns activities to students weekly on the teacher’s behalf. Students receive instant feedback as they complete activities, earning points that unlock gaming features, including customizing their avatar, challenging friends, and moving through virtual Penda Worlds. Teachers receive standards-based Class Mastery Reports weekly via email automated by the Penda platform. Reports are designed to help teachers proactively employ targeted intervention and remediation using Penda Learning intervention features/functionality.