Executive Summary:

The Relationship Between Discovery Education Market Presence and State of Florida Grades 3-12 Achievement

Prepared by McREL for Discovery Education

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Overview

The purpose of this study was to test the relationship between Discovery Education's (DE) market presence and school-level academic achievement in the State of Florida. Specifically, the study used a correlational design where the outcomes of interest were Spring 2019 and 2022 End of Course (EOC) and Florida State Assessment (FSA) Math, Science, English, and Social Studies school average test scores; and the focal predictor was if a school was a DE user or not (i.e., treatment or comparison).

Research Questions

The current study aimed to answer the following research questions:

1. Do schools who use one or a combination of DE products (Discovery Education [DE] Learning Platform, Science Techbook, Social Studies Techbook, or DE Learning Platform + Science Techbook) report higher achievement scores than schools who do not use any DE product?
2. Do some school districts respond better or worse to DE products?

Design and Methodology

The study used publicly available school achievement and demographic data posted on the State of Florida Department of Education website, as well as product licensing information furnished by DE. For the academic years under investigation (2018-19 and 2021-22), the State of Florida used a combination of two state assessments to capture achievement across a host of outcome domains: the Florida Standards Assessment (FSA) and End of Course assessments (EOC). Specifically, the study used the following State of Florida achievement data:

- EOC Algebra 1 scores
- EOC Geometry scores
- FSA Math Elementary School (ES) scores (Grades 3 to 5)
- FSA Math Middle School (MS) scores (Grades 6 to 8)
- EOC Biology scores
- Grade 5 FSA Science scores
- Grade 8 FSA Science scores
- FSA English Elementary School (ES) scores (Grades 3 to 5)
- FSA English Middle School (MS) scores (Grades 6 to 8)
- EOC History scores
- EOC Civics scores

For Research Question 1, Treatment schools were identified based on if they use 1) DE Learning Platform only, 2) Science Techbook only, 3) Social Studies Techbook only, or 4) a combination of DE Learning Platform and Science Techbook[1]. Since the DE Learning Platform is purported to address multiple content areas, its effect was tested against all outcome areas, while Science Techbook and Social Studies Techbook (products designed for specific content areas)

were tested against science and social studies outcomes, respectively. The combination treatment group of DE Learning Platform and Science Techbook was tested against all outcome areas since the DE Learning Platform addresses multiple content areas; however, in some tests of the effect of DE Learning Platform + STB, the sample size of the treatment group was too small (< 10), which made the resulting effects difficult to interpret. Those hard-to-interpret effects are omitted from this executive summary and the accompanying final report.

For Research Question 2, Treatment schools were defined based on if the school used at least the DE Learning Platform—the schools in this sample could use other products as well. The moderation effects of district membership were tested for all outcome areas.

The sample sizes for Research Question 1 and Research Question 2 analyses are presented in Table 1 and Table 2, respectively. Because Research Question 2 addresses moderation effects of district membership, Table 2 presents sample sizes disaggregated by school district. All schools in the study population are members of school districts served by the Florida Department of Education, including both traditional public schools and public charter schools.

Table 1: Sample sizes (number of schools) for Research Question 1 analyses.

	2018-19 Dataset		2021-22 Dataset	
	Treatment	Comparison	Treatment	Comparison
Discovery Learning Platform	267 (District N = 29)	587 (District N = 54)	274 (District N = 25)	582 (District N = 54)
Science Techbook	91 (District N = 19)	587 (District N = 54)	103 (District N = 19)	582 (District N = 54)
Social Studies Techbook	101 (District N = 15)	587 (District N = 54)	102 (District N = 13)	582 (District N = 54)
Learning Platform + Science Techbook	156 (District N = 10)	587 (District N = 54)	158 (District N = 11)	582 (District N = 54)
Total Sample Size	**1,202** (District N = 66)		**1,219** (District N = 67)	

Table 2. Sample sizes (number of schools) for Research Question 2 analyses.

	2018-19 Dataset		2021-22 Dataset	
	Treatment	Comparison	Treatment	Comparison
Alachua	22	10	22	9
Brevard	-	-	-	-
Broward	188	21	189	28
Duval	6	72	6	68
Hillsborough	5	75	9	73
Indian River	16	6	16	5
Lee	5	16	-	-
Manatee	-	-	-	-
Marion	-	-	6	26
Miami-Dade	312	19	322	16

Orange	-	-	-	-
Osceola	18	19	21	19
Palm Beach	8	18	6	17
Pasco	75	5	73	6
Pinellas	33	26	33	30
St. Lucie	-	-	-	-
Total Sample Size	**975**		**1,000**	

Data analysis

To answer the first research question, Ordinary Least Squares (OLS) multiple regression was used to regress school-level achievement on treatment group, controlling for school-level covariates, including the percentage of students who qualified for free or reduced-price lunch, English language learners, Black/African American, Hispanic or Latino/a, Asian, Multi-racial, and total school enrollment.

To answer the second research question, an interaction term between treatment and school district was needed. Ordinary least squares (OLS) multiple regression was used to regress school-level achievement on treatment group, district number, the interaction between treatment and district, and with school-level demographics used as statistical controls. Interactions were created by computing a set of dummy codes for each school district; where a school was assigned a 1 if the school was located in that district, and a 0 if it was not. These school-level district dummy codes were then multiplied by the schools' corresponding treatment indicator value (1 if the school was a treatment school, and 0 if it was a comparison school), thereby creating an interaction between a district and the treatment as the outcome of interest. As for Research Question 1, these analyses also controlled for school level demographics.

Results

The following sections report instances of positive effects of DE products on student achievement. Null and negative effects are presented in the full report.

Research Question 1

- The analysis of SY 2018-2019 data revealed positive effects of the DE Learning Platform on EOC Algebra, EOC Geometry, FSA Math ES, EOC Biology, FSA Science Grade 5 and FSA English ES scores. Additionally, DE Learning Platform + Science Techbook reported positive effects on EOC Algebra and EOC Geometry scores.

- The analysis of 2021-22 data revealed a small positive effect of DE Learning Platform on EOC Geometry, FSA Math ES, and FSA English ES scores. Additionally, DE Learning Platform + Science Techbook reported a positive effect on EOC Algebra and EOC Geometry scores.

- Across the two analyses, the DE Learning Platform was consistently positively related to

school-level student achievement.

Research Question 2

- The 2018-19 analysis revealed that DE market presence (defined as a school having at least the DE Learning Platform) had differential effects on school districts ranging from the smallest positive interaction effect for EOC Algebra, EOC History, and FS Math MS scores in Duval and Pasco Counties (*std.* $b = 0.10$); to the largest positive interaction effect for FSA Grade 8 scores in Miami-Dade County (*std.* $b = 0.45$).

- For the 2021-22 analysis, there were differential effects ranging from the smallest positive interaction effect for EOC History scores for Hillsborough and Palm Beach Counties (*std.* $b = 0.10$) to the largest positive interaction effect for EOC Biology scores in Miami-Dade County (*std.* $b = 0.68$). This largest effect was on the verge of statistical significance ($p = .052$). Duvall County also showed a positive statistically significant interaction effect for EOC Civics scores ($p = .031$); however, the effect size of 0.11 is relatively small.

- Across the two analyses, DE market presence was most commonly efficacious in Miami-Dade County.

Considerations

Four primary limitations concerning the study's internal validity should caution the direct interpretation of these findings:

1) The data used to indicate if a school was a user school are updated on a continuous basis (i.e., were updated as recently as December of 2022) and may not be a valid indicator of product usage for years prior to the latest data update (i.e., for product usage in 2018 or 2019) since the dates in which a specific product was implemented in a school was not known, and schools can change which products they use during a license period.

2) The study could not control for prior achievement since no true baseline could be established using the product usage indicators described above.

3) The study did not compare effects between schools matched on covariates and prior achievement, and therefore, cannot rule out the possibility that differences in achievement between schools existed prior to the study.

4) The research team did not have access to student-level or classroom-level data and therefore used publicly available, school-level data. This could lower the precision of the results if some teachers in the school are not using the products at an optimal level or at all.

Recommendations for subsequent inquiries into the effects of DE's market presence include using product usage data which reports on the dates in which a specific product was used, constructing a sample based on license period regardless of which product a school used, and using a quasi-experimental design to estimate the effect of DE usage on achievement gains over time (which include a true baseline) on schools matched on baseline characteristics using propensity score matching.