McREL INTERNATIONAL

curiosity for better learning

Discovery Education *Experience*: Arizona

Executive Summary

Prepared by McREL for Discovery Education

July 2024

McREL project team

Kristen Erichsen
kerichsen@mcrel.org
Armani Morris
amorris@mcrel.org
Tedra Clark
tclark@mcrel.org
Sheila A. Arens
sarens@mcrel.org
Ashlyn Osendorf
aosendorf@mcrel.org
Andrea Kreuzer
akreuzer@mcrel.org

McREL is a nonprofit, nonpartisan research, development, and service organization that helps schools, districts, and education agencies improve outcomes for all students. We provide:

- Analysis and alignment of curriculum, instruction, assessment, and standards
- Professional development, learning, and coaching for teachers, principals, and system leaders
- Research, data analysis, logic models, and program evaluations
- School improvement recommendations, action planning, implementation support, and technical assistance

4601 DTC Boulevard, Suite 500, Denver, CO 80237

www.mcrel.org 800.858.6830 info@mcrel.org

Executive Summary

Introduction

The purpose of this study was to examine the relationship between Discovery Education's (DE) market presence and school-level academic achievement in the State of Arizona. We examined the relationship between Discovery Education *Experience* usage and performance on School Year (SY) 2022–23 Arizona state mathematics and ELA assessments. Employing a correlational design, we examined whether there is an association between *Experience* usage and academic performance in grades 3–8.

Research Questions

This study is intended to answer the following research questions:

1. Do schools that have at least 4 teachers or at least 10 students who use *Experience* achieve higher percentiles on math and ELA assessments than schools that do not meet these usage levels?
2. What is the ideal threshold for *Experience* usage, where usage correlates with academic performance in grades 3–8?

Methods

RQ1: Experience-Defined Thresholds and Academic Performance

Publicly available data from the Arizona Department of Education were drawn from the agency website, including school-level achievement data and school-level demographic data. School-level product usage data was provided by DE. Because DE-provided data does not include school codes, we used fuzzy joining techniques, using the *fuzzyjoin* package in R, to join the datasets based on school name. Through this iterative process, we were able to match 85% of schools in the DE-provided dataset.

Arizona's Academic Standards Assessment (AASA) is administered at the end of each school year to all public and charter school students in grades 3–8 in mathematics and English Language Arts (ELA). Results include percentile achievement levels, which are the key outcomes for this study.

There were two treatment levels assigned to participating schools in this study. First, schools were identified as members of the first level of the treatment group if they had 4+ teacher or 10+ student users in SY 2022–23. Schools were identified as members of the second level of the treatment group if they had 4+ teacher or 10+ student users in both school-years 2021–22 and 2022–23. The control group was composed of (1) schools who were not provisioned with an *Experience* license and (2) schools who had a license but did not meet any of the usage thresholds.

To examine the relationship between *Experience* usage and math and ELA performance in SY 2022–23, we used a generalized linear model regression, which accounts for the non-normal distribution of percentile scores on the AASA. The key indicator was treatment level, and we controlled for prior achievement (AASA performance in SY 2021–22), as well as percent of students receiving free or reduced-price lunch, school type (e.g. Elementary, Middle), total school enrollment, school-level race

characteristics, percent of students identified as English language learners, and percent of students in the school with one or more disability.

RQ2: Threshold Exploration

We used the same publicly available data for key outcomes and control variables to explore the second research question. However, the purpose of this examination was to identify a threshold at which the relationship between *Experience* usage and student achievement becomes significant. To do this, we first examined the relationship between number of *Experience* student/teachers with interactions at the continuous level with academic performance in math and ELA. By visualizing this relationship, we can more effectively see at which number of *Experience* interactions the relationship may become significant. We let this visualization guide us in defining proposed treatment levels. The control group was composed of (1) schools who were not provisioned with an *Experience* license and (2) schools who had a license but did not meet any of the usage thresholds.

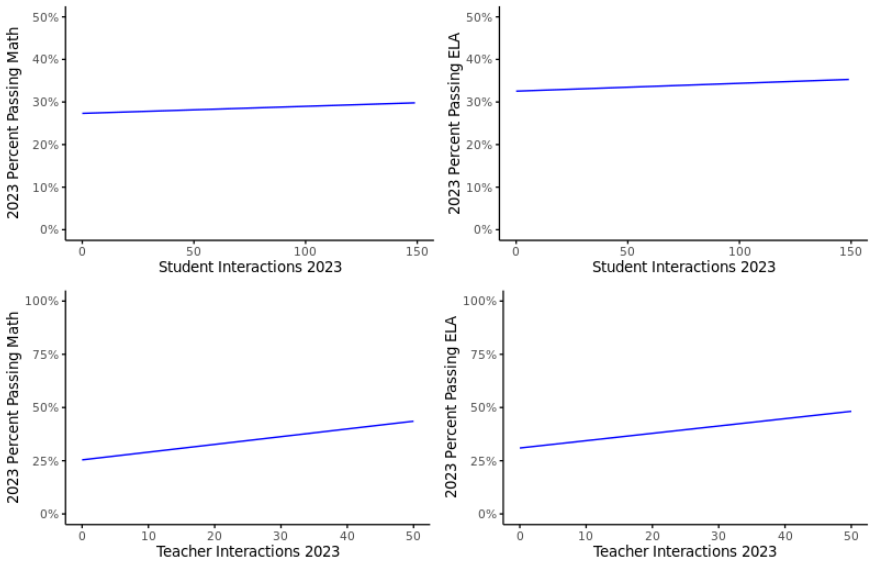

Figure 1. Relationship Between Student/Teachers with interactions and Math/ELA Performance

Once these treatment levels were identified (see Table 2), we conducted generalized linear model regression tests to examine the relationship between these levels for teachers and students individually. We used an iterative process of threshold adjustment to identify the level at which significance is achieved. This process revealed that the ideal threshold for *Experience* usage is likely 20+ teachers with interactions and 20+ students with interactions. Four treatment levels were assigned; these are shown in Table 1.

Table 1. Treatment Levels Tested

Treatment Level	Conditions
0	Usage threshold levels not met for SY 2022–23
1	Usage thresholds met for either teachers OR students in SY 2022–23
2	Usage thresholds met for teachers AND students in SY 2022–23
3	At least one threshold met for SY 2022–23 AND SY 2021–22
4	Usage thresholds met for teachers AND students in SYs 2021–22 and 2022–23

Study Population

School Level Breakdown

Out of the 1,622 schools in the dataset, 451 schools had missing information about teachers and students with interactions in either 2021 or 2023. These schools were removed from the dataset. A total of 845 schools (72%) reached the desired number of teachers or students with interactions for either year. When considering the number of schools with *Experience* users that meet either usage threshold, there were 936 schools at the Elementary School, Elementary/Middle School, and Middle School levels: in total, there were 477 Elementary schools (48%), 326 Elementary/Middle schools (37%), and 133 Middle schools (15%, see Figure 1).

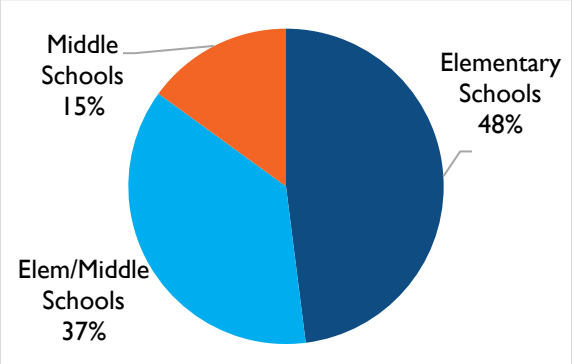

Figure 2. Total Schools in Treatment Level by School Type

Percentage of Total Passing Students

The median percent of students passing the 2021 ELA exam was approximately 18% and for mathematics it was approximately 14%. In 2023, the median among schools was 33% passing the ELA exam, and 26% for mathematics.

Student Demographic Characteristics

The school-level demographic characteristics included in this analysis were: gender composition, racial/ethnic composition, percent of students receiving free or reduced-price lunch, percent of students with disabilities, and percent of students who are English Language Learners.

Over half of the analytic sample was male (51%) and Hispanic/Latino (52%). On average, about 47% of students in schools receive free or reduced-price lunch. Just over 10% of students in schools have a disability, on average (13%). The average percent of students identified as English Language Learners was 9% (see Table 2).

Table 2. Student Demographic Characteristics

Demographic Characteristics	%
Gender	
Male	51%
Female	49%
Race/Ethnicity	
Hispanic/Latino	52%
White	35%
Black/African American	3%
American Indian/Alaskan Native	2%
Asian	2%
Native Hawaiian/Pacific Islander	<1%
Free and Reduced Lunch Recipients	
Recipients	47%
Non-recipients	53%
Ability Status	
Students with disabilities	13%
Students without disabilities	87%
English Language Learners (ELL)	
ELL	9%
Non-ELL	91%

Key Findings

RQ1: Experience-Defined Thresholds and Academic Performance

There is no significant association between either level of treatment and math or ELA performance in 2022-23 (see Table 3).

Table 3. Experience-Defined Thresholds and Academic Performance in Mathematics/ELA GLM Coefficients

Mathematics Performance						
	B	*std. err.*	*t*	*p*	95 % Confidence Interval	
Treatment Level 1	-0.02	0.19	-1.27	0.21	-0.09	0.02
Treatment Level 2	-0.01	0.03	-0.05	0.96	-0.03	0.03
ELA Performance						
	B	*std. err.*	*t*	*p*	95 % Confidence Interval	
Treatment Level 1	-0.01	0.01	-0.74	0.46	-0.18	0.10
Treatment Level 2	0.00	0.01	0.21	0.83	-0.03	0.01

RQ2: Threshold Exploration

Results of generalized linear models examining the relationship between the four proposed treatment levels and math and ELA performance in SY 2022–23 suggest the ideal threshold for Experience usage is 20+ teachers with interactions and 20+ students with interactions for two consecutive academic years (see Table 4).

When this condition is met, on average, schools have a 3.91% increase in the percent of students passing the mathematics AASA compared to schools with no *Experience* implementation. The effect size for this relationship is 0.33, indicating a large significant effect (Kraft 2019).

Additionally, schools who met this usage condition demonstrate, on average, a 3.27% increase in the percent of students passing the ELA AASA. The effect size for this relationship is 0.37, indicating a large significant effect (Kraft 2019).

Table 4. Threshold Exploration and Academic Performance in Mathematics/ELA GLM Coefficients

Mathematics Performance						
	B	*std. err.*	*t*	*p*	95 % Confidence Interval	
Treatment Level 1	-0.02	0.01	-1.71	0.09	-0.04	0.00
Treatment Level 2	-0.01	0.01	-1.18	0.24	-0.03	0.01
Treatment Level 3	0.01	0.02	0.56	0.57	-0.02	0.04
Treatment Level 4	0.03	0.01	3.49	**< 0.01**	0.02	0.06
ELA Performance						
	B	*std. err.*	*t*	*p*	95 % Confidence Interval	
Treatment Level 1	0.00	0.01	0.89	0.37	-0.01	0.03
Treatment Level 2	0.00	0.01	-0.11	0.91	-0.02	0.01
Treatment Level 3	0.00	0.01	0.40	0.69	-0.02	0.03

Treatment Level 4	0.03	0.01	3.45	**< 0.01**	0.01	0.05

Conclusions and Limitations

For treatment levels outlined in the first research question, there is no significant association between *Experience* usage and student performance on math and ELA AASA tests. This suggests that further exploration of usage thresholds is necessary to identify the level at which *Experience* usage may significantly affect school-level performance.

Results of threshold exploration suggest a promising relationship between *Experience* usage and math and ELA performance in grades 3–8, when there are at least 20+ teachers with interactions and 20+ students with interactions in two consecutive academic years. This relationship is significant and positive, controlling for a host of academic and demographic characteristics of schools.

There are several limitations of this study. First, the study did not compare effects between schools matched on covariates and prior achievement using a quasi-experimental design. Because of the correlational design of this study, we cannot conclude that *Experience* usage *causes* changes in math or ELA performance. Second, the data received from *Experience* did not include school ID variables, which would simplify matching between *Experience* usage data and Department of Education data. "Fuzzy matching" was employed to join the data together, so it is possible that a small degree of contamination of the comparison group occurred.

Recommendations for subsequent inquiries into the effects of DE's market presence include:

1. Employ a quasi-experimental design to estimate the effect of DE usage on achievement gains over time where treatment and comparison schools are matched on baseline characteristics using propensity score matching;
2. Establish a true baseline for product implementation and a clean comparison group to provide more precise impact estimates;
3. Include unique school IDs in DE datasets for improved confidence in the accuracy of data merging; and
4. Conduct implementation studies (i.e., evaluation of school-level usage) to supplement future examinations of DE product impacts.