



DERIVITA

ESSA Level III Study (2024–2025)

Prepared for:
Derivita

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EXECUTIVE SUMMARY

Derivita contracted with Instructure's Research Team and the International Centre for EdTech Impact to examine how student engagement with Derivita is associated with math outcomes, using the Every Student Succeeds Act (ESSA)¹ as the design standard. Findings align with Level III (Promising Evidence).

What the Research Found

For each additional Derivita question answered per day, an average student would be expected to perform 13 percentile points better on the Derivita math assessment. Meaning a student at the 50th percentile who answered just one additional Derivita question per day would be expected to perform at the 63rd percentile (effect size $b = 0.34$; $p < .001$).

Ultimately, even a single daily question drives meaningful math improvement.

Study Sample and Methodology

The study followed 1,647 grade 8 students during the 2024–25 school year. Researchers analyzed:

1. The number of Derivita questions students answered per day, and
2. Their performance on Derivita's math assessment.

Using Multilevel Linear Modeling (MLM), which accounts for differences across classrooms, researchers examined whether higher engagement was associated with higher performance, while controlling for each student's prior achievement.

Conclusions

This study meets ESSA Level III (Promising Evidence) requirements, including a correlational design, appropriate implementation, statistical controls for selection bias, and a statistically significant positive relationship between usage and outcomes.

¹ Every Student Succeeds Act, Pub. L. No. 114-95 (2015). <https://www.govinfo.gov/app/details/PLAW-114publ95>.

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INTRODUCTION

Derivita is a math engine designed to scale high-quality instruction from Grade 6 through Calculus. It eliminates the complexity of fragmented tools by embedding standards-aligned content directly into existing Learning Management Systems (LMS). The platform features an AI-powered engine that interprets open-ended student responses to provide instant feedback and automated grading and allows teachers to focus on instruction rather than administrative tasks.

As part of their commitment to delivering evidence-based solutions, Derivita contracted with the International Centre for EdTech Impact together with Instructure to examine the relationship between students' use of Derivita and student math learning outcomes. Guided by the Every Student Succeeds Act (ESSA) standards for research and evidence, Instructure designed the study to satisfy Level III requirements (Promising Evidence). The following research questions guided this study:

Implementation

1. How many Derivita questions per day did grade 8 students answer during the 2024–25 school year?

Student Outcomes

2. How does students' use of Derivita relate to their math scores?

This report details the study design and methods, implementation, findings, and conclusions.

STUDY DESIGN AND METHODS

This section of the report briefly describes the study participants, measures, and analysis methods.

Study Design, Setting, and Participants

Researchers used a correlational design to align with ESSA Level III evidence during the 2024–25 school year. The total student sample consisted of 1,647 grade 8 students² from a large, suburban school district of over 30,000 students in the Western United States.

Measures

This study included the following measures to provide insights into Derivita implementation and evidence about the potential impacts of Derivita usage on student math performance.

Derivita Usage Metric. Researchers utilized student-level usage (i.e., number of Derivita questions answered per day). These data informed the extent to which students used Derivita during the 2024–25 school year.

Performance Outcomes. Researchers used Derivita’s math assessment standardized scores as the outcome metric of interest for this study. Researchers also included students’ prior Derivita math assessment standardized scores as a control variable.

Data Analysis

Derivita shared de-identified usage and outcomes for the 2024–25 school year with Instructure researchers. Researchers first used descriptive statistics to describe participant characteristics and support analyses of implementation. Then, researchers conducted Multilevel Linear Model (MLM) analyses to examine the relationship between students’ Derivita usage and math assessment scores, with students nested within teachers. The analyses included students’ prior Derivita math assessment scores as a covariate to control for potential selection bias.

² Student-level demographics were not available for this study.

IMPLEMENTATION FINDINGS

This section examines how grade 8 students used Derivita during the 2024–25 school year. Researchers examined the implementation of Derivita on student math performance by analyzing the total number of Derivita questions answered per day.

1

How many Derivita questions per day did grade 8 students answer during the 2024–25 school year?

Student engagement with Derivita varied by participant. Overall, grade 8 students answered an average of 1.03 Derivita questions per day (Table 1).

Table 1

Average number of Derivita questions students answered per day

Derivita Usage Metric	<i>n</i>	Mean	SD	Min	Max
Questions per day	1,647	1.03	1.04	0.01	4.66

OUTCOME FINDINGS

The following sections examine how Derivita usage related to student math learning outcomes during the 2024–25 school year. In Appendix A, you will find additional information on the MLM model, and in Appendix B, you will find information on additional research questions and analyses.

2

How does students' use of Derivita relate to their math scores?

Researchers examined whether a greater number of Derivita questions answered per day was associated with higher Derivita math assessment scores using MLM analyses, with students nested within teachers. Students' prior Derivita assessment scores were included as a covariate in the model.

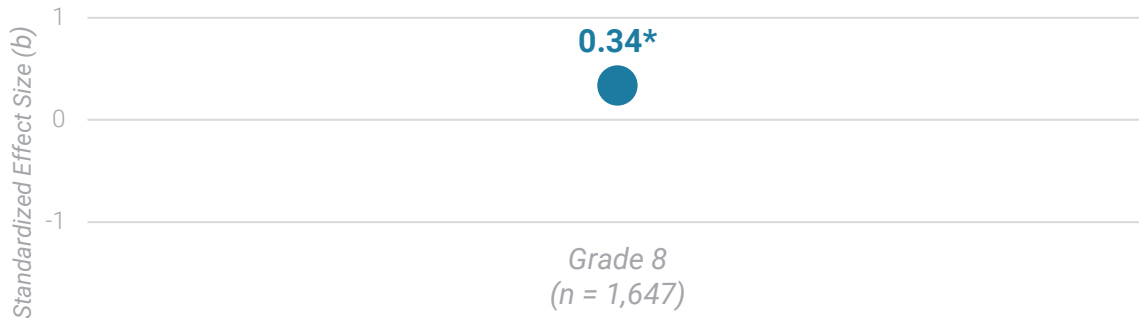
Questions per Day. A statistically significant, positive relationship was found between the number of Derivita questions answered per day and math assessment scores for grade 8 students ($b = 0.34$; $p < .001$; See Figure 1). In addition, researchers converted effect sizes to percentile points for ease of interpretation (von Hippel, 2023).³ The reported effect size suggests that for every Derivita question answered per day, an average student would be expected to perform 13 percentile points better on the Derivita math assessment (e.g., a student at the 50th percentile would be expected to perform at the 63rd percentile with one additional question answered per day; See Figure 2).

³ von Hippel, P.T. (2023). Multiply by 37: A surprisingly accurate rule of thumb for converting effect sizes from standard deviations to percentile points. (EdWorkingPaper: 23-829). Retrieved from Annenberg Institute at Brown University: <https://doi.org/10.26300/xk0b-ft25>

Figure 1

Standardized effect size (b) of MLM model examining the relationship between the total number of Derivita questions answered per day on their math learning outcomes

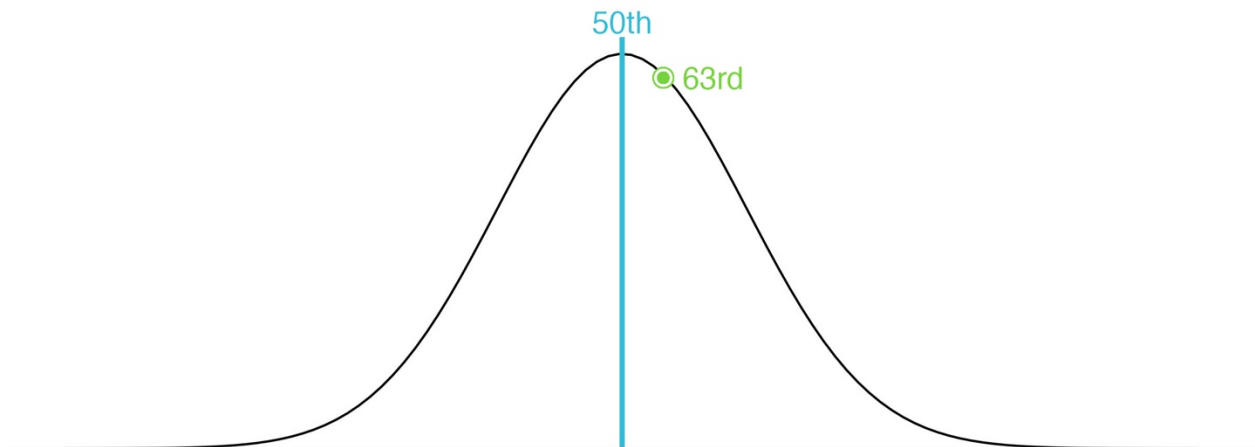
As students answered more questions per day on Derivita, they had higher math scores.



Note. Statistically significant findings are reported at the $p < .05$ level and indicated with an asterisk in the figure.

Figure 2

Interpretation of the statistically significant relationship between the total number of Derivita questions answered per day and grade 8 students' math learning outcomes



LIMITATIONS AND FUTURE RESEARCH

The current study offers promising results for Derivita, but further research is needed to address its limitations and strengthen findings:

- **Research Design.** Future studies could use quasi-experimental or experimental designs aligned with ESSA Level II or I.
- **Subgroup Populations:** Future studies could include subgroup analyses to examine potential differences in program impact.
- **Limited Generalizability (Grade Level):** Future studies could include other middle school grades or high school math classes to examine potential differences in program impact.
- **Reliance on Internal Assessment Measures:** The learning outcomes were measured using Derivita’s own math assessment. Future studies could use standardized assessments (e.g., state assessments, NAEP, i-Ready, NWEA MAP Growth).
- **Unexplored Teacher-Level Variables:** The Multilevel Linear Model (MLM) findings indicate that teachers accounted for 29% of the variance in student scores. While the model controlled for this variance, a limitation of the current study is that it does not examine how different teachers implemented Derivita in their classrooms, which plays a significant role in student outcomes.

CONCLUSIONS

In conclusion, findings indicate one statistically significant positive relationship between the total number of Derivita questions answered per day and Derivita math assessment scores during the 2024–25 school year.

Given the positive finding, this study provides results to satisfy ESSA evidence requirements for Level III (Promising Evidence) for grade 8 students. Specifically, this study met the following, minimum criteria for Level III:



- ✓ Correlational study elements
- ✓ Proper design and implementation
- ✓ Statistical controls through covariates
- ✓ At least one statistically significant, positive correlation with statistical controls for selection bias

APPENDIX A: ADDITIONAL INFORMATION ON MLM MODEL

Examining how Derivita usage is associated with student performance on Derivita math assessments

To analyze the impact of student engagement with Derivita on math learning outcomes researchers utilized a MLM to account for the nesting of students within specific teachers. This approach was statistically more appropriate than standard regression (MLM BIC < regression BIC). Furthermore, the Intraclass Correlation Coefficient (ICC) revealed that teachers accounted for 29% of the variance in student scores. By using teachers as a grouping variable and including prior math assessments as a covariate, the model effectively controlled for teacher-level differences and baseline student math knowledge.

Table A1

Derivita math assessment scores predicted by the total number of Derivita questions answered per day, with students nested within teachers

Outcome	Predictor	Coefficient	Standard Error	z statistic	p-value
Grade 8 Derivita Math Assessment Score	Questions per Day	0.34	0.04	7.67	< .001
	Prior Derivita Math Assessment	0.32	0.02	14.16	< .001

APPENDIX B: ADDITIONAL RESEARCH QUESTIONS AND ANALYSES

This appendix provides detailed information on supplemental research questions and exploratory analyses conducted during the study. While these metrics were used to inform the final selection of variables, they were omitted from the main report to maintain a focus on direct student engagement and primary outcomes.

Implementation Findings

1. To what extent did Grade 8 teachers use Derivita during the 2024–25 school year?

Teacher engagement with Derivita was measured by analyzing the "assignment cadence dose," defined as the proportion of weeks teachers gave assignments. On average, Grade 8 teachers used Derivita to provide assignments in 64% of weeks (Mean = 0.64; See Table B3).

Table B1

Proportion of weeks teachers gave assignments

Derivita Usage Metric	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Assignment cadence dose	1,647	0.64	0.31	0.04	0.89

Outcome Question and Findings

2. How does teachers' use of Derivita relate to students' math scores?

Researchers examined whether a higher assignment cadence dose was associated with higher student math assessment scores using Multilevel Linear Modeling (MLM), with students nested within teachers. Students' prior Derivita assessment scores were included as a covariate in the model to control for baseline achievement.

Assignment Cadence Dose: Results indicate that the frequency of teacher assignments did not have a statistically significant relationship with student math scores ($b = -0.12$; $p = .73$).

Table B2

Derivita math assessment scores predicted by proportion of weeks teachers gave assignments, with students nested within teachers

Outcome	Predictor	Coefficient	Standard Error	<i>z</i> statistic	<i>p</i> -value
Grade 8 Derivita Math Assessment Score	Assignment Cadence Dose	-0.12	0.35	-0.35	.73
	Prior Derivita Math Assessment	0.37	0.02	17.13	< .001

Exploratory Data Analyses

Student usage correlations

Researchers conducted pairwise correlations to understand the relationship between student-level usage variables. "Questions per day" and "seconds per day" were found to be highly correlated ($r = 0.85, p < .001$). Consequently, "questions per day" was selected as the primary engagement metric for the main report.

Table B3

Pairwise correlations between student usage variables

Usage Variables	Questions per Day	Seconds per Day
Questions per Day	1.00	
Seconds per Day	0.85*	1.00

Note. Statistically significant findings are reported at the $p < .05$ level and indicated with an asterisk in the table.

Teacher usage correlations

Exploratory analyses revealed a low correlation ($r = 0.16, p < .001$) between "assignment cadence dose" and "average teacher logins per week". These teacher-level metrics were ultimately excluded from the primary findings to focus on student-level engagement as the main driver of math outcomes.

Table B4

Pairwise correlations between teacher usage variables

Usage Variables	Assignment Cadence Dose	Average Teacher Logins per Week
Assignment Cadence Dose	1.00	
Average Teacher Logins per Week	0.16*	1.00

Note. Statistically significant findings are reported at the $p < .05$ level and indicated with an asterisk in the table.