

Reading Eggs (2021-22)

Study Type: ESSA Evidence Level III

Prepared for:
3P Learning

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EXECUTIVE SUMMARY

3PLearning contracted with LearnPlatform by Instructure, a third-party edtech research company, to examine the relationship between usage of Reading Eggs and student reading achievement. LearnPlatform designed the study to satisfy Level III requirements (Promising Evidence) according to the Every Student Succeeds Act (ESSA).

Study Sample, Measures, and Methods

This study occurred during the 2021-22 school year and included 1,756 K – 2 students from ten elementary schools in one district.

Researchers used two measures to provide insights into Reading Eggs implementation and evidence about potential impacts of Reading Eggs on student learning outcomes: Reading Eggs usage and NWEA MAP® scaled scores for Reading.

Researchers used a variety of quantitative analytic approaches. First, researchers conducted descriptive statistics to describe participant characteristics and support implementation analyses. Researchers then conducted linear regressions to examine how use of Reading Eggs related to student reading achievement from fall 2021 to spring 2022. In addition, researchers calculated standardized effect sizes (Hedge's g) to determine the magnitude of changes in student achievement.

Student Outcomes

- ✓ K – 2 students who completed between 51–121 total lessons (high use) in Reading Eggs had higher end-of-year NWEA MAP® achievement compared to students who completed between 0–50 total lessons (low and moderate use).
- ✓ Kindergarten and Grade 1 students who completed more Reading Eggs lessons had statistically significantly higher end-of-year reading achievement. This relationship was not significant for Grade 2 students.

Conclusions

This study provides results to satisfy ESSA evidence requirements for Level III (Promising Evidence) given the study design and positive, statistically significant findings.

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Introduction

3P Learning recognizes that early elementary teachers often lack the capacity to meet the unique literacy needs of all students as providing effective supplemental self-paced literacy supports is often costly, time consuming, and fails to engage students in their own learning. Reading Eggs provides students aged 3 – 7 years with a comprehensive online literacy curriculum using thousands of ready-made and self-paced lessons, activities, and resources.

As part of their ongoing efforts to demonstrate the efficacy of Reading Eggs, 3P Learning contracted with LearnPlatform, a third-party edtech research company, to examine the relationship between usage of Reading Eggs and student achievement. After co-developing an updated logic model (see Appendix A) for Reading Eggs (Scanlan & Henschel, 2022), LearnPlatform designed the study to satisfy Level II requirements (Moderate Evidence) according to ESSA. Implementation of the Reading Eggs program among K – 2 students did not yield a large enough comparison sample of non-users for an ESSA Level II design.

As a result, the current study had the following research questions to satisfy Level III requirements (Promising Evidence) according to ESSA:

Program Implementation Research Questions

1. Overall, how many Reading Eggs lessons were completed by students during the 2021–22 school year?
2. Among Reading Eggs users, what were the usage patterns?

Effectiveness Research Questions

After controlling for students' prior reading achievement, gender, race, and grade,

3. How were different Reading Eggs usage patterns related to students' spring 2022 reading achievement?
 - a. Which usage pattern(s) of Reading Eggs had the greatest impact on students' spring 2022 reading achievement?

Methods

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

Setting

The study included one district in South Carolina and an analysis sample of K – 2 students across ten schools.

Participants

There were 1,756 students in the final analytic sample. According to demographic data provided by the district, the racial breakdown of students in the sample was as follows: White (58%), African American (23%), Hispanic (10%), and multi-racial (8%). Females comprised 49% of the group, while males accounted for 51%. In addition, the percentages of students enrolled in each of the grades was as follows: kindergarten (23%), first grade (36%), and second grade (40%; Appendix B).

Measures

This study included the following measures to provide insights into Reading Eggs implementation and evidence about the potential impacts of Reading Eggs on student achievement.

Reading Eggs Usage Metrics. Researchers utilized 2021-22 student-level usage (i.e., total lessons completed). These usage data informed the extent to which students used Reading Eggs during the school year and whether students' use of Reading Eggs related to learning outcomes on NWEA MAP® Reading.

NWEA MAP® Reading Scores. NWEA MAP® RIT scales are stable, equal interval scales that use individual item difficulty values to measure student achievement independent of grade level. The scores are vertically scaled so that student scores can be compared over time and across grade levels. The RIT scale ranges from 100–350. Researchers used the RIT scale score as an overall measure of reading achievement at two time points: pretest (i.e., fall 2021) and posttest (i.e., spring 2022).



Data Analysis

Researchers used a variety of quantitative analytic approaches to answer the research questions. First, researchers used descriptive statistics to examine participant characteristics and support analyses of implementation data. Then, researchers conducted linear regression analyses to investigate how the use of Reading Eggs was related student reading achievement from fall 2021 to spring 2022. Analyses included student-level covariates to control for potential selection bias. In addition, researchers calculated standardized effect sizes (Hedge's *g*) to determine the magnitude of changes in student achievement.

Program Implementation Findings

The charts below highlight Reading Eggs use during the 2021-22 school year based on 3P Learning’s internal usage data (Table 1). Overall, K – 2 students completed an average of 22 Reading Eggs lessons (SD = 20).

Table 1: Average Reading Eggs Student Usage by Grade

		K	Gr 1	Gr 2
	Number of Reading Eggs users	407	639	710
	Average Reading Eggs lessons completed	26	26	17

Researchers conducted a *k*-means cluster analysis to group students by similar levels of Reading Eggs usage based on the number of total lessons completed.

For total lessons completed, K – 2 students fell into three usage categories ranging from low usage (mean = 9, range = 0–21 total lessons), to moderate usage (mean = 34, range = 22–50 total lessons), and high usage (mean = 67, range = 51–121 total lessons; Figure 1).

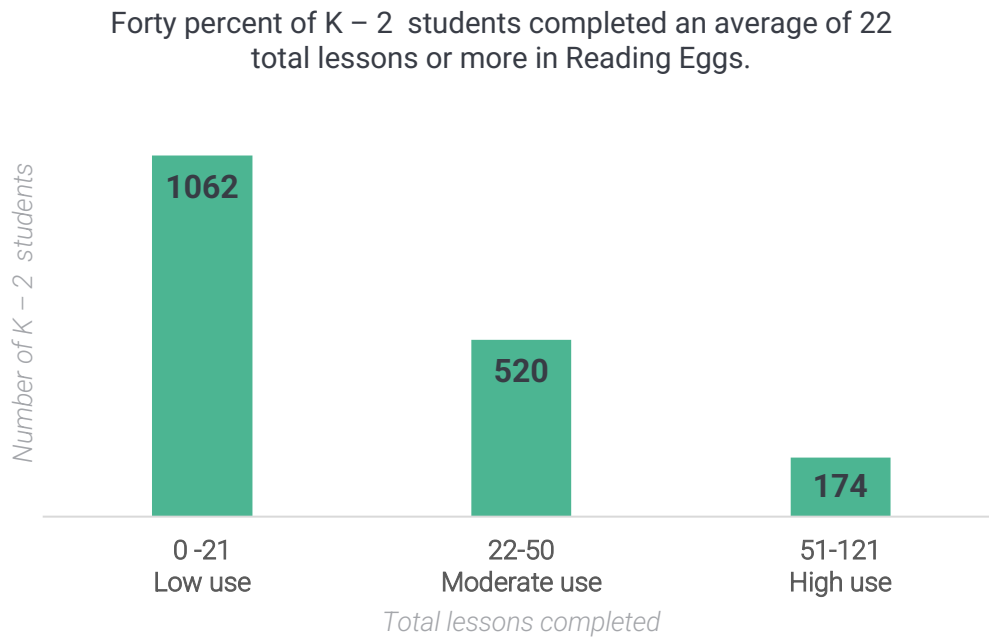


Figure 1. Overall distribution of total lessons completed in Reading Eggs by Grades K – 2 students.

Student Findings

Researchers examined whether greater usage of Reading Eggs related to higher end-of-year NWEA MAP® reading achievement using linear regression models that included beginning-of-year NWEA MAP® achievement, race, and grade as covariates. This relationship was first investigated with the overall K – 2 sample and then individually, for each grade. To allow for better interpretability of results, marginal means charts are presented below. The orange vertical lines at the top of each bar represent a 95% confidence interval (see Appendix B for more details about the model and the corresponding Hedge’s *g* effect sizes).

Overall Relationship Between Total Lessons Completed and K – 2 Students’ Reading Achievement on NWEA MAP®

Key Finding 1. Overall, K – 2 students who completed between 51–121 total lessons (high use) in Reading Eggs had higher end-of-year NWEA MAP® achievement compared to students who completed between 0–50 total lessons (low and moderate use; effect sizes 0.14 and 0.14 respectively) (Figure 2).

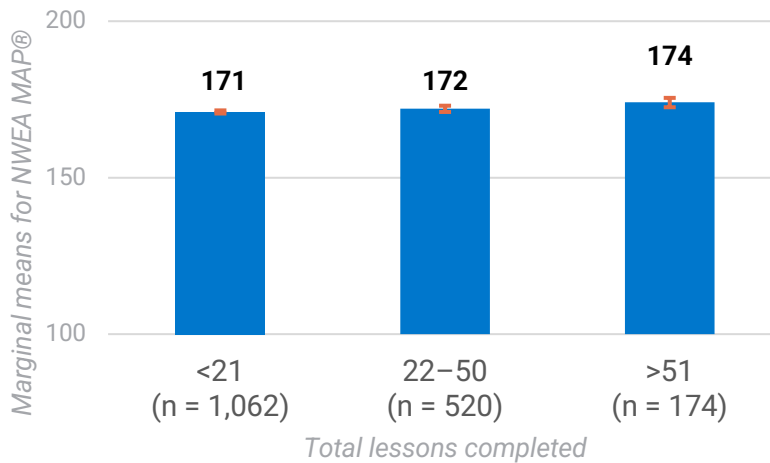


Figure 2. Marginal means for NWEA MAP® for K – 2 Reading Eggs users ($n = 1,756$) by usage group.

Relationship Between Total Lessons and K – 2 Students’ Reading Achievement on NWEA MAP® by Grade

Researchers examined whether greater usage of Reading Eggs was related to higher end-of-year NWEA MAP® reading achievement for each grade. Each linear regression model included NWEA MAP® scores, gender, and race as covariates.

Key Finding 2. The results for kindergarten students were statistically significant relationship, such that students who completed more Reading Eggs total lessons had higher end-of-year NWEA MAP® achievement. Specifically, kindergarten students who completed between 51–121 total lessons (high use) in Reading Eggs had higher end-of-year NWEA MAP® achievement compared to students who

completed between 0–50 total lessons (low and moderate use; effect sizes 0.44 and 0.36 respectively) (Figure 3).

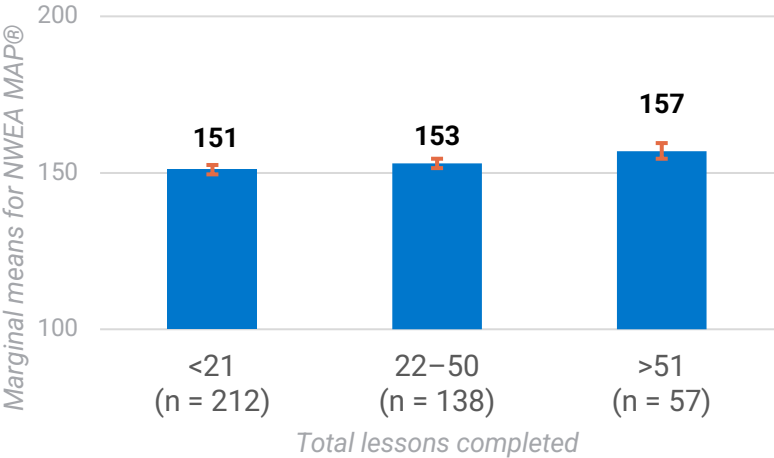


Figure 3. Marginal means for NWEA MAP® for kindergarten Reading Eggs users (n = 407) by usage group

Key Finding 3. The results for Grade 1 students were also statistically significant relationship, such that students who completed more Reading Eggs total lessons had higher end-of-year NWEA MAP® achievement. Specifically, Grade 1 students who completed between 51–121 total lessons (high use) in Reading Eggs had higher end-of-year NWEA MAP® achievement compared to students who completed between 0–50 total lessons (low and moderate use; effect sizes 0.23 and 0.23 respectively) (Figure 4).

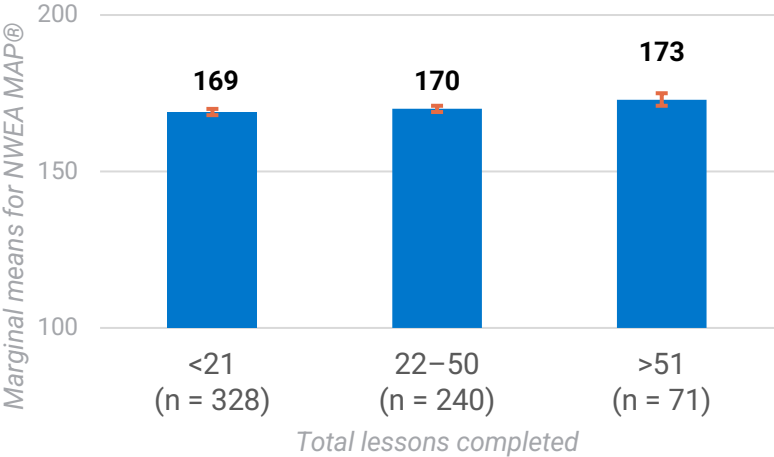


Figure 4. Marginal means for NWEA MAP® for Grade 1 Reading Eggs users (n = 639) by usage group

For Grade 2 students, the result was negative but not statistically significant. Specifically, Grade 2 students' achievement was approximately equivalent across all the usage groups (Figure 5).

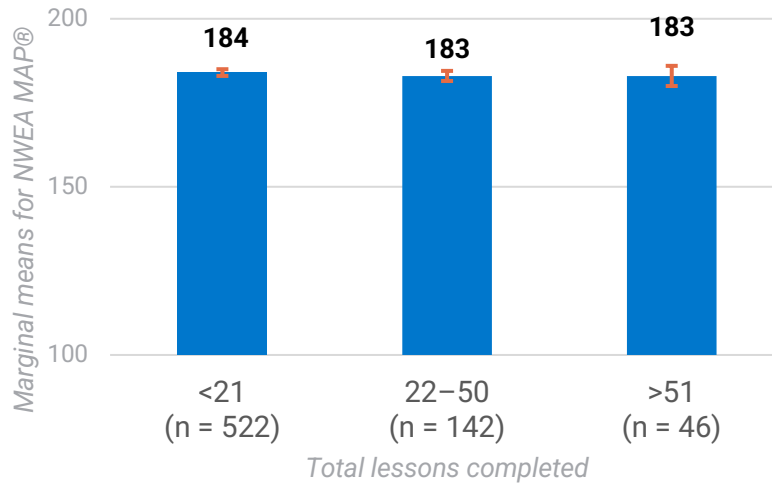


Figure 5. Marginal means for NWEA MAP® for Grade 2 Reading Eggs users ($n = 710$) by usage group.

Conclusions and Recommendations

In sum, the findings support a relationship between Reading Eggs usage and improved reading skills for K – 2 students. Given the positive outcome findings, this study provides results to satisfy ESSA evidence requirements for Level III (Promising Evidence). Specifically, this study met the following criteria for Level III:

- ✓ Correlative design
- ✓ Proper design and implementation
- ✓ Statistical controls through covariates
- ✓ At least one statistically significant, positive finding

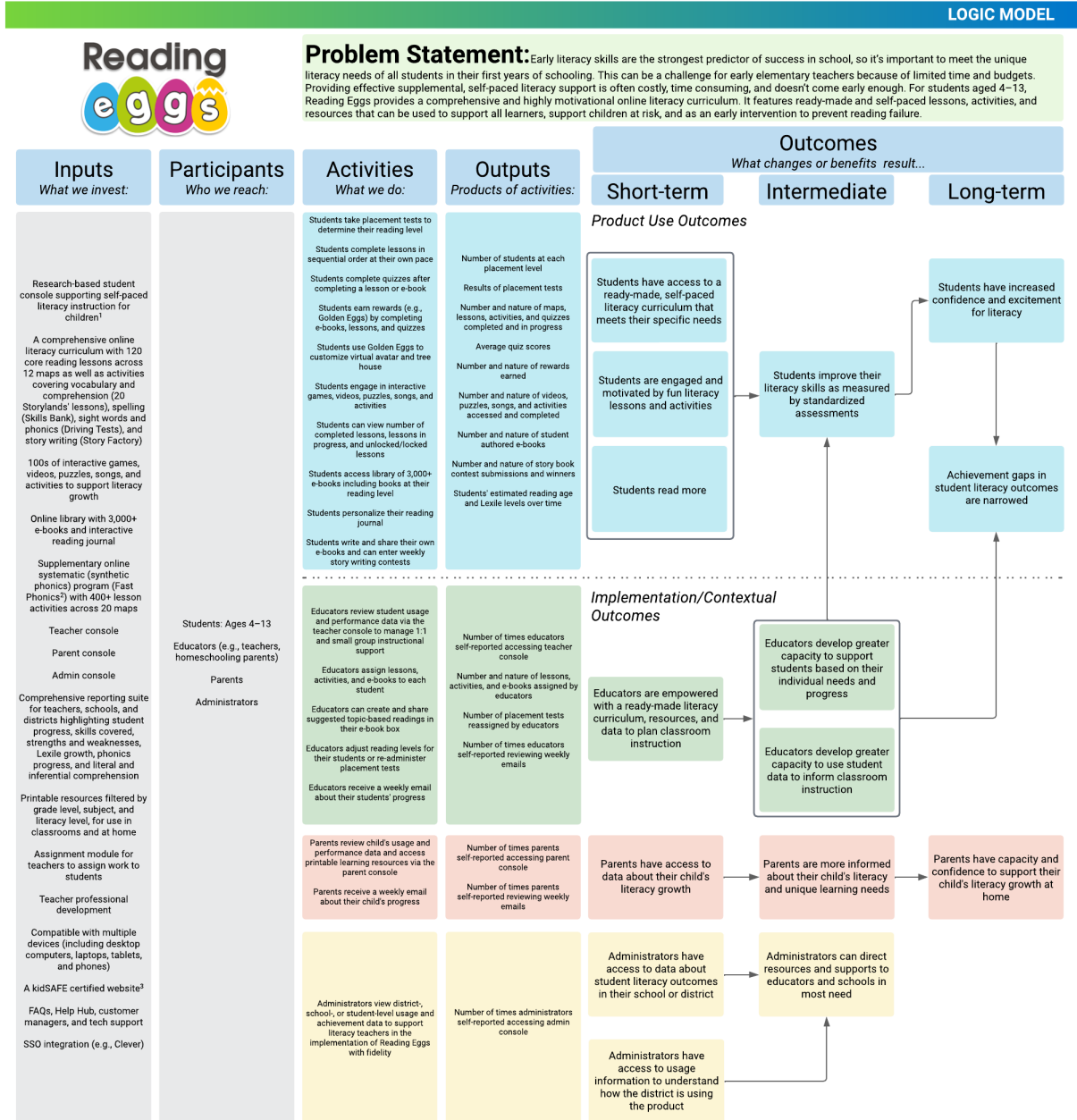
Researchers recommend the following next steps:

- K – 2 students who completed 50 total lessons or more had higher scores on the end-of-year NWEA MAP® assessment. 3PLearning should continue to explore ideal implementation at other sites using this baseline information.
- 3P Learning should consider recruiting a district that has a sufficient number of K – 2 non-users to better understand how reading achievement for K – 2 students who use Reading Eggs compares to that of students using other reading programs in those grades.

Acknowledgements

The authors would like to extend their deepest thanks to Ben Chalmers who supported the preparation of data for this report.

Appendix A. Reading Eggs Logic Model



¹3P Learning recommends that students use Reading Eggs for a minimum of 2 times a week for 20 minutes each session.

²Fast Phonics is an online systematic, synthetic phonics program designed for emergent and early readers as well as older students with gaps in their core reading knowledge. Fast Phonics is a supplementary component of Reading Eggs.

³A kidSAFE certified website means that the product has been independently reviewed, certified, and/or listed by kidSAFE to meet certain standards of online safety and/or privacy.

Appendix B. Additional Information on Outcome Findings

Table B1. NWEA MAP® unadjusted, raw means by Grade for Fall 2021 and Spring 2022

Sample	N	Fall 2021 Mean	SD	Spring 2022 Mean	SD
Overall K – 2	1,756	159	20	172	19
Kindergarten	407	138	9	153	12
Grade 1	639	157	14	170	15
Grade 2	710	172	18	183	17

Overall Relationship Between Total Lessons and K – 2 Students' Reading Achievement on NWEA MAP®

Table B2. Overall K – 2 Students' Reading Achievement on NWEA MAP® by Total Lessons on Reading Eggs (covariates: beginning-of-year NWEA MAP® achievement, grade, and race)

Group Comparisons	Coefficient	Standard Error	t-value	p-value	Effect Size
0–21 total lessons compared to 22–50 total lessons	0.60	0.52	1.13	.257	0.03
0–21 total lessons compared to 51–121 total lessons	2.86	0.80	3.60	<.001***	0.14
22–50 total lessons compared to 51–121 total lessons	2.27	0.84	2.69	.007**	0.14

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Relationship Between Total Lessons and K – 2 Students' Reading Achievement on NWEA MAP® by Grade

Table B3. Kindergarten Students' Reading Achievement on NWEA MAP® by Total Lessons on Reading Eggs (covariates: beginning-of-year NWEA MAP® achievement and race)

Kindergarten Group Comparisons	Coefficient	Standard Error	t-value	p> t	Effect Size
0–21 total lessons compared to 22–50 total lessons	1.61	1.039518	1.55	.121	0.13
0–21 total lessons compared to 51–121 total lessons	5.54	1.397476	3.97	<.001***	0.44
22–50 total lessons compared to 51–121 total lessons	3.93	1.463538	2.69	.008**	0.36

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B4. Grade 1 Students' Reading Achievement on NWEA MAP® by Total Lessons on Reading Eggs (covariates: beginning-of-year NWEA MAP® achievement and race)

Grade1 Group Comparisons	Coefficient	Standard Error	t-value	p> t	Effect Size
0–21 total lessons compared to 22–50 total lessons	0.93	0.81	1.16	.248	0.06
0–21 total lessons compared to 51–121 total lessons	3.58	1.24	2.89	.004**	0.23
22–50 total lessons compared to 51–121 total lessons	2.65	1.28	2.07	.039*	0.23

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B5. **Grade 2** Students' Reading Achievement on NWEA MAP® by Total Lessons on Reading Eggs (covariates: beginning-of-year NWEA MAP® achievement and race)

Grade 2 Group Comparisons	Coefficient	Standard Error	t-value	p> t	Effect Size
0–21 total lessons compared to 22–50 total lessons	-0.42	0.95	-0.44	.659	-0.02
0–21 total lessons compared to 51–121 total lessons	-0.65	1.53	-0.43	.671	-0.04
22–50 total lessons compared to 51–121 total lessons	-0.23	1.69	-0.14	.89	-0.01

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$