

Northwestern

Center for Education Efficacy,
Excellence, and Equity (E4)
SCHOOL OF EDUCATION AND SOCIAL POLICY

How Students Use Digital Learning Materials

Grades 1-5

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About E4

To improve K-12 education and address educational inequities, school districts need timely, rigorous analyses of student outcome data. Housed within Northwestern University's School of Education and Social Policy, the Center for Education Efficacy, Excellence, and Equity (E4) is a research-practice partnership that brings together Northwestern researchers, school districts, and the technology company Curriculum Associates to produce usable knowledge for educational practitioners. The E4 Center is generously supported by The Bill & Melinda Gates Foundation.

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Introduction

Just prior to the beginning of the pandemic, more than half of US students reported using digital learning materials daily.¹ Since then, engagement with digital learning platforms has become even more prevalent.² Students use supplementary digital learning materials for a variety of reasons. In some cases, individual students may receive targeted intervention.³ In other situations, an entire classroom, school, or district may use a particular resource with all students to supplement classroom instruction.⁴

Given the range of circumstances in which students might engage with digital learning materials, there is reason to believe that usage patterns may vary as well. As digital learning continues to spread, there is a need to better understand how exactly students are interacting with these platforms.

i-Ready Fast Facts

- i-Ready is a suite of instructional and diagnostic products made by the educational technology company Curriculum Associates
- i-Ready Personalized Instruction is a product that uses data from i-Ready Diagnostic to create a personalized path of online lessons for each student
- i-Ready Personalized Instruction is intended to supplement and work with classroom teachers' instruction
- i-Ready provides guidelines on recommended usage of the platform: 30-45 minutes per week in both reading and math with a goal of passing at least 70% of lessons

In this research report, we explore the i-Ready program i-Ready Personalized Instruction, observing how the platform was used by a national group of elementary students over the course of the 2021-22 school year. Our analysis focuses on over 300 million math and reading lessons completed by 4.3 million students in thousands of schools across the country. We explore how the platform is being used, when the platform is being used, how successful students are at mastering platform content, and how usage varies by grade level and baseline achievement. This report concludes with a discussion of implications for educational practitioners.

1. Gallup & NewSchools Venture Fund, 2019

2. BrightBytes, 2020; National Center for Education Statistics, 2022

3. Lin et al., 2013; Ross & Bruce, 2009

4. Pane et al., 2016; Prescott et al., 2018

A High-Level Picture of i-Ready Lesson Usage

During the 2021-22 school year, the typical student completed 66 i-Ready lessons, spent 22 hours on the platform, and took 19 minutes to complete each lesson. However, there was substantial variation in usage.

Lesson usage: average totals for the 2021-2022 school year

On the low end of usage (10th percentile)	In the middle (50th percentile)	On the high end of usage (90th percentile)
14 lesson attempts	66 lesson attempts	161 lesson attempts
4 hours	22 hours	53 hours
13 minutes/lesson	19 minutes/lesson	30 minutes/lesson

Lesson usage by subject

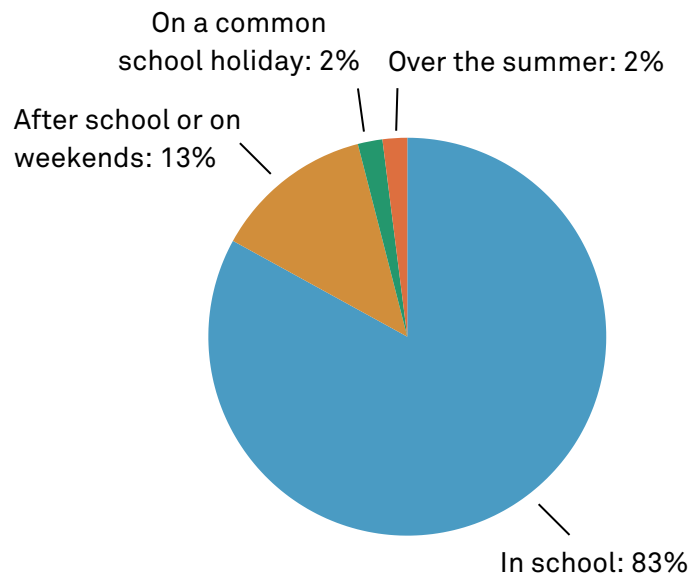
Math & Reading	Math only	Reading only
78% of students	16% of students	6% of students



02 When Do Students Use Digital Learning Materials?



Most i-Ready usage occurred during typical school hours.⁵ In-school lessons account for 83 percent of all lessons completed during the 2021-22 school year.⁶ Lessons were completed after school and on weekends in 13 percent of cases.⁷ Less often, students completed lessons during common holidays and during the summer.⁸



5. We are unable to observe each school's specific bell schedule, so we approximate school hours to be 8am-4pm Monday through Friday on non-holidays between each school's start and end date.

6. After school and weekend hours are defined as lessons completed between a school's start and end date on weekdays outside of 8am-4pm, and Saturdays and Sundays any time.

7. Common holidays include Veteran's Day, the week of Thanksgiving, the final two weeks of December, New Year's Day, Martin Luther King Jr. Day, President's Day, Good Friday, and Juneteenth.

8. Summer is defined as any date outside of a school's start and end date.

Usage by month

Aug '21	Sept '21	Oct '21	Nov '21
3%	13%	14%	12%
Dec '21	Jan '22	Feb '22	Mar '22
8%	11%	11%	12%
Apr '22	May '22	June '22	July '22
9%	7%	1%	<1%

In-school usage of the platform varies throughout the year. More lessons were completed in October than any other month. Usage tapered off in December and then again at the end of the academic year.

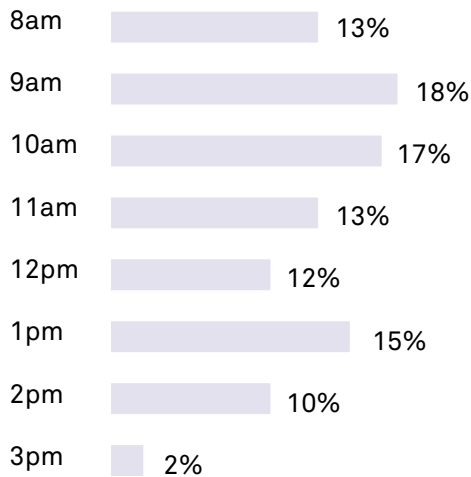
Usage by day of week

In-school usage was slightly more common on Tuesdays and least frequent on Fridays.

Mon	Tues	Wed	Thurs	Fri
20%	22%	21%	20%	17%

Usage by time of day

In-school usage of the platform also varied by time of day. Lessons were most commonly completed between 9:00 and 9:59am, and 10:00 and 10:59am (represented as 9am and 10am, respectively, in the figure below).



03 How Often Do Students Pass Lessons?

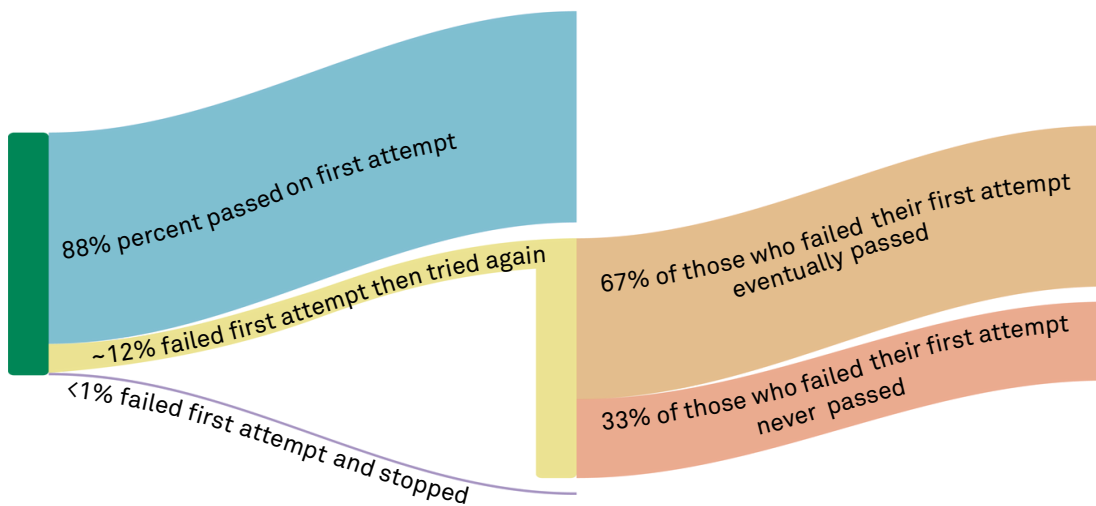
Lessons in i-Ready are designed for mastery; most lessons were passed on the first attempt.

The median student passed 89% of their lesson attempts, though there was variation across students:

Pass rate per average student

On the low end of mastery (10th percentile)	In the middle (50th percentile)	On the high end of mastery (90th percentile)
71%	89%	100%

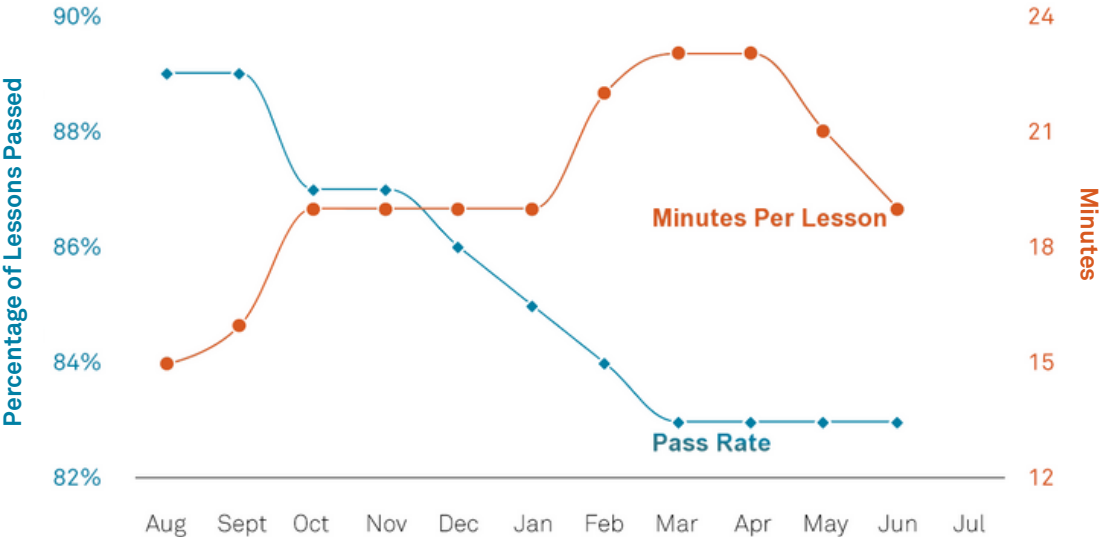
When students do not pass a lesson on their first attempt, they are prompted to try again. Most lesson topics (88%) were passed on the first attempt. About 12% of the time, students did not master the lesson topic and attempted it again. Most of the time, students eventually passed the lesson, usually on their second attempt. In some cases, students attempted the lesson again (usually just once more) and never passed. Very rarely (<1% of the time) students who failed a lesson on their first try never attempted the topic again.



Focusing again specifically on lessons completed in school, we examined how pass rates and time spent per lesson vary across various measures of time: month, day of week, and time of day.

Variation by month

As the school year progressed, students were slightly less likely to pass lessons and spent more time on each lesson. While we cannot be entirely certain of the reason, this is likely due to content becoming more complex as students progressed through the school year.



Variation by day of week

When pass rates and time spent per lesson were disaggregated by day of the week, we did not find any differences. On any given day, 86 percent of lessons were passed and took about 19 minutes each.

Variation by time of day

While we did not find any notable variation in time spent per lesson based on time of day, students were slightly more likely to pass lessons as the school day progressed.

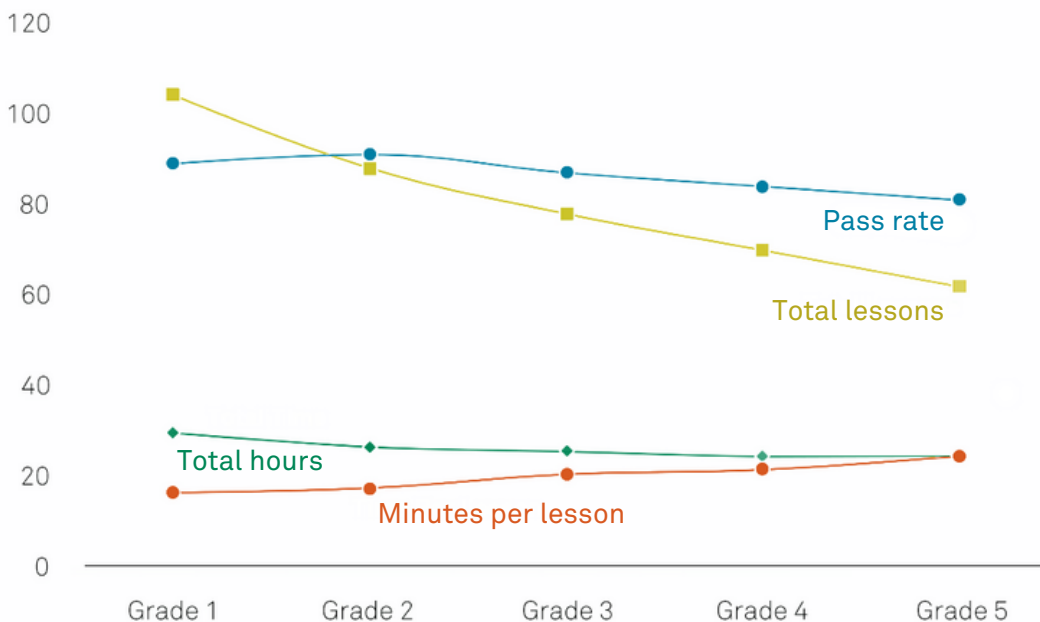
8:00-11:59 am	85% pass rate
12:00-2:59 pm	86% pass rate
3:00-3:59 pm	87% pass rate

04 How Does Usage Vary Across Student Groups?



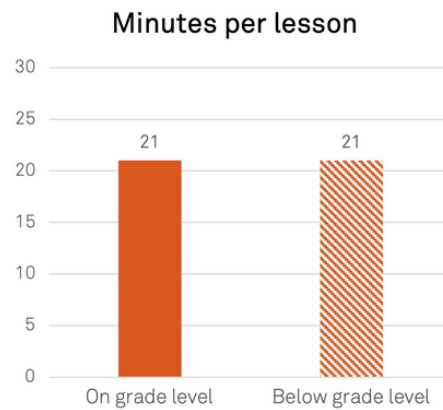
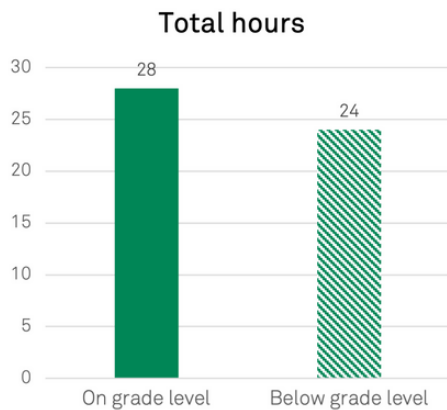
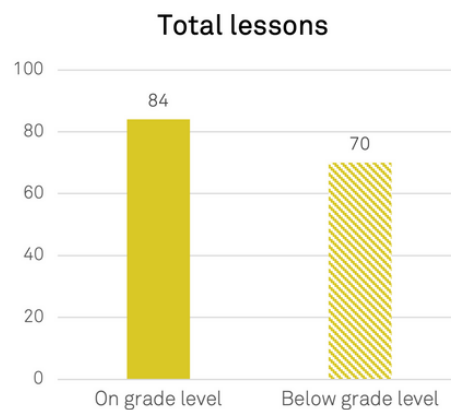
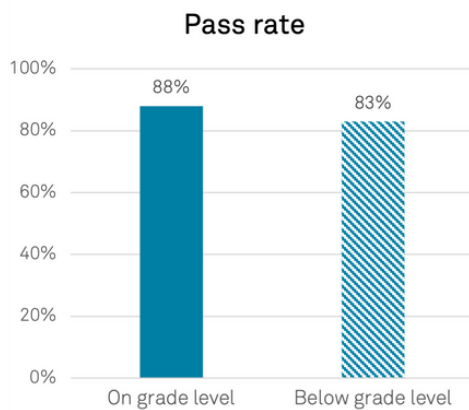
Variation by grade level

Beginning first with grade level, we compared total lessons attempted, total time spent on the platform, time per lesson, and pass rate. As shown below, students in earlier grade levels tended to complete more lessons, spend more total time on the platform, and complete lessons more quickly. Pass rates were also higher in earlier grades. While we cannot be entirely certain of the reason for these trends, it is likely that lessons are intentionally designed to be longer as students develop and mature.



Variation by baseline achievement

We made similar comparisons based on whether or not students began the school year on grade level as defined by their i-Ready diagnostic assessment score. As shown below, students who began the year on grade level completed more lessons, spent more total time on i-Ready, and were slightly more likely to pass their lessons. There was no difference in time spent per lesson based on baseline achievement. There are several possible explanations for these trends, which are explored further in the discussion section.



Discussion

This exploration of a common digital learning platform demonstrates variation in usage across various measures of time, as well as variation in usage by student group. Below, we share key takeaways, implications, and suggestions for future research.

In the fall, usage was highest and students had higher pass rates and completed lessons more quickly.

This shift in usage throughout the school year may be due to such factors as increasingly challenging lesson materials, evolving priorities in schools, administration of assessments, or a change in the student population using the platform. When educators have clarity on the purpose of digital learning materials in their own unique contexts, they can make informed decisions about the best points in the year to emphasize their use. It may be the case that there are particular points in the year where lower or higher usage is optimal for students.

Compared to lessons completed in the morning, those that were completed in the afternoon resulted in slightly higher pass rates.

While there were likely numerous contributing factors to these patterns that we cannot observe (e.g., lunch/recess times, school-specific start and end times), this finding suggests that independent work on a digital platform in the afternoon rather than morning may maximize student success. As educators make decisions around how to best integrate digital learning materials into the school day, it may be most effective to dedicate time to these activities later in the school day while reserving the morning for other forms of instruction. However, because contexts vary, individual school and classroom data should be examined to determine whether afternoon is best for each unique group of students.

Students in higher grades completed fewer lessons and took longer to complete each one.

For example, the average fifth grade student spent 25 minutes on each lesson, while first grade students spent just 17 minutes. Pass rates also decreased in higher grade levels (89-91% in first and second grade vs. 81% in fifth grade).

While we were unable to determine whether these differences are due to increasingly challenging content or an increased likelihood that the platform was used as a form of intervention in later grades, these differences have important implications for educators. If expectations for usage of digital learning materials are set at the school or district level, it may be beneficial for administrators and instructional coaches to adjust those

expectations by grade level and not hold all classroom teachers to the same requirements. In the case of this particular platform, older students require additional time to complete lessons. As such, educators should consider how daily schedules and lesson plans are generated across various grade levels to ensure that students have sufficient time to make progress. Generalizing this finding to other digital learning platforms, practitioners should make sure they understand how norms for use and performance might vary across grade levels to ensure that expectations are appropriate.

Students who began the school year below grade level tended to complete fewer lessons, spend less total time using the platform, and pass fewer lessons than students who were on grade level in at least one subject.

This finding has significant implications for classroom teachers. Students below grade level might benefit from additional check-ins from their teachers, additional direction on how to successfully use the learning platform, clearly communicated expectations for use, and a clear understanding of whom they might reach out to if they need additional assistance (e.g., peers, classroom aide, teacher). While these strategies would likely be useful for all students, they may be especially beneficial for students who might find the material challenging.

Future research

It should be noted that because of pandemic-related interruptions, the 2021-2022 school year is not typical or representative. Future research can examine lesson usage over a greater number of years, pre and post pandemic.

However, these findings beg some important questions around implementation. Given differences in progress based on where students begin, future research might explore how digital learning materials are being integrated into the classroom:

- How are teachers using digital platforms?
- How are students being directed to use these platforms?
- How are teachers using the data generated by digital platforms in their instructional decision making?
- What types of additional supports might lead to greater progress?
- How can these type of resources be implemented in a way that maximizes learning opportunities for the students who stand to gain the most?

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