Exploring Literacy Growth and Engagement:

An 8-Week Pilot of Shoelace Learning in the Classroom

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Foreword

As educators, we recognize that the way students engage with learning has evolved. Today's learners are surrounded by technology, instant access to information, and a world of digital experiences that shape how they process and retain knowledge. As Superintendent I have always believed in meeting students where they are—rather than forcing them into traditional models that may not resonate.

That's why as a district we were eager to pilot Shoelace Learning in our 3rd- and 4th-grade classrooms. From the beginning, I was intrigued by Shoelace's modern, gamified approach to literacy. The Shoelace story captivated me—not just because of the technology, but because of its mission: to make learning engaging, immersive, and meaningful. We know that when students are motivated and excited about their learning, they persist longer, engage deeper, and, ultimately, grow.

The results of this pilot reinforce what we hoped to see: students embracing literacy in a way that feels like play but functions as powerful learning. Dreamscape, Shoelace's flagship reading platform, allows students to immerse themselves in a story-driven game while simultaneously improving their reading comprehension skills. It's more than just engagement—it's sustained effort, with students willingly pushing themselves to improve.

As a leader in education, I have always believed in trying something different—in being open to new methods that spark interest and create opportunities for students. Shoelace has done just that. This study highlights real-world literacy growth, showing that innovation and education can work hand-in-hand to create meaningful outcomes.

At Newaygo, we see this as more than just a pilot; we see it as an opportunity—a chance to reimagine how we approach literacy instruction and student motivation. And that's a game worth playing.

Ben Gilpin
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Introduction

Michigan's Top Ten Strategic Education Plan was adopted in August 2020 to guide K-12 education stakeholders in working toward a common set of goals. The second goal on the list is to "Improve early literacy achievement" (Michigan Department of Education, n.d.). In recent years, small declines in Michigan students' performance on the reading portion of the National Assessment of Educational Progress (NAEP) (The Nation's Report Card, n.d.) have emphasized the need for this goal, as well as the need for new interventions that will boost students' literacy skills. In Fall 2024, *Michigan Virtual*, a key stakeholder in the education success of K-12 students in Michigan, partnered with Shoelace Learning to run a pilot aimed directly at tackling this goal.

Shoelace Learning is an educational technology company focused on building students' reading comprehension skills through video games. *Michigan Virtual* worked with Shoelace Learning to implement their games in 13 elementary classrooms across Michigan to study whether these games would improve students' confidence and literacy skills.

Literacy in the US

Literacy is an important skill with wide-reaching implications for all ages. A study by the Annie E. Casey Foundation noted that children who were not proficient in reading by the end of third grade were four times more likely to drop out of high school than reading-proficient peers (Hernandez, 2011). Those who continue to have poor literacy levels in secondary school often experience difficulty throughout and beyond school (Hakkarainen et al., 2016; The Children's Reading Foundation, n.d.). Indeed, insufficient literacy skills in adulthood can have financial impacts, as adults with low literacy skills are more likely to be unemployed than adults with high literacy skills (The National School Boards Association, 2014). Educators and policymakers have recognized literacy's importance and the need to help students develop strong skills early (Michigan Department of Education, 2024).

Over the years, many reading interventions have been implemented with the hopes of improving K-12 literacy with varied success. Interventions, such as small-group and motivational reading have been shown to positively impact students' reading abilities (Hall & Burns, 2018; McBreen & Savage, 2021). Unrau et al. (2018) and Moon et al. (2017) have also highlighted that increasing reading enjoyment and self-efficacy may also help students to engage and persist in reading. But, most importantly, early interventions seem to be crucial for struggling readers (Wanzek et al., 2018).

Gamification

Gamification in education, creating game-like experiences to engage learners with content and help them progress toward a goal, has become a popular intervention strategy in recent years (Dehghanzadeh et al., 2024). Gamification has shown promise in improving behavioral, affective, and cognitive/learning outcomes in K-12 settings, and this may, in part, be attributed to its ability to engage and motivate students (Dehghanzadeh et al., 2024; Huang et al., 2020; Prados Sánchez et al., 2021; Sailer & Homer, 2020). While gamification has been shown to engage students in the task at hand, its ability to improve student outcomes has been mixed and can hinge on various factors related to game design, the context in which it is delivered, and learner characteristics (Dehghanzadeh et al., 2024). For this reason, this pilot was conducted to examine Shoelace Learning's reading comprehension games to evaluate them both on their ability to engage and motivate students and, even more importantly, on their ability to impact student learning.

Study

Given the promise of gamification for engaging students, the goal was to examine the impact that providing teachers with games designed to engage students in reading comprehension could have on literacy rates. The current study was designed to assess teachers' perceptions of Shoelace (both in terms of the impact on their students and the ease of use in their classrooms), student engagement with the platform, and the efficacy of the games in improving literacy skills. The pilot lasted for eight weeks and consisted of 13 teachers and their classes, all from Michigan.

Design

The main component of the pilot was the eight-week period of play for the students. However, the teachers started their participation a couple of weeks in advance by first participating in a 60-minute orientation and introduction to Shoelace Learning. During this orientation, teachers were provided with an overview of the Shoelace platform and teacher dashboard, including examples of gameplay, assessments, reporting, and assignments.

While teachers had considerable autonomy over *how* they implemented Shoelace in their classrooms, they were asked to have their students play for a minimum of 30 minutes each week for the eight weeks. During this play period, *Michigan Virtual* researchers conducted roundtable discussions with many of the teachers and students, and Shoelace employees also did in-class visits with a number of the classrooms.

Following the eight weeks of play, gameplay data was collected, and the teachers received a survey that assessed their perceptions of students' reading comprehension, enjoyment, and confidence, and the usability of Shoelace in the classroom.

Participants

Thirteen participants were recruited through the **Michigan Elementary and Middle School Principals Association (MEMSPA)**. They came from six school districts with which *Michigan Virtual* had existing relationships. In return for participating, *Michigan Virtual* provided teachers with Shoelace access for two years, from September 2024 to June 2026, and a $150 stipend upon completing the pilot.

Table 1 provides an overview of the 13 classes that participated.

Table 1 - Grade level and number of students for each participating class.

Class	Grade	# of Students
1	2	23
2	Reading Interventionist (multi-grade)	15
3	4	30
4	4	25
5	4	19
6	3	20
7	4	27
8	3	24
9	3	21
10	3	24
11	3	25
12	3	23
13	4	24

Shoelace

Shoelace is an online platform that provides reading comprehension practice through game-based delivery and is intended for students in grades 3-8. In order to progress in the games, students must correctly answer reading comprehension questions. The reading comprehension questions cover over 100 different reading skills and are each assigned a grade and difficulty level. The questions may be delivered in conjunction with a short reading passage. These bundles (questions + passage) are used to evaluate students' overall Reading Comprehension Level (RCL). Students also encounter standalone questions, which are questions that do not have a corresponding passage and instead focus on specific skill development.

There are two games that students can choose to play: Dreamscape or Dreamseeker Drift. Dreamscape is a strategy game that is similar to *Clash of Clans* and is built around a central "vision core," a diamond-like structure that players must protect and level up to progress. Dreamseeker Drift is an endless runner in a similar vein to *Subway Surfers*, where players aim to achieve the longest "run" possible by avoiding obstacles. In both games, in order to engage with the game elements (for example, buy new avatars and skins, compete in challenges, or start new runs) students must *correctly* answer reading comprehension questions.

Gameplay data reported by Shoelace:

- Learning Moments Delivered (LMD): The number of questions a player answered (regardless of correctness).

- Reading Comprehension Level (RCL): A leveling system based on passage (e.g., sentence structure, vocabulary) and question difficulty. The scale ranges from 1.0 to 8.9, with the first number representing grade level (e.g., 3.4 is grade 3) and the second indicating progress towards the next grade level (e.g., 0.4 indicates approximately halfway through the level).

Results

Participating classrooms were expected to have students use Shoelace for 30 minutes per week for eight weeks. As time data was not available, prior Shoelace data showing that 30 minutes of quality play was equivalent to approximately 25 LMD was used instead. For the purpose of our evaluation, student fidelity is defined as students who played a minimum of seven weeks (to provide flexibility for absences) with an average of 25 LMD per week. As Table 2 shows, fidelity varied across participating classrooms. For classroom fidelity, we modified this definition to be that 80% of the students in the class played with fidelity. As shown in the next section, a class or student who did not meet the fidelity benchmarks should not be interpreted as the class or student did not play (or even that they played very little). While 58.7% of students played with fidelity, 91% of students had a minimum of five weeks of participation.

Table 2 - Participation and fidelity levels by class.
**Classes marked with an * achieved class level fidelity.**

Class	# of students	% who participated	% who played at least 7 weeks	% who played with fidelity (7 weeks + min average of 25 LMD)
Overall	300	99.7%	69.0%	58.7%
1*	23	100%	100%	100%
2	15	100%	40.0%	20.0%
3	30	96.7%	0%	0%
4	25	100%	76.0%	52.0%
5	19	100%	0%	0%
6	20	100%	65.0%	55.0%
7	27	100%	77.8%	66.7%
8*	24	100%	100%	95.8%
9*	21	100%	85.7%	85.7%
10*	24	100%	100%	100%
11	25	100%	52.0%	8.0%
12	23	100%	95.7%	73.9%
13*	24	100%	100%	100%

Student and Class Participation

A student was considered to have participated in a given week if they answered a minimum of one LMD. Total class participation (active # of students / total students in class * 100) provided insight into what percentage of a class played. Students were free to play either game during the eight-week pilot period so the following discussion will be agnostic as to which game they played. Of the 300 students across the 13 classes, 299 of them (or 99.7%) played at least once.

Figure 1 shows the average percentage of active students per week. From week to week, participation ranged from about 71% to 91%. There was no clear trend, with participation fluctuating from week to week but overall staying relatively high between approximately 80 and 90%. The largest gain was seen from weeks 2 to 3 of 9.7%, while the largest loss happened between weeks 5 and 6 of about 6.7%.

Figure 1 - Percent of students who played by week.

Percent Active vs. Week
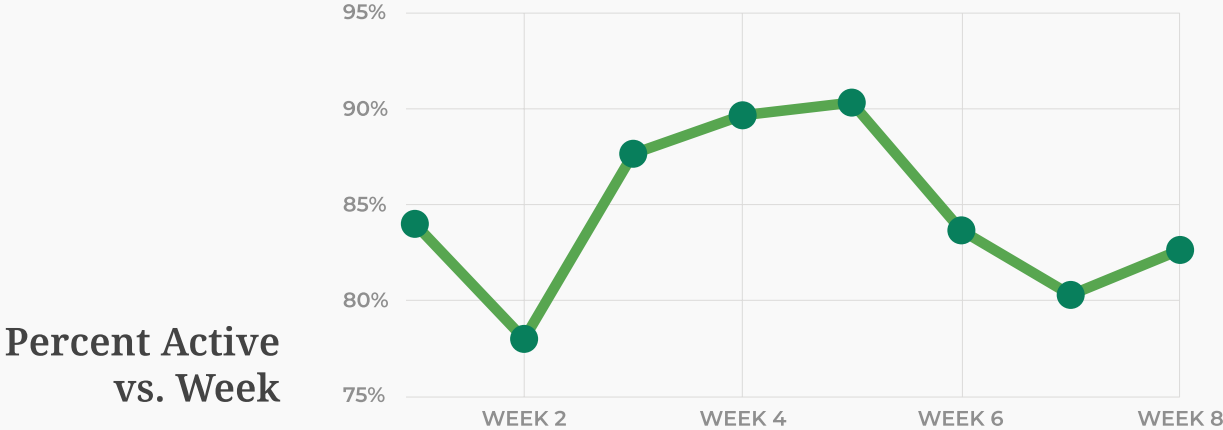
At the class level, as seen in Table 3, participation fluctuated more widely from week to week, as most weeks' classes either had most everyone play or no one play. Class 3 was the main outlier, as max participation never surpassed 60% in a given week.
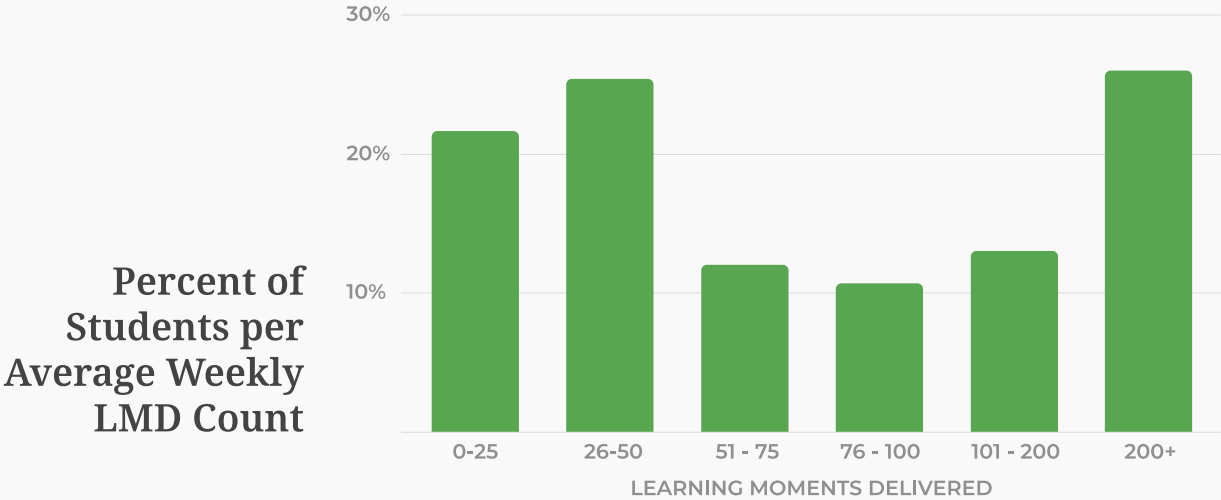
Table 3 - Min, max and average participation levels by class.

Class	Min Participation	Max Participation	Average Participation Across Weeks
1	91.3%	100%	98.4%
2	0.0%	93.3%	76.7%
3	0.0%	60.0%	40.8%
4	56.0%	100%	87.5%
5	0.0%	100%	71.7%
6	65.0%	95.0%	81.3%
7	77.8%	96.3%	89.8%
8	87.5%	100%	96.9%
9	81.0%	100%	93.5%
10	91.7%	100%	97.4%
11	48.0%	96.0%	76.0%
12	87.0%	100%	96.7%
13	95.8%	100%	99.5%

Learning Moments Delivered (LMD), Accuracy and Guessing

Learning Moments Delivered (LMD) represents a single question attempted by a student (regardless of whether they got it right or wrong). On average, students attempted 721 LMD over the eight-week period. Excluding the one student who did not participate, the number of LMD earned over the period showed large variation, as they ranged from a low of 3 to a max of 6,858. Similarly, when looked at by weekly averages, students ranged from a low of 1 to a high of 859. Figure 2 highlights the variation in student data.

Figure 2 - Percent of students grouped by their average weekly LMD counts. Target was ≥25 LMD/week.

Percent of Students per Average Weekly LMD Count

LEARNING MOMENTS DELIVERED

In addition to looking at the total number of LMD, student accuracy was also examined. Accuracy was calculated by dividing the number of correctly answered questions by the total number of questions students attempted. Table 4 shows the min, max, and average accuracy by class and overall. Students averaged an accuracy rate of 50.2%, with a minimum of 26.7% and a maximum of 94.7%.

Table 4 - Min, max, average accuracy by class over the eight-week period.

Class	Min Participation	Max Participation	Average Participation Across Weeks
Overall	26.7	94.7	50.2%
1	30.4%	74.4%	40.4%
2	31.5%	63.4%	47.7%
3	28.6%	86.4%	53.0%
4	33.3%	77.4%	55.7%
5	29.5%	76.0%	43.2%
6	26.7%	80.0%	50.9%
7	27.9%	72.2%	42.0%
8	31.9%	81.1%	54.7%
9	28.9%	76.4%	50.0%
10	28.0%	74.2%	45.8%
11	31.3%	72.0%	54.2%
12	29.9%	71.7%	51.5%
13	32.8%	94.7%	61.0%

Prior Shoelace data shows that maintaining an accuracy rate of 50% or higher from their learning engine is suggestive of positive use and learning results. Because the learning engine will periodically introduce incrementally more difficult content to determine if students are ready to engage with it, student accuracy rates will not be akin to, nor should they be compared to, those produced from summative assessments. Accuracy rates between 40-50% usually indicate students are struggling more with the content and may be turning to guessing (something often seen with students whose reading comprehension is too low for the program). Accuracy rates that fall below 40% are generally indicative of students who have primarily turned to guessing.

Reading Comprehension Levels (RCL)

Reading Comprehension Level (RCL) is Shoelace's leveling system based on passage and question difficulty. RCL, thus, provides important information about students' progress and reading abilities over the course of their engagement with Shoelace. A student's RCL can range from 1.0 to 8.9. The first digit represents the grade, and the value after the decimal represents progress towards the next grade. An RCL of 3.4 would mean the student is reading at a grade 3 level and approximately 40% of the way to grade 4. Most students in a class had RCL data available (97.9%, *SD* = 0.04).

The first RCL value that students receive is set by the placement test that is initiated upon a student's first play session. The placement test is a quick assessment designed to adjust the starting point for the learning engine. The placement test results in a value between 1.0 and 8.5 in increments of 0.5. At the start of the pilot, the average RCL after the placement test was 2.0, with a range from 1.0 to 6.5. By the end of the 8 weeks, the average RCL value was 2.1, with a range of 1.0 to 6.6.

Figure 3 shows the average change by class. On average, classes showed an increase of 0.13 RCL, with a range of -0.1 to 0.4.

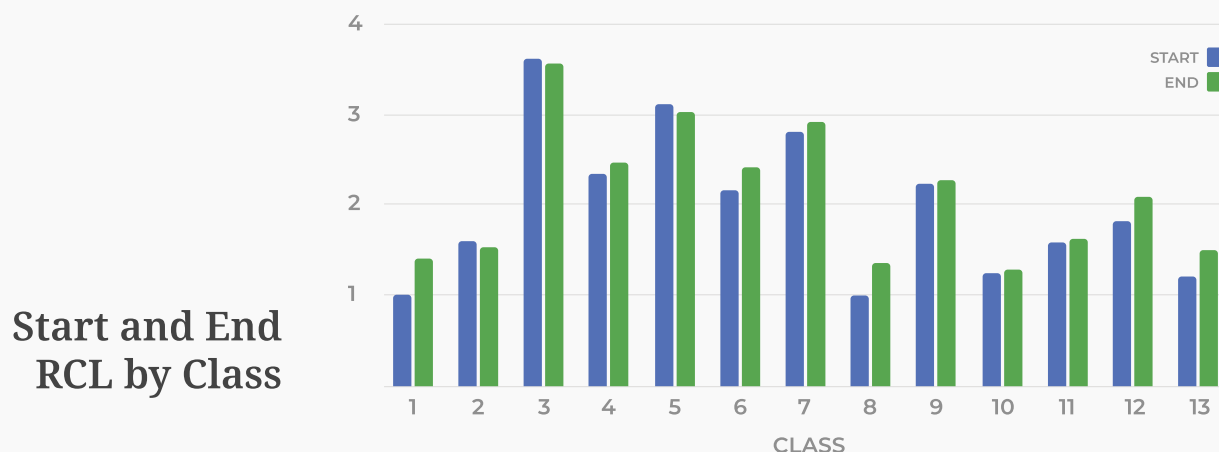**Figure 3 - Average start vs end RCL by class.**

Start and End RCL by Class

Table 5 shows how many students fall into specific RCL Change groupings based on whether they played with fidelity. RCL Change data was available for 295 out of 299 (98.7%) students. One hundred and seventy-five students played with fidelity, while 120 did not. Of the 175 students (59.3%) who played with fidelity, 97 (55.4%) saw an RCL Change of greater than 0.0, and 75.4% of those had an RCL Change value greater than 0.2. Taking a look at the 120 students who did not play with fidelity (40.7%), 40 (33.3%) saw an RCL Change of greater than 0.0 while 20 (50.0%) saw RCL Change values of greater than 0.2.

Table 5 - RCL changes by student based on fidelity of play.

RCL Change	Played with Fidelity 7+ weeks + min 25 LMD/Week		Did Not Play with Fidelity (<7 weeks and/or < 25 min LMD/week)	
	# of students	% of students	# of students	% of students
< 0	25	14.3%	33	27.5%
0	53	30.3%	47	39.2%
> 0	97	55.4%	40	33.3%
Total Students	175		120	

Teacher Perceptions

At the end of the eight-week play period, the 13 teachers filled out a survey about their perceptions of how playing Shoelace games impacted students' reading confidence, comprehension, fluency, vocabulary, and enjoyment. The vast majority of the teachers reported that they believed using Shoelace *increased* or *significantly increased* their students' confidence in reading (n=10), reading comprehension (n=10), fluency (n=10), vocabulary development (n=12), and enjoyment of reading (n=12). Of those teachers who did not report an increase, they all reported no changes (n=1-3). Table 6 provides a closer look at teachers' ratings of student outcomes.

Table 6 - Teacher ratings of student growth.

Rating	No Change	Increased	Significantly Increased
Confidence	23.1% (n=3)	69.2% (n=9)	7.7% (n=1)
Comprehension	23.1% (n=3)	69.2% (n=9)	7.7% (n=1)
Fluency	23.1% (n=3)	69.2% (n=9)	7.7% (n=1)
Vocabulary	7.7% (n=1)	84.6% (n=11)	7.7% (n=1)
Enjoyment	7.7% (n=1)	84.6% (n=11)	7.7% (n=1)

Teachers were also asked about how easy or difficult they found it to include Shoelace in their classroom and how well it aligned to their curriculum and their daily teaching. Table 7 shows that the vast majority of teachers were satisfied or very satisfied with all aspects of Shoelace usability (n=11-12).

Table 7 - Teacher perceptions of Shoelace usability.

Rating	Dissatisfied	Neutral	Satisfied	Very Satisfied
Curriculum	7.7% (n=1)	7.7% (n=1)	61.5% (n=8)	23.1% (n=3)
Daily Teaching	7.7% (n=1)	7.7% (n=1)	61.5% (n=8)	23.1% (n=3)
Training Support	0.0% (n=0)	0.0% (n=0)	61.5% (n=8)	38.5% (n=5)
Teaching Tool	0.0% (n=0)	15.4% (n=2)	61.5% (n=8)	23.1% (n=3)
Technical	0.0% (n=0)	7.7% (n=1)	69.2% (n=9)	23.1% (n=3)

Discussion

Class Participation and Engagement

Class-level engagement patterns appear consistent with teachers' self-reported data about the usability and impact of Dreamseeker Drift and Dreamscape. Survey data collected from teachers indicated a positive experience overall, with 11 of the 13 teachers satisfied or very satisfied with integrating Shoelace into the curriculum, their daily teaching, and its use as a teaching tool. There was, however, considerable variation in engagement levels across classes and fluctuations in both the percentage of active students and average LMD over the eight-week pilot period. While only five of the classes were identified as having reached the benchmark for class-level fidelity, and while a few of the classes had very few students who hit the individual student benchmark for fidelity, overall, 58.7% of students played with fidelity. This percentage of player fidelity can be deemed as highly positive, as research by Stanhope and Rectanus (2015) has shown that for most products, on average only 5.2% of student licenses reach full dosage amounts.

The LMD values across the pilot at both the individual student and class level revealed substantial variability, which also likely points to both between- and within-class differences in-game use. From the survey results and the roundtable discussions with the teachers, this may also be a result of the learning curve the teachers identified in implementing the games in their classrooms. Given this, along with the autonomy they were given over their individual implementations, these results are not surprising. Similarly, the differences in weekly LMD averages and accuracy are also likely impacted by factors such as class time, other commitments, how teachers chose to implement Shoelace, ease of implementation, student perceptions, or students' reading abilities.

The overall activation rate (students who played at least once) of 99.7% significantly exceeded the industry standard of an average student license activation rate of 63.4% across school and district sites (Stanhope & Rectanus, 2015). This exceptionally high activation rate may reflect positive teacher perceptions of the platform's curricular alignment and/or teacher commitment to implementation fidelity, given that they were taking part in a paid research pilot period. While outside motivators may have influenced activation and the continual engagement with the platform, the volume of students who answered large numbers of LMD (71.3% attempted ≥200 LMD) show that the games did engage the vast majority of the classes' and students' interest over the entire pilot period.

Impact on Literacy Skills

Shoelace assigns students their first Reading Comprehension Level (RCL) at the end of the initial placement test. After that, their RCL value is updated each time a student completes a passage and question bundle. How it changes (increasing, decreasing, or staying the same) depends on how the student performs (accuracy over the entire bundle), the difficulty of the passage, and the students' current RCL. RCL values range from 1.0 to 8.9. For this study, changes to students' RCL over the eight-week period were used as a proxy for the improvement of their literacy skills.

While the classes in the study ranged from grades 2 through 5, the students' initial placement test results revealed that the students' abilities covered a much larger range from a 1.0 (equivalent to the start of grade 1) to 6.5 (equivalent to about halfway through grade 6) with an average value of 2.0. This distribution of grades reflects the challenge of trying to teach students with a wide variation of skill level, which teachers frequently encounter in their classrooms.

By the end of the eight weeks, the range had widened slightly (1.0 to 6.6) but more interesting was the increase to the average RCL to 2.1. While a 0.1 increase may sound minor, each 0.1 step on the RCL scale can be viewed as roughly equivalent to a month's progress (given a 10-month school year). When the data was dug into further, of the students who played with fidelity, 55.4% had at least a 0.1 increase and 42% had an increase of at least 0.3, or three or more months' worth of growth in 8 weeks. Of the students who didn't reach fidelity with their play, 33.3% had an increase of at least 0.1 and 16.7% of them showed 3 or more months of growth. These values demonstrated the relationship between consistent gameplay and positive change in RCL.

In addition to these results, the survey and conversations with teachers showed that the teachers were also seeing positive literacy growth. From the survey results, a minimum of 76.9% of the teachers (or 10 of the 13) saw increases in students' confidence, comprehension, fluency, vocabulary and enjoyment.

Limitations of the Study

Classrooms were expected to play either of the Shoelace games for a minimum of 30 minutes a week for each of the eight weeks of the pilot. At the class level, a class was considered to have met this goal and to have played with fidelity if a minimum of 80% of their students played with fidelity (reduced to provide flexibility). Even with this reduced benchmark, only 38.5% (or 5 of the 13) classes that participated met the fidelity threshold. At the individual level, students did slightly better, with 58.7% of them meeting their fidelity definition of a minimum of seven weeks played and answering a minimum average of 25 LMD per week.

There are many reasons for students and classes not to have hit the benchmark for fidelity, including (but not limited to) time limitations, unknown barriers to implementation (i.e. confusion around gameplay), and student (or teacher) absences. Overall, while the number of classes that achieved fidelity was low, as the data above has shown, there is a good reason to set the bar for fidelity high and to push for this level of usage.

The irregular usage may also imply barriers to consistent implementation (e.g., time) or perceptions about Shoelace's usability or impact that were not captured by survey data. Indeed, whole-class conversations revealed that many teachers perceived Shoelace as having somewhat of a learning curve and that it required them to be "hands-on" while their students were engaged with the games. Students had overall positive perceptions of the games, with many talking enthusiastically about them. However, they also noted that more detailed in-game help would be beneficial. While a training session was provided to teachers at the start of the pilot, and additional training material made available, conversations from the teachers who received in-person visits by the Shoelace team revealed that additional face-to-face (vs asynchronous) training was extremely useful, especially once their class had started to play and the teachers had a clearer understanding of where they wanted and needed further information and training. The time and effort required to implement Dreamseeker Drift and Dreamscape may have impacted some teachers' classroom use.

Conclusion

Students with low literacy skills struggle throughout their entire K-12 educational journey, but the impact does not end there. It will follow them throughout their adult life, affecting everything from the jobs they have to their financial health. Addressing this problem is the second goal of **Michigan's Top Ten Strategic Education Plan**. *Michigan Virtual* and Shoelace Learning partnered together to run an eight-week pilot to examine whether using Shoelace games in Michigan classrooms would improve students' confidence and literacy skills.

The results of this study strongly indicate that Shoelace games result in gains in student literacy and confidence, with four important notes:

1. Fidelity of usage is important. The students who played most consistently across the eight weeks showed the greatest gains, with 42% of them seeing the equivalent of at least 3 months of reading growth.

2. There is a learning curve for teachers, and they need training and support to overcome it. An initial overview and introduction to the platform is not enough, teachers need follow up once their students have started playing to address any questions and concerns that come up in the classroom.

3. Engagement was high. While the educators who chose to participate did receive a stipend and two-year Shoelace licenses for doing so, that doesn't discount just how high participation levels remained throughout the pilot and beyond. More than half the students answered over 300 LMD over the eight-week pilots, and more than 80% were still playing more than two months after the conclusion of the pilot.

4. Teachers' positive perceptions of Shoelace and its impact on students' skills were high. The vast majority of the teachers indicated that their students improved their confidence, comprehension, fluency, vocabulary, and overall enjoyment. A similar majority found that it met their curriculum and daily teaching needs.

The combination of the pilot data and the teachers' positive perceptions points to the overall utility of Shoelace as a tool for teachers looking to improve their students' reading comprehension.

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