Research Foundation for Lalilo
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Introduction

As of 2019, about 35% of fourth graders in the United States were not reading at or above grade level (National Center for Education Statistics [NCES], 2019). While there has been a slight but consistent increase in reading proficiency since the 1990s, the number of students who are not learning the skills they need is still too large, especially when considering the predictive outcomes of reading proficiency by the end of third grade. For example, students who are not reading at a proficient level by the end of third grade are more than four times less likely to graduate high school on time compared to those who are reading at a proficient level (Hernandez, 2012). Additionally, low reading proficiency is related to an increased likelihood of conduct disorders (Bennett et al., 2003). And most importantly, early academic success, particularly in reading achievement, is a strong predictor of long-term academic achievement (Hanover Research, 2016).

Further, the reading gap is significantly larger for some groups than others. When the overall statistics are parsed out among racial groups, the data shows that students who are Black (18%), Hispanic (23%), Native Hawaiian/Other Native Islander (25%), Native American/Alaskan Native (19%), and 2 or more races (40%) all have significantly fewer students reading above grade level on the National Assessment of Educational Progress (NAEP) than white students (45%; NCES, 2019). The probable cause of such disparities is lack of resources. Duncan and Magnuson (2005) surveyed Black, White, and Hispanic families and found that socioeconomic status (SES) accounted for about 50% of the variance in test scores. They also found that 10% of White students experienced poverty while 42% of Black students and 37% of Hispanic students experienced poverty. In turn, it is plausible to link race to test scores by way of resource access.

A second barrier to on- or above-level reading skills for students is the lack of consensus in and relative inexperience of teaching emergent literacy. Extensive research suggests that explicit systematic instruction of each foundational reading skill is critical to reading skill development. However, due to lack of universal acceptance and because it was only recently adopted, even experienced teachers seem to not know enough about the individual elements of emergent literacy (e.g., phonemes, graphemes, and orthographic units), such that they cannot confidently and sufficiently teach early literacy to their students (Cunningham et al., 2009; Mather et al., 2001; Moats, 1994). Additionally, Landry et al. (2006) conducted a quasi-experimental study with pre-k students and teachers evaluating the role that professional development plays on students’ assessment scores. The study revealed that increased professional development in literacy instruction (1–2 years), and the presence of periodic training programs paired with research-based curriculum, resulted in increased assessment scores for students.

Lalillo aims to close this reading gap in two ways: (a) by providing all students with equal access to high quality, standard-aligned instructional practice, and (b) by serving as a systematic instruction and practice tool to support teachers’ lesson plans.
About Lalilo

Lalilo is a web-based application that provides instructional practice for foundational literacy skills for kindergarten through second-grade level readers. With engaging characters and a seamless user experience, Lalilo takes students through different worlds, benchmarked by various activities and skills. Centered around college and career readiness standards, content developers with years of early literacy teaching experience created Lalilo’s activities, influenced by a balance of explicit and systematic phonics and word study instruction paired with authentic texts to allow students to practice skills in context. As a research-based instruction tool, Lalilo was developed around five main pillars:

- Foundational literacy skills
- Comprehensive literacy
- Self-paced practice
- Formative feedback
- Learning analytics

**Foundational literacy skills**

The primary goal of Lalilo is to teach foundational literacy skills. Research suggests that phonological awareness, alphabet knowledge, and orthographic recognition are key predictors of literacy achievement (Foulin, 2005; Ziegler et al., 2010), and these three skills are emphasized in Lalilo activities. As students move through the program, they are systematically presented with activities that focus on any of the foundational literacy skills: phonics, comprehension, sight words, word families, grammar and conventions, and vocabulary (see figure 1). Because evidence shows that students benefit from explicit, systematic instruction in decoding and comprehension (Wild, 2009), the Lalilo content-development process can best be explained by the Hoover and Gough’s (1990) simple view of reading (SVR), Scarborough’s rope model, and the comprehensive emergent literacy model (CEL model; Rohde, 2015). The other four pillars explain how Lalilo provides early literacy instruction.

**Figure 1. Lalilo activities focus on foundational literacy skills**
Comprehensive literacy
Lalilo takes a comprehensive literacy approach to present students with activities and skills. Comprehensive literacy instruction is an explicit, systematic focus on each component of foundational literacy (i.e., decoding, sight words, phonics, and so forth), which has shown to significantly benefit student literacy-skill development (Wild, 2009). Specifically, a focus on decoding skills, vocabulary knowledge, conceptual knowledge, comprehension strategies, and thinking and reasoning skills is critical to developing skill-based and knowledge-based literacy competencies (Juel et al., 1986). Lalilo uses a combination of adaptive learning algorithms to present students with activities that focus on skills in these areas based on the student’s need. The content areas and activities both help to inform teachers’ lesson plans and teachers can assign lessons to students in Lalilo that follow their lesson plans. Lalilo helps to develop well-rounded readers who gain confidence and speed in reading and develop a strong understanding of complex literacy and advanced text.

Self-paced practice
Students work at their own pace in Lalilo and are only given activities within their zone of proximal development (ZPD; Vygotsky, 1978). Teachers assign the amount of time that students use the program but do not control how many activities or skills the student is presented. There is no time limit for how long a student takes to answer a question. Research suggests that self-paced learning is much more effective than the alternative at increasing academic outcomes, when teachers are appropriately monitoring the student’s work (Palaigeorgiou & Papadopoulou, 2019). Self-paced computer-based literacy programs have been shown to increase reading skills by almost 7 months in some students, compared to traditional literacy instruction (Hughes et al., 2013). As early literacy skills can predict a plethora of long-term outcomes, Hughes et al. also tested the effect that self-paced computer programs have on externalizing and internalizing behaviors. They found that students who used the self-paced program exhibited fewer signs of externalizing and internalizing behavior compared to the control group. Many teachers use Lalilo during small-group rotations, so students can work on grade-level skills by practicing current lesson and filling in gaps from previous lessons or grades.

Formative feedback
A critical component of Lalilo is formative feedback. Depending on the question type, the student may be given the correct answer after one try or three tries. Some activity types have questions that provide formative feedback, while others will allow the student to try indefinitely until they select the correct answer. If the student answers correctly, the program displays a trophy after 1, 2, 3, 4, or 7 questions, varying by question type (see figure 2). Black and William (1998) synthesized the existing literature on formative assessment and feedback and revealed that continuous, detailed feedback is critically important for students’ academic progress and improvement. A strong body of research suggests that formative feedback is one of the most effective ways to give students ownership over their learning journey. Students can visualize their success and progress towards their goals, while continuously learning from their mistakes (Brookhart et al., 2009). Within Lalilo, students see a scope and sequence depicted along a pathway so that students can visualize their progression through the skills.
Learning analytics
From the teacher’s perspective, Lalilo supports formative feedback through learning analytics. Beginning at the placement exam, the learning algorithm collects user data for each student to understand their progress on skills and state standards. Teachers can refer to their teacher dashboard to view class trends and student-specific data that they can use to shape their lesson plans to fit the needs of the students and share as formative feedback to their students. The more teachers refer to the dashboard, the more they use student-specific pedagogical knowledge to inform their formative feedback (Molenaar & Knoop-Van Campen, 2018). Data-based feedback and class- and student-specific lesson plans increase engagement and, in turn, learning outcomes.

Adaptive Learning Algorithm
Lalilo functions on an adaptive learning algorithm. The automatic progression is built on a linear scope and sequence of about 650 lessons for the English language throughout K–2 reading levels. These lessons are the basis of the teacher dashboard, and each one is linked to a cluster and a tab (see figure 3). Students progress through Lalilo by mastering lessons and may work simultaneously on up to five active lessons. Once they have begun work on five lessons, they must master one before beginning any new lessons. Lessons are activated in the order of the scope and sequence.
When students first connect to Lalilo, they are given a series of 30 questions on phonics skills and sight words to assess their level. The placement test takes about 10 minutes to complete (see figure 4), and questions begin at a level that corresponds to the grade level the teacher selects and adapts to the student’s individualized level based on their responses. When they have completed the test, and students are placed at a starting lesson along the Lalilo progression, the algorithm then chooses only lessons after this point in the scope and sequence.

To validate a lesson, students must validate all mandatory learning objectives (LOs) included within the lesson. Lessons contain 3–8 of these LOs—typically the first phonics lessons contain a larger set of LOs than later lessons of the scope and sequence. Some lessons contain non-mandatory LOs that expose students to exercises they are not likely to master yet. For example,
there are spelling exercises in non-mandatory LOs for earlier lessons. For each LO of a lesson, a student has to complete a predetermined number of exercises. For each mandatory LO, the validation will be triggered when the student has an 80% success rate on the last set of the minimum number of exercises. All lessons (except comprehension lessons built on books, where there is currently no adaptive learning) share the same rules. Once all mandatory LOs for a lesson are validated, the lesson is validated, which means the student will get a badge, and the teacher will see the lesson tile turn green in the dashboard. Once a lesson is validated, students will not return to it unless the teacher reassigns it.

The difficulty of each content line ($\beta$) is estimated by the Elo algorithm (using psychometrics similar to item response theory; Pelánek et al., 2017). Student level ($\theta$) is determined by the history of individual performance within Lalilo. Like in chess where the Elo system is also used, student level $\theta$ is updated after each answered question. A success at the question will lead to an increase in student level while a wrong answer will lead to a decrease in the student’s level. To match the student with the right exercise at the right time, Lalilo adaptive algorithms mimic the reasoning of a teacher choosing an exercise for their student by considering exercise difficulty, diversity, and pedagogical constraints.

To choose the right level, Lalilo uses a combination of student level and difficulty of the exercise to find an activity in the student’s ZPD (Vygotsky, 1978). In combination with the Elo algorithm, it uses Catboost, an open-source algorithm that supports decision-tree building to identify and assign an exercise with the right difficulty (Prokhorenkova et al., 2017). This algorithm estimates many different student levels (on different concepts, lessons, and time windows) and calculates probability of success of the student at a given exercise. To ensure diversity among exercises, the algorithm attempts to reduce repetition of content lines.

Lalilo aims to trigger any exercise that seems necessary. For example, if a student seems to be struggling in a particular area, the algorithm detects that and triggers activities to support the student including remediation activities that will not count towards a student’s validation threshold. Once the student has completed the required number of questions in the exercise that the algorithm has deemed best for the student, it checks again to see if the mastery threshold has been reached. If not, the algorithm will choose another exercise for the student.

Decoding and Comprehension: The Simple View of Reading

The simple view of reading suggests that reading comprehension (RC) is a product of decoding (D) and language comprehension (LC; Hoover & Gough, 1990). To fully understand the role that each component plays in the theory, it is best to view it as a formula:

$$RC = D \times LC$$

Recognizing reading comprehension as a product rather than a sum of decoding and language comprehension puts emphasis on the idea that students must learn and be proficient in both to be truly proficient in reading comprehension. Thus, the two should be taught concurrently (i.e.,
teachers should not wait until students completely master decoding, but rather have students work on comprehension as soon it is within their ZPD). While there is a natural progression from decoding to language comprehension, language comprehension should be incorporated into instruction as soon as it seems appropriate. To do so, students should be taught about various subjects, giving them context and background knowledge to further support reading comprehension. In 2009, Tilstra et al. examined 271 fourth, seventh, and ninth graders and found that SVR accounted for a significant proportion of the variance in reading comprehension at all grade levels. Lalilo follows SVR. Students complete both decoding and language comprehension activities to deepen their ability to understand complex text, and the scope and sequence progressively increases the level of complexity that students are required to read independently.

In SVR, the process of moving from decoding to reading comprehension requires explicit steps. Ehri’s theory of word reading (2005) informs specifically the decoding aspects of the SVR in relation to Lalilo by giving nuance to the processes by which students learn to read through an emphasis on decoding. Building off SVR, the theory of word reading posits that students need to explicitly learn decoding and comprehension. The first phase, the pre-alphabetic phase, describes the process of connecting cultural context to words. Students tend to have already mastered this phase before starting school (before the scope of Lalilo). However, the second (partial-alphabetic) and third (full-alphabetic) phases encompass the decoding component of Lalilo. In these two phases, students begin learning grapheme-phoneme connections and consolidating orthographic units to allow for easier recall. We see these phases reflected in Lalilo through activities that focus on phonics, phonology, and word families. For example, the program will pronounce a phoneme with an example of its use (e.g., /a/ as in apple). Then the program will verbally deliver a word and ask if the student hears the previously noted phoneme. By building and strengthening these skills, students can then segue into language comprehension.

Language comprehension includes anything from vocabulary, verbal reasoning, background knowledge, and literacy knowledge. According to Ehri’s theory, once students begin consolidating orthographic units, they move into the fourth phase (consolidated alphabetic phase). At this point, students begin developing a bank of sight words and consolidating phonemes into phoneme clusters to allow for faster reading and increased comprehension. Sight words include irregularly spelled words and words that a student has practiced decoding extensively and thus are easily retrievable. By the nature of phases, it does suggest a linear progression. This phase is best represented in Lalilo’s reading comprehension activities. Students independently and silently read books. To develop listening comprehension (a key component of language comprehension), the program also reads books to students, which supports word recognition skills. In both instances, after every few pages, students are asked questions about the content and given feedback or further context about the answer. (Note, Ehri’s theory does not suggest there is no overlap in phases. Thus, similar to SVR, Lalilo attempts to incorporate each of these phases as early as each student can comprehend it.)
Skill Integration: Scarborough’s Rope Model

Scarborough’s (2001) rope model aligns with SVR by posing a model that similarly suggests that learning to read requires systematic, explicit instruction in both language comprehension and word recognition (which includes decoding skills). However, she expands SVR by giving more nuance to the two components that make up reading comprehension. The model positions explicit instruction in language comprehension (background knowledge, vocabulary, language structures, verbal reasoning, literacy knowledge) and word recognition (phonological awareness, decoding, and sight recognition) as almost protective factors to increase reading comprehension. Language comprehension skills serve to make students more strategic in utilizing context and previous knowledge when presented with new text. Meanwhile, word recognition skill development increases automaticity such that the rules of decoding and phonological awareness can be applied to any word and with enough repetition, frequently used words can be stored as sight words for fast retrieval (see figure 5).

Figure 5. Scarborough’s rope model


Her depiction of strands weaving together into two ropes that intertwine incorporates the extensive literature that suggests that reading comprehension is a product of these skills. Further, this example suggests that each skill is equally important, and one does not necessarily have to precede another skill in instruction. Each skill can be taught in tandem with one another depending on the ZPD.
Synthesized from multiple studies, Scarborough (2001) explains that the cognitive-linguistic strands of her model are often taught before the student even starts formal schooling, and that students who begin school with weaker verbal abilities and literacy knowledge are much more susceptible to difficulties while learning to read. Students receive varying amounts of literacy practice at home. A pervasive predictor of literacy development is historical literacy socialization—how parents explicitly or implicitly teach literacy and familiarize students with text at home (Pellegrini, 2001). Literacy is a learned skill rather than acquired, so how much and in what way a student practices, is critical to their development. Childcare quality (which can be a predictor of SES) too seems to be related to literacy skills development, in that students in higher quality childcare focused more on school-based literacy and exposing students to print and text exhibited higher literacy achievement (Lazar et al., 1982).

Another prevalent finding from her review is that while reading disabilities often are caused from core phonological deficits, the reaction to such deficit might not be a chain reaction—students might still be able to read, but if they do not have strong decoding skills, they may not be able to read as quickly. Consequently, it can be difficult to identify reading deficits and disabilities. To put it in the context of the rope metaphor, if one of the strands (phonological awareness) is breaking or completely non-existent, there can still be a rope (reading comprehension) it will just not be as strong as other ropes that do have that strand. But because it can still make what seems like a sufficient rope, it can be hard to tell that it is not as strong of a rope, until the rope breaks. Scarborough (2001) poses this nonlinear model of reading skill development. As students naturally grow and plateau throughout the reading process, there is this “illusory recovery” period in which students with deficits may appear to have caught up to their peers but will continue to plateau for longer while other students are in a growth spurt.

Lalilo embodies this nonlinear model by serving as a proactive treatment to reduce deficits in early literacy skills, most notably decoding, phonological awareness, and language comprehension (print concepts, vocabulary, and language structure). All students who use Lalilo (regardless of external factors such as SES or teacher’s literacy instruction style) have access to quality systematic, explicit, and engaging foundational literacy-skill instruction and practice. Lalilo includes activities that explicitly address phonological awareness, decoding, and sight cognition—all of which are key predictors of literacy deficits.

**Oral Reading and Listening Comprehension: Comprehensive Emergent Learning Model**

Rohde’s (2015) CEL model serves as an umbrella under which we create all Lalilo content and features. Rohde proposed an expansion of emergent literacy to include the context of the student and the teacher. Comparable to Scarborough’s (2001) model, Rohde suggests that literacy development is not necessarily a linear process and can be affected by one’s environment and individual experiences. The three main components of Rohde’s model include:

- Print awareness is necessary for word identification.
• Phonological awareness is intertwined with listening comprehension.
• Oral reading is a key steppingstone to silent reading comprehension.

The final component of the model is that writing has a bi-directional relationship with each of the components listed above (Note, writing is currently beyond the scope of Lalilo).

While Scarborough's (2001) model highlights the importance of print awareness and phonological awareness, the CEL model emphasizes the relevance and necessity of oral reading and listening comprehension in reading comprehension. Rohde's model holds that children depend on social, oral communication to develop context and learn new concepts. Even though familiarity with new language and vocabulary is strongly linked to ability to develop reading comprehension skills (Metsala, 1999), oral fluency and listening comprehension is not often emphasized in formal education likely due to curriculum requirements and inability to test it in a standardized way. Lalilo provides practice in oral fluency and listening comprehension by reading books to students and asking questions about the content. Additionally, our listening comprehension texts address topics that are commonly taught in K–2 social studies and science curriculum, further reinforcing oral language topics that are discussed in the classroom. Our reading content also becomes cyclical across grade levels, such that students will revisit topics, which reinforces vocabulary within the same content areas. Listening comprehension activities allow students to practice this skill while gaining additional context on words and concepts as the program expands on each comprehension question.

Additionally, using proprietary speech-recognition technology, Lalilo has speech activities that aid students with oral fluency. Students are asked to read aloud and record a word, phrase, or sentence into a mic, depending on the student's level and lesson content. The recording is played back, followed by a fluent model of the sentence. To account for the effect of accents and speech difficulties, the student will be asked if the recording matched the program's fluent model. Word and text reading activities have been strongly linked to reading comprehension skill development. For example, students who practiced text reading activities showed greater signs of reading-comprehension skill development than those who did not practice text reading (Jenkins et al., 2003). The unique link of text reading to reading comprehension seems to increase literacy skill level, and thus is reflected in Lalilo's scope and sequence as students begin with word reading activities and progress towards longer phrases. In fact, Kim et al. (2014) discovered that text reading fluency could be a bridge between word reading fluency and reading comprehension. Kim et al. also found that text reading fluency mediates the relationship between listening comprehension and reading comprehension. Lalilo supports the link between listening comprehension and oral reading fluency as an important puzzle piece in reading comprehension.

In sum, CEL model posits that it is important to consider the community, culture, and environment of both teachers and students when teaching literacy (Rohde, 2015). We strive to provide culturally responsive content, ensuring that each activity, question, and book is written to appeal to a diverse audience. While the model does begin to address the nuances of skills related to reading comprehension, Rohde's more so takes a broader perspective, insisting on holistic
instruction for literacy skills. We believe strongly in this notion and work to incorporate the tenants of this model into each piece of content we create.

**Computer Automated Instruction**

One of the most prominent differences between Lalilo and typical English language arts (ELA) instruction is that Lalilo provides computer automated instruction (CAI). From an efficiency and reinforcement perspective, extensive research shows the benefits of CAI on learning and literacy instruction. In a French efficacy study of Lalilo (Lalilo was launched in France, teaching French literacy), students who used Lalilo for the recommended time per week were able to read a significantly greater number of familiar and invented words in a minute than those who did not (Sergent, 2021). Students may be more receptive and engaged with online literacy tools than typical in-person instruction (Vernadakis et al., 2005). In a quasi-experimental study based on a product similar to Lalilo, students in the intervention groups scored significantly higher at the end of the year Dynamic Indicator of Basic Early Literacy Skills (DIBELS) benchmark test than the control group (Wilkes et al., 2020). Watkins and Dehaene (2021) found that CAI significantly increased reading fluency from kindergarten to first grade, and that a literacy CAI tool improved phonological awareness, word recognition, and letter naming skills. Van Daal and Reistma (2000) found that kindergarten students could effectively learn the content of 3 months of in-person instruction in 16 hours on computers. This is all to say that CAI is an effective and efficient way to deliver lessons and strategies that are beneficial and effective for the students.

We recommend teachers use Lalilo anywhere from 15–20 minutes per day with their students, and no more than 30 minutes for 3–5 times per week. This way, students are not being exposed to too much screen time, and teachers are able to spend quality time with other students on personalized instruction while confident that other students are getting effective and quality instruction and practice from Lalilo. Lalilo’s adaptive learning algorithm provides individualized instruction and adaptive practice in a way that teachers may find difficult to accomplish due to the nature of a typical classroom.

**Student engagement systems**

Lalilo provides consistent feedback and positive reinforcement. Kids earn treasures as they complete a series of activities, badges as they master skills, new stories to read after every three badges earned, and diplomas after they complete 10 stars on the map (see figure 6). Earning a diploma allows students to advance through worlds. As students enter different worlds, the theme of the program changes to, for example, Forest, Dreamland, or Underground.
Lalilo’s rewards are consistent with *operant conditioning* (efforts to increase or decrease a behavior by providing or taking away reinforcement or punishment; Skinner, 1971), in that positive feedback increases behaviors, which in turn increases engagement and motivation. Lalilo aims to focus on intrinsic motivation rather than extrinsic reward. The program avoids too much gamification, which could consequently result in excess extrinsic motivation—resulting in a reduction of learning benefits for the students (Hanus & Fox, 2015). Research shows tangible rewards can lead students to value the reward over the content and learning experience of the game (Lepper et al., 1973).

Bartle (1996) developed four user types of multiplayer games, which Marczewski (2013) later modified to include the following users in the context of educational gamification:

- **Player**—motivated by extrinsic reward
- **Socializer**—motivated by relatedness
- **Free spirit**—motivated by autonomy
- **Achiever**—motivated by mastery
- **Philanthropist**—motivated by purpose

Marczewski (2013) developed these user types to explain how distinct types of gamifications benefit different students. These 5 archetypes can be broken into two groups: motivated by intrinsic reward or by extrinsic reward. The only user type that falls into the extrinsic reward is the “player,” while the other four user types are motivated by some form of intrinsic reward. Users that fall into the “achiever” archetype strive for point collection and leveling up as their main reinforcement. Because of the nature of Lalilo, the program appeals most directly to the achiever archetype, with some appeal to the “socializer,” “free spirit,” and “philanthropist.” Within the case of the philanthropist, the purpose that users would be motivated by is their own reading skill improvement.

Lalilo cannot really appeal to the “player.” Almost all the badges within the game are earned by mastery. The only exceptions are the placement test and a few of the book lessons. Students automatically receive a badge for completing the placement test and students are automatically validated after the second attempt for comprehension questions in the books, regardless of
mastery. By excluding the player archetype from the game, we can feel confident that most any student using and enjoying Lalilo is doing so to improve their literacy skills. For example, socializers can be motivated by the certificates that come at the end of each world as students tend to share which world they are in with their peers. Lalilo also appeals to the free spirit because a student can only get through each skill by mastering it on their own. While teachers can assign different tasks to each student’s scope and sequence, they cannot manually assign worlds, and so on. The teacher can only ask that students participate for a given amount of time, but what the students learn from and get out of the program is up to them.

Additionally, there is no true way to cheat the system to earn more badges. The student would continue the same scope and sequence even if the rewards were not present. The only way that students could earn badges without actually learning is by random clicking; however, the likelihood of getting enough questions correct to earn rewards this way is small. Further, while ultimately at the teacher’s discretion, Lalilo badges and rewards do not correspond with any tangible rewards (e.g., grades or prizes). In turn, the student would have no extensive extrinsic motivation to earn badges and rewards.

Lastly, according to cognitive evaluation theory, reward is beneficial when it increases perceived self-determination (Deci & Ryan, 1985). Because in Lalilo all rewards but one (treasures) are earned by personal mastery of skills, these rewards increase perceived self-determination as students earn badges directly related to mastering skills. Beyond the skill badges, the other rewards (books and worlds) only open the student to more activities. They do not gain anything, but access to more tools and activities that support the intrinsic purpose of the program—learning to read.

**Professional development and teacher dashboard**

The final aspect of Lalilo that sets it apart from competitors and makes it so useful, is the data that teachers collect from it. To ensure that teachers are using the program as intended, to best support educators and students, each teacher that uses Lalilo is invited to complete an e-course. The e-course walks the teachers through the product from both the teacher’s and students’ perspectives. Teachers are provided with resources and suggestions for how to use Lalilo in the classroom and how they can use it to support their lesson plans.

In the teacher portal, educators use the dashboard for progress monitoring (see figure 7) using three widgets: Student Activity, Students Needing Support, and Your Explorers. Using these tools, they can see which students are active/inactive and for how long, which students are not meeting mastery levels on skills, and the progress each student is making through their world in each widget, respectively.

Teachers can see students’ progress on various measures—skills, Lalilo worlds, and Common Core State Standards (CCSS)—and on each specific skill in a matrix. For each activity the student completes, a tile denotes whether the student has mastered the skill, is struggling, or needs more work. If the student has placed out of the skill (determined by the placement exam) the tile will be marked through.
Viewing the student profile (see figure 8), teachers can see how active each student is and how they are progressing through the CCSS and the Lalilo worlds, including which skills they have mastered that align with each standard and how well they did on those skills. Finally, within the student profile, the teacher can view the answer report which shows which activities the student completed, what they answered, and the teacher can even demo the activity. These metrics help teachers understand where students are struggling and how to adjust the lesson plan to meet students' needs.
Conclusion

Lalilo has one goal in mind—to provide effective and efficient literacy instructional practice for all students reading at a kindergarten through second grade level. To achieve this goal, the program is centered around three main evidence-based models: the simple view of reading, Scarborough’s model, and the comprehensive emergent literacy model. All three theories build off the same concept: literacy requires practice. Lalilo provides that practice, with a comprehensive, yet systematic, approach, beginning with decoding and integrating comprehension. Using Lalilo in the classroom allows teachers to spend more time helping students in smaller groups and one on one, and it is an efficient progress monitoring tool to ensure each student is on the right track towards fluent reading.
References


