SAS® Read Aloud: A Mobile App for Early Reading

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Abstract. Shared reading is an important instructional technique for developing literacy in young readers. It helps to develop print and phonological awareness and fosters motivation and enjoyment of reading. Mobile reading technologies have capitalized on some of the benefits of shared reading, but there has been limited systematic investigation into how they can be most effectively used to support early literacy. This work presents SAS® Read Aloud, a mobile iPad app for early reading with a design that is grounded by empirical research. We also identify opportunities for incorporating intelligent technologies to further improve and understand early literacy learning.

Keywords: Mobile learning, reading development, shared reading

1 Background

Reading skills are multifaceted and are acquired overtime beginning at a very young age. Before children being to demonstrate the skill of reading autonomously, several foundational skills develop during a period known as emergent reading [1]. Given the cumulative nature of the development of reading skills, increasing instructional quality at the emergent reader level has been identified as a powerful technique for preventing reading difficulties later in development [1]. However, according to the 2011 National Assessment of Educational Progress [2], on average, only 34% of US 4th graders demonstrated proficient reading status leaving the majority of students reading at or below the basic level [2]. Furthermore, longitudinal investigations have identified 3rd grade reading performance as a critical variable for predicting children’s lifelong academic success [3]. Therefore, there is great motivation for enhancing children’s experiences during the emergent and early reading stages.

Shared reading has been touted as one of the most influential instructional techniques for both phonological awareness and written language awareness development [1, 4, 5]. In fact, according to the Commission on Reading [6], “The single most important activity for building knowledge required for eventual success in reading is reading aloud to children” (p. 23). Also known as joint book reading and storytime, shared reading occurs when a parent or more advanced peer reads aloud to a developing reader [4]. While reading aloud might seem casual and basic on the surface, several longitudinal studies have shown shared reading experiences to be a better predic-
tor of later reading performance than common educational predictors such as socio-economic status or parent education [4, 7].

Among the benefits of shared reading, these experiences allow emergent readers to practice and develop print and phonological awareness—skills necessary for further reading development. For example, by reading along with others, children are given opportunities to see written language in various forms (print awareness) as well as draw connections between text features such as written words and letters and spoken language (phonological awareness). Furthermore, shared reading creates a space where children can observe fluent readers modeling more advanced skills such as comprehension strategies and fluency [8]. Additionally, through reading aloud with friends and family, children can develop positive associations with reading, which have been shown to encourage and influence later motivation for reading [9].

Therefore, parents are encouraged to expose their emergent readers to literacy experiences, such as shared reading, as often as possible, especially during the preschool years [4]. Moreover, while all shared reading experiences are valuable, the utility of the session as an instructional tool is dependent on quality [5, 8]. Research investigating eye gaze has shown that, without guidance, emergent readers generally focus on illustrations as opposed to text during shared reading sessions [10] and that children appear to benefit more from active sessions in which the reader engages the child using various attention-focusing methods [5]. As ubiquitous reading applications are becoming available on popular mobile devices, it is important to investigate how application developers can leverage this technology to provide shared reading experiences designed with best practices for reading development.

2 SAS® Read Aloud

SAS® Read Aloud is a mobile iPad application for early literacy centered around a digital library of freely available books. At the time of writing, this library consists of over 24 books designed to support different levels of literacy learners including early emergent, emergent, and early fluent readers. Each book may be read in one of three modes, designed to guide learners through different stages of reading:

- **Read to Me**: In this mode, readers see words highlighted as the book is read aloud by a narrator. Readers experience the intonation, rhythm, and stress provided by each speaker. This mode is designed to engage readers in stories and offer an introduction to text that may be beyond the learner’s current abilities.

- **Help Me Read**: In this mode, readers are guided through the book and control the speaker’s pace as each word is read aloud independently. Readers focus on developing both print and phonological awareness. This mode is intended to guide students towards independent reading by drawing attention to individual words and how these combine to make sentences and stories.

- **Read by Myself**: In this mode, readers are encouraged to read through the book independently with the ability to select the words they would like to be read aloud. This mode is intended to allow readers to build confidence in their reading abilities while supporting them when there are words they are unfamiliar with.
Each book includes a default narration designed to engage the reader and support development of correct pronunciation and intonation during reading. Additionally, SAS® Read Aloud encourages users such as parents, teachers or young readers to record themselves reading each story. During recording, the narrator follows the text that is being read aloud with their finger to indicate which word should be highlighted along with the recording. In this way, users can still enjoy all the features of the Read to Me mode including intonation and rhythm with the literacy support features of word-by-word highlighting. Narrators are also encouraged to record individual words with a focus on clarity and pronunciation to support the word-level learning encouraged by the Help Me Read and Read by Myself modes. Through these recordings, students will be able to listen to books recorded by people they know and love such as parents, grandparents, and teachers. It is hoped that this will develop a motivational and emotional connection to reading books with SAS® Read Aloud similar to that of one-on-one storytime. Together, these features seek to promote a love of reading and provide the tools for young readers to guide their own literacy learning.

3 Proposed Directions

Since its release, conversations with users have identified several important areas for future directions. Many users are interacting with SAS® Read Aloud in unexpected ways to further support early literacy. Most prominently, teachers are encouraging students to record themselves reading a story and listen to it to identify their own reading disfluencies. Some students are asked to listen to their own recording and compare it to an expert. Others are asked to complete multiple recordings to see how they have improved with practice. These patterns of interaction have prompted the development of additional features titled Practice and Progress.

In this mode students are encouraged to record multiple practice readings of a book. Each recording is stored along with the date and time so that students may play back any earlier readings. During playback students, teachers or parents are able to identify areas of difficulty and indicate errors such as stumbles or mispronounced words. This information can be used in reports or feedback designed to demonstrate a student’s progress and improvement over time and encourage targeted reading practice. Furthermore, it is hoped that this mode can be used in place of traditional "prac-
tice your reading” assignments often given by teachers. Now, instead of relying on student reports of the time they spent reading, teachers can verify students’ practice and easily assess any issues the student may be having.

The inclusion of this mode opens several opportunities for intelligent modeling and adaptation. First, with user consent, practice recordings and annotations will be uploaded to a secure server for analysis. This is expected to result in a large corpus of early reader speech that can be used for building targeted speech recognition models. This, along with the annotation of errors, will aid in the development of automated identification of reader mistakes and fluency. In this way, mistakes can be highlighted automatically for users. Additionally, detailed fluency metrics can be tracked across time without requiring user annotation. The second major opportunity is to apply machine learning techniques to the corpus of annotated errors to identify common mistakes (e.g. compound vowels, or multisyllabic words). Learned models can then be incorporated into the application to guide users towards exercises or books that may help them practice in areas where they have difficulties. This will help the user receive the targeted support and practice they need to improve their reading skills. Finally, the corpus may be analyzed to identify patterns of how early readers learn to read. Data mining approaches can highlight common patterns of development and suggest new areas for investigation. Overall, intelligent modeling and adaptation provides significant opportunities for advancing the efficacy and impact of early reading applications with the goal of addressing the national need for more proficient readers.

References

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