

Apps For Good Proposal:

Vocabli

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Executive Summary

Language acquisition in young children is crucial for their success later on in life. However, many children are falling behind in language skills before the age of two. Studies have shown that there are vocabulary disparities between high socioeconomic status and low socioeconomic status children at this age, and that these differences persist - and magnify - through the rest of school and adulthood. This app aims to catch any language deficits early and correct them. Using vocabulary acquisition tools with algorithms to promote the learning and retention of words, this app aims to teach language skills in a manner closer to how kids learn. In addition, it focuses on engaging care-takers in order to foster productive conversations between them and the child outside of the app.

The app aims to automatically teach children new words and expose them to a new language, all while facilitating conversation between the child and their parents to build crucial context around the words they learn. Regular exposure and reinforcement of vocab words will be based on a combination of text, audio, still images, animation, video, and/or other interactive content. The goal of which is to provide multiple means of engagement and interaction to stimulate motivation. Through an advanced feedback algorithm, the app will adapt to the progress of the user, accelerating the pace when children are ahead and making sure that more difficult concepts are fully learned. In addition to enforcing the semantics, or the meanings behind words, the app will be nuanced to allow for parent engagement unlike many language development apps on the market that focus solely on a digital experience. Therefore, this app serves to guide both the caretaker and the child by providing methods for fun and engaging verbal activities outside of the app. In addition, the app will contain some form of autonomy for the parent in order to specialize for content-specific vocabulary that will strengthen semantic networks.

Introduction

Language development in young children is essential for educational growth. However, the lexicon of younger-aged children can vary between different backgrounds. In a study titled “SES differences in language processing skill and vocabulary are evident at 18 months”, researchers found that the socio-economic status of families has an effect on the quantitative vocabulary of younger aged children starting at eighteen months of age (Fernald, et. al, 2012). By age two, these vocabulary disparities have grown drastically (Fernald, et. al, 2012). Another study conducted by Stanford University demonstrated this disparity by testing the language processing of children aged eighteen to twenty-four months (Colker, 2014). In the study, two pictures were shown to the children, one of which corresponded to a verbal sentence that identified an image. The child’s every movement and the time taken to identify the right image with their eyes was used to gauge the child’s processing speed (Snow, 2013). It was determined that children aged 18 months from a high economic background performed at the same level as children aged 24 months from a low economic background (Snow, 2013). These word gaps are significant because they affect further growth in vocabulary and academic success in school later on (“Bridging the word gap”, 2020).

Recent research has suggested that these disparities are largely tied with reading habits that exist between parents and children at a younger age rather than their pure socio-economic status. In a study by Ohio State University, researchers calculated the theoretical word exposure from a parent reading five books a day to a child (Logan. et al., 2019). By age 5, the child would be exposed to 1,483,300 words compared to 4,662 words without reading (Logan et al., 2019). This is also supported by a study from 1992 which suggested that by the age of three, children from poverty stricken houses hear about 30 million fewer words than those from privileged families (Logan, J. et al., 2019). These reading sessions are very important because they are considered to be more lexically diverse than typical caregiver and child conversations. The amount of time that a child and parent partake in this activity can be tied to

socio-economic status, in the sense that economic ease can allow for this free time between the parent and the child.

This issue is exemplified with the ongoing educational crisis during the COVID 19 pandemic. A study, *COVID-19 and the Educational Equity Crisis*, highlighted the measured educational loss over the COVID-19 pandemic. The educational growth was measured using three different tests: the MAP assessment, the Star assessment and the iReady diagnostic. Analysis of the MAP and STAR assessments from six districts in California displayed the negative overall learning change, especially with younger students in grades 4-8, as seen in Figure 1.

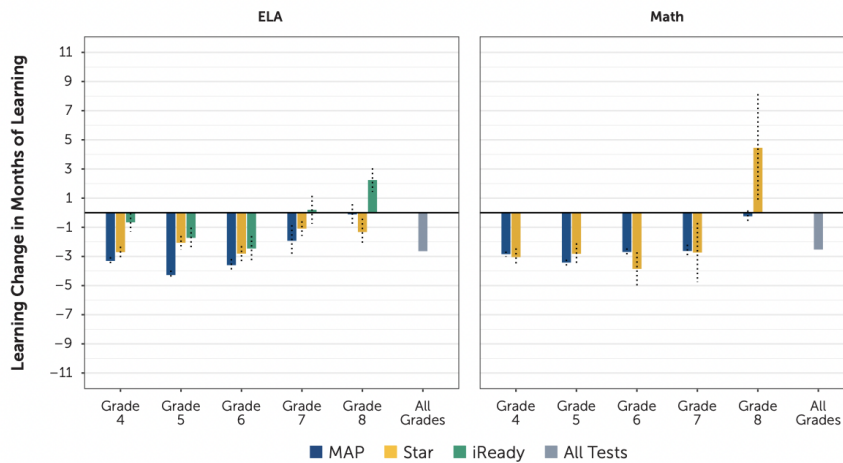


Figure 1. English Language Arts and Math Learning Change. The figure above shows the change in learning during the pandemic in math and ELA. The data was from from fall of 2019 to winter of 2021.

The negative impacts of COVID are also shown to be more harmful for lower-socioeconomic students compared to families of greater economic stability. This was evident in MAP ELA assessment where socially economically disadvantaged students exhibited a seven percent decline in scores, which is portrayed in figure two.

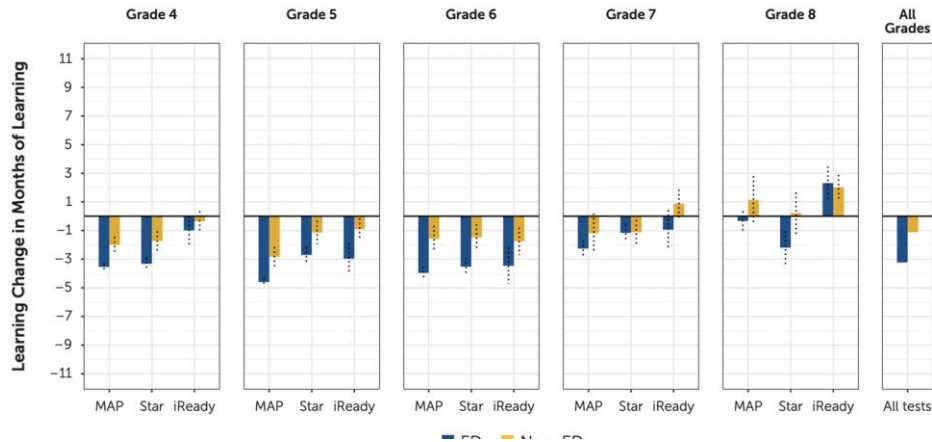


Figure 2. English Language Arts Learning Change. The figure above shows the change in learning during the pandemic between economically disadvantaged students and non-economically disadvantaged students (Pier, et al. 2021).

Based on the data collected by the study by Pier, et al, it can be inferred that the learning gaps between lower-income students are worsening due to the pandemic (Pier, et al. 2021). Since the pandemic is causing education to become increasingly more difficult to obtain, lower income students do not have school as an outlet for being exposed to new words, thus increasing the word gap. With that being said, making sure one’s child is up to speed with their vocabulary is vastly important. Vocabulary in younger children can also influence school preparedness, one’s educational and future health, earnings, and stability (“Bridging the word gap”, 2020), making it a crucial part of parenting.

The app will primarily target children around and between 18- 24 months of age that are expressing a lower word count compared to their peers, though that isn’t to say it can’t be used by other children who aren’t experiencing the same difficulty in word acquisition. More importantly, it is designed for co-engagement amongst their parents/guardians, and is well adapted for those parents/guardians who have less structured word acquisition routines because of external responsibilities. In meeting with professionals, plans were developed for various levels of parent engagement, from pre-written prompts to more organic conversations. One goal of this app is to develop future literary habits through or not through the app by fostering a fun and engaging routine between the child and the

parent/guardian. It is aimed to assist the children themselves who will use the app while the parents would be able to guide their children through on-screen instructions, assisting the child in building more context around the words. An additional goal of this app would be to allow for parent/guardian interaction of the specialization and feedback aspects of the app. This is all important in building the rich environment that the app would garner outside of it. And, it would be designed to comparably look at the growth of the child with their parent compared to without.

Competition

A few of the existing apps on the market share similar functions, but none of them focus on the specific nuances of our app. Nuances for one that include a focus on toddler aged children, which have a larger receptive vocabulary -what the child hears and understands- compared to their productive vocabulary, the words and phrases they produce. Uniquely, the app would be designed to walk the parent and child through it, while also providing external activities, unlike many pre-existing digital interfaces. And additionally an interface could feature the parent-based specialization of specific words, sounds, and images that they want their child to see and learn. Since our app is aimed at children with a lower or difficult ability in word acquisition the overall parent interaction is particularly relevant and necessary compared to existing apps that have this independent child-user interface.

Considering that our app is aimed at this particular age group, where the main relevance is word acquisition and meaning rather than developing more of a relationship amongst words, the basic app called "First Words 18 Months" contains a "flashcard" system, but does not include the parents for conversation skills, context, or measured progress analysis. The closest app to our system, LingoKids, does have a basic "parents area," but it serves an entirely different purpose, only giving a basic overview of childhood education and progress rather than incorporating them in the learning process.

This app will also provide context clues to more closely mimic how kids learn words in the real world by presenting words in a relevant setting - a menu in a restaurant, for example - it provides important clues to the use of the words beyond basic flashcards.

Importantly it will have an advanced user feedback system capable of adapting to user progress, and relaying the growth to the parent and child from its analysis. When words are learned, this adaptation will cause them to be shown less often to allow time for new words, but old vocabulary is occasionally shown in order to prevent the users from forgetting. Apps such as LingoKids and “First Words 18 Months” do not have systems that adapt to the proficiency of the user.

Specifications

Features

1. An adaptive learning algorithm from gathered user data to determine pacing and when certain words are taught.
2. Flashcard-style questions to build vocabulary and parent instructions to build context skills.
3. A parent guided mode that contains various layers of complexity: direct prompts and more organic sentences designed to promote basic conversation as parents and kids become more comfortable with the system.

Provided content:

Public domain clipart from <https://www.rawpixel.com/> will be used for the images and potentially free licensed sound as well.

Information that we need from the client:

Besides the child’s age, the app will passively collect data from app usage in order to determine mastery. Data collected includes time and accuracy information for each type of word.

Feedback

We will continue to meet with professionals for feedback and suggestions. Feedback from participants can be gauged using surveys, and data from the app will provide insight into its sufficiency allowing for potentially further improvement. Qualitative feedback of the app is especially important, as it provides information regarding the effectiveness of the suggested activities in the parent guided mode. Surveys can be used to identify successful activities in order to allow for more developed and continued ones.

Further Iterations

Algorithmic optimizations and improvements to attention retention are long-term projects to improve the app. The app could also have an option for parents to input custom words for their child. This would allow the user to continue the use of the system once the kids have learned all of the words

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