Yaroslav Litvak - Study Proposal

Team Members

The study will be completed by a single researcher – Yaroslav Litvak.

List of Tasks and Delivery Dates

Weekly Milestone 1	Provide the participant with access to the Учубука application for one hour daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	March 4, 2017
Weekly Milestone 2	Provide the participant with access to the Учубука application for one hour daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	March 11, 2017
Intermediate Milestone 1	Provide the participant with access to the Учубука application for one hour daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results. Complete an analysis of the participant’s progress in the first three-week period. Consider changes to the schedule.	March 18, 2017
Weekly Milestone 3	Provide the participant with access to the Учубука application for thirty minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	March 25, 2017
Weekly Milestone 4	Provide the participant with access to the Учубука application for thirty minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	April 1, 2017
Intermediate Milestone 2	Provide the participant with access to the Учубука application for thirty minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results. Complete an analysis of the participant’s progress in the second three-week period. Consider changes to the schedule.	April 8, 2017
Weekly Milestone 5	Provide the participant with access to the Учубука application for fifteen minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	April 15, 2017
Weekly Milestone 6	Provide the participant with access to the Учубука application for fifteen minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results.	April 22, 2017
Final Report	Provide the participant with access to the Учубука application for fifteen minutes daily in “hint” mode. Have the participant complete a test in “test” mode at the end of the week. Record the results. Complete an analysis of the participant’s progress in the third three-week period. Complete an analysis of the participant’s progress during the duration of the study. Prepare the Final Report.	April 29, 2017
Final Presentation	Prepare the Final Presentation in PowerPoint.	May 1, 2017

Description of the Phenomenon

The purpose of this study is to examine the efficacy of using mobile technology to help preschoolers develop early literacy skills. Specifically, an iPad application Учубука (MobileUp, 2012) will be utilized to train and test the development of phonological awareness and letter recognition of the Cyrillic alphabet. Phonological awareness (PA) is defined as the ability to hear sounds that make up words in spoken language, which includes deciding whether words begin or end with the same sounds, understanding that sounds can be manipulated to create new words, and separating words into their individual sounds (Stanovich, Cunningham & Cramer, 1984). We are specifically concerned with measuring the participant's ability to recognize verbal input. Letter recognition (LR) is defined as the ability to recognize and name the letters of the alphabet based on visual cues (Longcamp, Zerbato-Poudoub & Velay, 2005).

Literature Review

The American Academy of Pediatrics (AAP) recommends that children between two and five are limited to two hours on screen-time daily, with screen-time defined as time spent on the computer, television or mobile devices (Committee on Public Education, 2001). Unfortunately, these recommendations are rarely followed, and the average screen-time often exceeds four hours a day (Tandon, Zhou, Lozano, & Christakis, 2011). Since this study will make use of a mobile application designed for preschoolers, following AAP recommendations is an integral part of the study design.

The use of technology to promote early literacy skills has been widely researched. In a 1996 study, Kaminsky and Good tested the efficacy of three novel computer applications on thirty-seven kindergarteners and forty-one first-graders. One of the applications was designed to assist the participants with phonological awareness, and fluency in letter naming by sounding out a letter and asking the participants to select it from a list of four letters (Kaminsky & Good, 1996). A statistical analysis of the results determined that the measures displayed adequate psychometric properties for kindergarten children who were not yet reading (Kaminsky & Good, 1996). Specifically, phonological awareness improvement was significantly more pronounced in preliterate kindergarteners than in first-graders, who had better early literacy skills prior to the administration of the treatment (Kaminsky & Good, 1996).

In a 2008 study, Revelle, Reardon, Green, Betancourt and Kotler developed a mobile-phone based intervention that would encourage parents to engage their children in daily literacy-learning activities. Though the primary subject of this study was the effect the technology had on the time parents spent teaching their children early literacy skills, the authors found that mobile delivery made it significantly easier to incorporate literacy activities into the children's daily routines (Revelle, Reardon, Green, Betancourt & Kotler, 2008).

The use of mobile device applications to assist in the development of literacy skills was further examined by Lan, Sung and Chang in a 2007 study. This study focused on the effect of a mobile application designed to improve phonological awareness in elementary school English/foreign language (EFL) learners on collaborative learning (Lan, Sung & Chang, 2007). The authors found that the use of mobile technology significantly improved learning outcomes (Lan, Sung & Chang, 2007).

The Application

The study will make use of an existing iPad application Учубука created by MobileUp in 2012 specifically to help preschoolers develop early literacy skills. To the best of this author's knowledge, the efficacy of the application has never previously been tested.

The application has several use-cases for different ages, including animal recognition, letter recognition, word recognition and spelling (MobileUp, 2012). For this study, we will concentrate on the single use case of letter recognition.

There are two distinct modes of use, "hint" mode and "test" mode. In hint mode, the subject is presented with a screen on which a letter is flashed

and the application provides a verbal hint – "This is the letter И (the application pronounces the sound the letter makes)". The flashing letter utilizes visual short-term memory (VSTM) to improve letter recognition and phonological awareness. This technique has been shown to be more effective than pure phonetic techniques, where the letter is only sounded (Ehri & Wilce, 1985).

On the next screen the subject is presented with multiple letters

and verbal instructions to find the letter "И" are given. The subject then uses the touchscreen to pick a letter from the six choices provided.

If the wrong letter is chosen, it falls off the screen

and the subject is given a verbal instruction to try again. If the correct letter is chosen, the application presents one of a variety of “Good Job” screens

followed by the next problem.

In test mode, the application does not provide a verbal or visual hint. The choices are presented immediately and the subject is asked to pick the letter that is sounded out. There is no report feature and the results must be manually recorded for analysis.

Research Methodology

The study will be conducted using a single participant case study design. It will seek to determine the efficacy of Учубука, an app designed to improve phonological awareness and letter recognition in pre-literate preschoolers.

After an initial round of testing, I will provide the subject, a two-and-a-half-year-old male, with one hour screen-time daily for a three-week period and test phonological awareness and letter recognition at the end of that period. The testing will be conducted using the test mode of the application with results manually recorded. The subject will be presented with twenty questions in each testing round.

That will be followed with a second three-week period of exposure to the app, where the daily screen-time will be reduced to thirty minutes, followed by a second round of testing. Finally, in a third three-week period, screen-time will be reduced to fifteen minutes, followed by a third round of testing. The independent variable in the study will be screen time provided to the subject to use the application. The dependent variable will be the number of questions answered

correctly in a round of testing. The results will be compared using t-tests to test the following hypotheses:

1. There will be a significant improvement in both, phonological awareness and letter recognition following the initial three-week exposure period. If true, this hypothesis will be used to provide evidence of the efficacy of the app on learning outcomes.

2. There will be no significant difference in improvement in either phonological awareness or letter recognition between the last two rounds of testing. If true this hypothesis will be used to provide evidence that shortening screen-time to levels more in line with AAP recommendations will not have a negative impact on learning outcomes.

IRB Approval

Due to the tremendous difficulties of obtaining IRB approval for studies involving children and the time constraints of the class schedule, I will not seek IRB approval for the study. Unfortunately, this precludes the study from publication ion peer reviewed journals and submission to conferences. The study will be published as a White Paper.

Description of the Data to be Obtained

The research data will be obtained exclusively by testing the participant using the Учубука application's "test" mode. It will consist of twenty multiple choice questions presented to the participant in sequential order. Each question will contain a screen with six letter choices and the application will ask the participant to choose the letter that is being pronounced.

The application will record the answers for analysis. Data acquisition is essential to the study design and the study cannot be completed if this data is not available.

References.

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