

# Challenges and Promise of a Vocabulary App Designed to Teach Words in Depth in English to Second Grade Hispanic English Learners

**Doris Luft Baker, Ph.D., Southern Methodist University**

**Hao Ma, Ms. Southern Methodist University**

**Paul Polanco, Doctoral Candidate, Southern Methodist University**

Computerized reading instruction has been considered a key to motivating students to interact with text for greater amounts of time than if only conventional instruction were provided (National Institute of Child Health and Human Development, 2000). Nonetheless, Torgesen & Barker (1995) suggested that well-designed instructional software should include many of the critical features found to be effective for helping at-risk students and English learners (ELs) access the general education curriculum and attain grade-level expectations.

Despite the promise of technology to enhance and improve language teaching and learning (Adkins-Bowling et al., 2001; Garrett, 2009; Lee, 2006), technology has been mainly used to create dynamic activities (e.g., fill in blanks or respond to multiple-choice questions). Recently, however, pedagogical agents (i.e., avatars) have been created to help students improve their reading comprehension skills (Wijekumar, 2012), and emerging research suggests that the use of avatars has the potential of motivating students to learn resulting in gains on standardized tests that are equivalent to human tutoring (Ward, Cole, Bolaños, Buchenroth-Martin, Svirsky, & Weston, 2013). The use of an avatar to build student vocabulary and language proficiency, however, has not been examined up to date.

Thus, in this presentation we report results of an experimental study designed to examine the promise of an intervention that uses an avatar and scaffolded activities to improve the vocabulary and reading comprehension skills of second grade Hispanic ELs. Specifically, we attempted to answer the following research questions:

1. *What was the impact of the vocabulary intervention on the vocabulary knowledge of second grade ELs?*
2. *Did ELs with higher English language proficiency benefit more from the intervention than ELs with lower English language proficiency?*
3. *Did ELs in the treatment condition increase their receptive vocabulary and reading comprehension more than ELs in the control condition?*
4. *What are the challenges in the development of an online system that could facilitate or constrain the use of the app in an efficacy study?*

## Method

### Research Design

Using a cluster randomized design, we first matched teachers within schools based on the number of eligible participants in the classroom, and the program of instruction (i.e., whether teachers taught in a bilingual program or an English only program). We then randomly assigned each pair of teachers to the treatment ( $n = 13$ ) or the control condition

( $n = 13$ ). A maximum of 10 Hispanic students in each classroom who had turned in their parent consent form signed were eligible to participate. If there were more than 10 students in the class, we randomly selected ten of these students.

## **Participants**

Twenty-six second grade teachers in seven schools agreed to participate. All teachers had certifications with an average of 6.5 years of classroom experience; 13 teachers were Hispanic and 13 were White. Fourteen teachers followed an English only model of instruction, and 12 teachers followed a bilingual model with variations. All 217 second grade students eligible to participate were Hispanic; approximately 60% were female, and more than 80% qualified for free and reduced lunch.

## **Description of the Vocabulary App**

The app includes passages and vocabulary activities connected to abstract words in science and social studies topics that are included in the Common Core State Standards and the Texas Knowledge and Skills Standards in grades 2-3. An avatar guides students through the lessons and provides them with prompts and feedback. All materials were designed to be culturally relevant to Hispanic ELs, and they provided them with multiple opportunities to use English in a variety of meaningful contexts. Students were trained on how to login and log out from the app, and select the unit they were working on. Students were asked to use the app for 20-30 minutes per day for approximately seven weeks (i.e., seven units with 5 sessions each).

## **Measures**

Students were assessed with a Depth of Knowledge Vocabulary Measure (DOKTotal), the Receptive One Word Picture Vocabulary Test (ROWPVT), Gates Mc Ginitie (Gates) reading comprehension test, and the Test of Language Development (TOLD). We also assessed usability and feasibility through observations, surveys, and interviews.

## **Data Analysis Procedure**

To respond to questions 1 and 3, we used a multilevel model with two levels, student, and classroom. We did not include a school level because initial analysis using a three level model indicated that between school variance was not significant ( $ICC = .001\%$ ). To determine if there were differences in teachers between the treatment and control classrooms, we compared teacher characteristics on a series of demographic variables. Results indicated that teachers were comparable with the exception of teacher specializations (i.e., 4 teachers in the control classrooms had a reading endorsement compared to 1 teacher in the treatment classrooms). To respond to question 2 we used the (TOLD), and the DOK total at pretest as covariates. Question 4 will be discussed in the context of our findings and feedback from teachers and students.

## **Results**

Results for research question 1 indicate that students in the treatment condition significantly improved their vocabulary knowledge of the words taught ( $ES = 0.52$ ), and the definition of these words ( $ES = 0.61$ ). For question 2, students in the treatment condition who scored higher on the TOLD had higher scores on the DOK compared to students who scored lower, independently of the type of program they attended (i.e., English only or bilingual). For question 3, we did not find any significant effects of condition on our standardized measures of receptive vocabulary (ROWPVT) or reading comprehension (Gates) at posttest. Teachers thought the program was well received by their students. Participants indicated that they enjoyed the program, particularly the fact that the avatar was helping them learn new words.

### **Conclusions**

We discuss our findings in the context of developing and implementing technology interventions to enhance the vocabulary, language proficiency, and reading comprehension of English learners attending English only and bilingual programs.

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant No. R305A140471 to Southern Methodist University. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

## References

- Adkins-Bowling, T., Brown, S., & Mitchell, T. L. (2001). The Utilization of Instructional Technology and Cooperative Learning To Effectively Enhance the Academic Success of Students with English-as-a-Second-Language.
- Garrett, N. (2009). Technology in the service of language learning: Trends and issues. *The Modern Language Journal*, 93(s1), 697-718.
- Lee, R. (2006). Effective learning outcomes of ESL elementary and secondary school students utilizing educational technology infused with constructivist pedagogy. *International Journal of Instructional Media*, 33(1), 87-94.
- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups*. (NIH Publication No. 00-4754). Washington, D.C.: U.S. Government Printing Office. [www.nichd.nih.gov/publications/nrp/report.htm](http://www.nichd.nih.gov/publications/nrp/report.htm)
- Torgesen, J. K., & Barker, T. A. (1995). Computers as aids in the prevention and remediation of reading disabilities. *Learning Disability Quarterly*, 18, 76-87.
- Ward, W., Cole, R., Bolaños, D., Buchenroth-Martin, C., Svirsky, E., Vuuren, S. V., ... & Becker, L. (2011). My science tutor: A conversational multimedia virtual tutor for elementary school science. *ACM Transactions on Speech and Language Processing (TSLP)*, 7(4), 18.
- Wijekumar, K. K., Meyer, B. J., & Lei, P. (2012). Large-scale randomized controlled trial with 4th graders using intelligent tutoring of the structure strategy to improve nonfiction reading comprehension. *Educational Technology Research and Development*, 60(6), 987-1013.