

The Effects of an ICT-Based Reading Intervention on Students' Achievement in Grade Two

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Literacy and its component skills, the ability to read with fluency and comprehension and the ability to write fluently and coherently, are foundational to educational attainment across domains: they bridge the gap between learning to read and reading to learn, and they provide the key which opens the door to a world of textually-based knowledge. Ample evidence indicates that systematic instruction in the sound-symbol correspondences of spoken and written language can improve literacy achievement, even among students with reading-related challenges (Ehri et al., 2001; Snow, Griffin, & Burns, 2005). However, the majority of American teachers are insufficiently prepared to provide evidence-based reading instruction to their students (Snow et al., 2005), and only a small minority of teacher preparation programs are sufficiently comprehensive in their coverage of the topic (Walsh, Glaser, & Dunne-Wilcox, 2006). The question therefore arises: Until classroom teachers are well prepared to provide evidence-based reading instruction to all of their students, who or what remains to fill in the gap?

Code-based reading instruction using information and communication technologies (ICT) has been enthusiastically trumpeted as a means by which to promote reading achievement (Savage et al., 2013), and such instruction often requires little or no intervention on the part of the classroom teacher. However, little has been done to “tie computer-mediated reading instruction to contemporary theoretical models of reading acquisition and to coherent pedagogical models for technology” (Savage et al., 2013, p. 310), and scant well-designed research has been performed examining the use of ICT to promote the acquisition and development of reading skills among children aged eight years and under (Lankshear & Knobel, 2003).

In the present study, the authors report the results of quasi-experimental research designed to evaluate the efficacy of MindPlay Virtual Reading Coach (MVRC), an ICT-based reading intervention, when used to supplement regular

language instruction provided by a classroom teacher. MVRC offers highly individualized instruction in systematic phonics, fluency, comprehension, vocabulary, and grammar consistent with Common Core standards. The software is designed to adapt to student performance on embedded formative assessment activities, adjusting content and presentation to meet each student's individual needs.

Research question. In this study, the following question was explored:

Are there significant mean differences in (a) non-word reading, (b) real word reading, (c) non-word spelling, (d) real word spelling, and/or (e) reading fluency achievement scores favoring students assigned to use the MVRC online reading intervention, once the effects of differences in pre-test achievement scores and relevant demographic variables have been accounted for?

Participants. Participants included 209 students enrolled in eight, second grade classrooms (four classrooms in each school) in two public elementary schools in the southwestern United States. Of those, 107 were assigned to the treatment condition, and a 102 were assigned to a business-as-usual comparison condition. However, 32 participants (13 from the treatment condition and 19 from the comparison condition) left the study prior to post-testing owing to school moves, leaving 179 remaining cases. Of the remaining cases, eight were missing dependent variable or covariate data, leaving 171 complete cases.

Method. Participants assigned to the treatment group received MVRC online reading instruction in addition to Success for All reading and language arts instruction in the classroom setting. Participants assigned to the treatment group used the software for 30 minutes each day, Monday through Thursday, for a total of two hours per week throughout the regular school year (mid-September through mid-April), with the exception of holidays, school functions, and mandatory state testing days. Participating students assigned to the business-as-usual comparison condition received Success for All reading and language arts instruction but did not receive the MVRC intervention. During the time allotted for the MVRC intervention, students assigned to the business-as-usual comparison condition received additional language arts instruction from their classroom teachers consistent with the Success for All curriculum and routine classroom practice. Examiners obtained reading achievement data from each participating student. Pre- and post-test measures included tests of the Woodcock-Johnson Tests of Achievement (WJ IV ACH), as well as the Test of Silent Word Reading Fluency, Second Edition (TOSWRF-2).

Analyses. A multivariate analysis of covariance (MANCOVA) was used to determine whether significant mean differences existed in (a) non-word reading, (b) real word reading, (c) non-word spelling, (d) real word spelling, and/or (e) reading fluency achievement scores favoring students assigned to use the MVRC online reading intervention, once the effects of differences in pre-test achievement

scores and relevant demographic variables had been accounted for.

Results. Analyses revealed a significant main effect ($\lambda = .668$, $F [5, 161] = 16.014$, $p < .0001$, multivariate $\eta^2 = .332$) of the intervention on achievement scores of participants assigned to the treatment condition, a result which was confirmed across three of the study's independent variables: ($F [1, 165] = 16.341$, $p < .0001$, multivariate $\eta^2 = .090$), non-word reading ($F [1, 165] = 4.368$, $p = .038$, multivariate $\eta^2 = .026$), non-word spelling ($F [1, 165] = 29.212$, $p < .0001$, multivariate $\eta^2 = .150$), and reading fluency ($F [1, 165] = 58.348$, $p < .0001$, multivariate $\eta^2 = .261$). Effect sizes ranged from moderate to very large.

Discussion. The results of this research suggest a very robust effect of the MVRC intervention on participants' reading fluency and spelling achievement gains. While significant effects of the intervention were not detected in isolated word reading tasks (i.e., non-word reading and real word reading), it is possible participants in both groups had reached saturation in this aspect of decoding, as such tasks are heavily emphasized in the Success for All curriculum. Participants in both groups made statistically significant gains on word reading measures from pre-test to post test. Though the results of this study point to MVRC as a promising intervention, further research is warranted. High-quality intervention studies, including replication research, should be performed to further evaluate MVRC, as well as other ICT-based reading interventions commonly used in American public schools.

References

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