The Effect of Metacognitive Interventions with an Electronic Book for Promoting Literacy among Young Students at Risk for Learning Disability

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Abstract

Learning disabilities are among the most prevalent disabilities found in the Israeli educational system. Kindergarteners and early schoolers display delays in literacy development, significant difficulties in spoken and written language, and lack of metacognitive ability, which put them at risk for learning disabilities. There is a need, therefore, to develop interventions aimed at promoting literacy skills among such children in order to decrease future gaps between them and typically developing peers with normal development. For the first time, the present study examined the effects of various metacognitive interventions with an electronic book (e-book) for promoting literacy among first grade students at risk for learning disabilities. In addition, the transfer of previously learned literacy skills with an e-book to a different e-book of similar structure was examined. Finally, the research investigated for the first time the ability to predict success in the vocabulary tests of children at risk for learning disabilities.

The research participants were 150 first-grade students who had been identified by the Israeli Ministry of Education's Psychological Services as exhibiting specific developmental delays that placed them at risk for learning disabilities. Screening tests were conducted prior to the study. The study included only children with linguistic ages lower than expected for their chronological age, but with nonverbal intelligence within the norm. The participants were then randomly divided into five equal groups comprising four experimental groups and one control group. The four experimental groups comprised three subgroups that received metacognitive intervention of various kinds (either specific, general, or combined) prior to e-book activities. The fourth experimental group took part in educational e-book activities but without any metacognitive intervention. The control group continued its regular class activities. General metacognitive intervention was based on asking general questions focused on self-direction in learning and regulating and controlling learning in various areas of knowledge, such as mathematics, social skills, and life skills. Specific metacognitive intervention was based on asking specific questions focused on learning strategies for understanding difficult words while listening to or reading an e-book.

The research procedure consisted of two phases, intervention and transfer, each phase divided into three stages:

In the first phase, intervention, a metacognitive intervention (either specific, general, or combined) was delivered prior to activity with an e-book.

A. In the first stage, pre-tests were conducted to evaluate four literacy abilities: vocabulary, phonological awareness, print concept awareness, and word reading. Ability to predict success in vocabulary tests was evaluated as well.
B. In the second stage, four individual intervention sessions were conducted over a period of one month, each lasting thirty minutes.
C. In the third stage, post-tests were conducted to assess literacy abilities, prediction of success in vocabulary, and story comprehension.

In the second phase, transfer, we assessed if the literacy skills gained during the intervention phase were transferred to a different e-book with a structure similar to that of the intervention e-book. In this phase, no metacognitive intervention was carried out prior to the activity with the second e-book.

A. In the first stage of this phase, pre-tests were conducted to evaluate literacy ability; the ability to predict success in vocabulary tests was measured as well.
B. In the next stage, four sessions with a new e-book similar to the intervention e-book were conducted without any metacognitive intervention.
C. In the last stage, post-tests were conducted to assess literacy abilities and story comprehension.

The research findings indicated that, as expected, there was greater improvement in vocabulary among the three groups receiving metacognitive intervention compared to the e-book only and control groups – after both the intervention and the transfer phases. The degree of improvement in vocabulary measures was higher in the specific and combined metacognitive intervention groups compared to the general metacognitive intervention group.

Results from sentence comprehension and Joint Story Retell tests, which assess story comprehension, were shown to be higher in the metacognitive intervention groups than the e-book only group after the intervention and transfer phases. However, the degree of improvement in Joint Story Retell was higher in the specific and combined metacognitive groups compared to the general metacognitive intervention group. In Picture Sequence (another test measuring story comprehension) and Joint Story Retell, the results of the specific and combined metacognitive intervention groups were higher than the e-book only and general metacognitive intervention groups.

The post-tests conducted after the intervention phase showed that in the syllabic test of phonological awareness, the degree of improvement in the general metacognitive intervention group was higher than that of the e-book only and control groups. In contrast, after the transfer phase, there were no differences in the level of improvement between the five research groups. In the sub-syllabic test of phonological awareness, the degree of improvement in the four experimental groups (metacognition intervention and e-book only) was higher than in the control group, after both the intervention and the transfer phases, with no differences found in degree of improvement between the four experimental groups. A greater degree of improvement was also seen in the four experimental groups compared to the control group in print concept awareness. In contrast, in word reading, no differences were found in the level of improvement between the five research groups. Finally, the ability to predict success in vocabulary tests was found to be higher among the three metacognitive intervention groups compared to the control group both after the intervention phase and before the transfer phase.

This study is unique and innovative in three ways: First of all, for the first time in a controlled study, metacognitive interventions, particularly specific and combined, prior to an activity with an e-book were found to promote the literacy skills of children at risk for learning disabilities. Second, the findings indicate that these interventions contributed significantly to the transfer of literacy skills to a different but similarly structured e-book. Finally, again for the first time, the research found that metacognitive intervention contributed to the ability to predict success in vocabulary tests among children at risk for learning disabilities. The findings of the study may help researchers, educators, and literacy teachers of children at risk for learning disabilities.