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The Effect of Meta-Cognitive Guidance Embedded
in an Educational Electronic Book
on Emergent Literacy Development
Among Children at- Risk for Learning Disabilities

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Abstract

Children at risk for developing learning disabilities are characterized by their difficulties in oral language development and a delay in emergent literacy skills. These difficulties may later affect their ability to acquire reading skills and can result in problems related to reading comprehension. Therefore, great importance is placed on intervention as early as kindergarten age, with the purpose of promoting emergent literacy skills for children at risk for learning disabilities (ALD), and thus reducing future gaps.

In addition, children with learning disabilities exhibit deficiencies in their metacognitive knowledge, which affects their literacy performance. Metacognitive knowledge and skills already develop during pre-school years, and therefore there is a need to find effective ways to intervene, in order to help to promote metacognitive skills among ALD kindergarteners. In the last decade, special attention has been directed towards the development of research-based technological tools which would properly address the needs of ALD kindergarteners, and would help in the development of literacy which is the base for acquiring reading and writing skills. One of the newest computer software tools, which is thought to have the potential to promote emergent literacy for kindergarteners, is educational e-book software.

With this as a backdrop, the primary goal of this study was to examine the effects of this activity with an original educational e-book, developed for ALD kindergarteners, at the level of emergent literacy (vocabulary, phonological awareness and story comprehension) learning gains. This study also aimed to investigate the effect of metacognitive guidance embedded in the educational e-book on the learning gains in emergent literacy of ALD kindergarteners. To the best of our knowledge, no study has been performed to date on the effect of metacognitive

guidance embedded in the educational e-book on the learning gains in emergent literacy of ALD kindergarteners.

Four questions were at the base of this study: a) To what extent does the activity with an educational e-book effect the level of emergent literacy among ALD kindergarteners? b) Is there a unique contribution to the activity with an educational e-book including metacognitive guidance in comparison to an identical e-book, without metacognitive guidance? c) Is the frequency of operating the "hot spots", as measured during activity with the educational e-book, will find higher in the experimental group who activate an e-book including metacognitive guidance, as compared to the experimental group who activate an identical e-book without metacognitive guidance? d) Will be found a correlation between the activity level of ALD kindergarteners who activate an educational e-book, as measured by the frequency of operating the "hot spots", and the level of the achievements in the various measurements of emergent literacy tested?

Seventy-seven children ranging in age from 4.5-7.0 years (M = 5.88, SD = .67) participated in the present study. They were all identified by the Israeli Educational Psychological Service as having specific developmental delays that place them at risk for having learning disabilities. In addition, all the children who participated possessed characteristics comparable to those which characterize children at risk for learning disabilities (DSM,IV TR, 2000; National Joint Committee on Learning Disabilities [NJCLD], 2006).

For the purposes of the present study, the children were randomly divided into three groups: two experimental groups and one control group. Children in the first experimental group were exposed to activities in emergent literacy with an educational e-book with metacognitive guidance (n=26). Children in the second experimental group were exposed to activities in

emergent literacy with an identical educational e-book without metacognitive guidance (n=25). Children in the control group were exposed to the regular kindergarten program only (n=26).

The study was comprised of three stages. Prior to the intervention, participants were individually administered tests to assess their verbal and non-verbal intelligence in order to determine their suitability for the present research. Those participants who were determined to be eligible to take part in the present research were tested with the emergent literacy measures in the following domains: vocabulary and phonological awareness, and in the areas relevant to the activity with the e-book.

The second stage of the study included intervention in which children in the two experimental groups (with and without metacognitive guidance) were exposed to activities in emergent literacy with an educational e-book over the course of five sessions. The length of each session was about 20 minutes. Except for the first session, in which the children were exposed to the e-book as a group, the remainder of the sessions was carried out individually.

In the third stage of the research, following the intervention, all participants from the three groups were tested again to estimate their level of vocabulary and phonological awareness. The two experimental groups, which were exposed to the e-book, were tested for story comprehension as well.

The findings of the study indicate that, the activity with the educational e-book contributed to a significant improvement in emergent literacy demonstrated by vocabulary and phonological awareness among the children in the two experimental groups as compared to those in the control group. Significantly higher gains were found in rhyming abilities among children who were exposed to the educational e-book with metacognitive guidance, compared to the achievements of the children in the experimental group that exposed them to educational e-book without metacognitive guidance, and the control group. However, no significant difference was

found in rhyming achievements between the children in the experimental group who were exposed to the educational e-book without metacognitive guidance and the control group.

In addition, the findings indicate that the e-book activity's positive impact was demonstrated even when the intervention was indirect. The children in the two experimental groups who worked with the e-book significantly improved their achievements in their ability to separate a word's last phoneme, as compared to the control group. With regard to the children's ability to segment a word's opening sub-syllabic, no advantage was found in favor of the experimental groups.

Regarding the question of the unique contribution of the metacognitive guidance embedded in the educational e-book and on the learning gains in emergent literacy of ALD kindergarteners, it was found that the achievements in rhyming of children in the experimental group working with an e-book with metacognitive guidance was significantly higher than the achievements of children in the group working with an identical e-book without metacognitive guidance.

In addition, a positive correlation was found between the level of activity, as measured by the frequency of operating the "hot spots" on the illustrations, and the achievements in the various measurements of literacy: vocabulary, syllables, sub-syllables, and story comprehension (based of the main idea recall measure). Significant correlations were also found, of a mixed pattern, between the level of activity, as measured by the frequency of operating the "hot spots" on the words, and the level of achievements in the various measurements of literacy. A positive correlation was found between the frequency of clicks on words at "read with dictionary" mode and the level of achievement of the measurement of sub-syllables. A negative correlation was found between clicks on words at "play with words- rhyming " mode and the level of achievement in the vocabulary measurement. Regarding the rest of the measurements, no unique

contribution was found to support metacognitive guidance. In fact, no advantage was found to support metacognitive guidance in the field of story comprehension when comparing the two experimental groups. Furthermore, it was found that with regard to the frequency of pressing the "hot spots" in the target words, in both rhyming mode and vocabulary mode, the group operating with an e-book including metacognitive guidance performed significantly higher compared to the group operating with an e-book with no meta-cognitive guidance.

The results of the present study are in line with an increasingly growing body of knowledge suggesting that the educational e-book has the potential to promote the emergent literacy performance of ALD kindergarteners. Furthermore, the findings in this study emphasize the need for further research in order to learn more about the effects of metacognitive guidance embedded in educational e-books on the language skills of young children, especially those who are at risk for learning disabilities

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