

The Influence of Exposure to Multimedia in an
Electronic Book on the Literacy of Students With
and Without Symptoms for ADHD

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המכון ללימודים מתקדמים
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Abstract

Attention Deficit Hyperactivity Disorder (ADHD) is a Neurodevelopment disorder that is expressed by a low attention span, difficulties in organization, impulsiveness and hyperactivity. ADHD may also affect learning functions especially in the field of literacy, as well as social aspects from early age to adulthood.

In an era of technology, significant efforts are made to integrate diversified teaching among special needs students. These students require multisensorial teaching to make up for the difficulties limiting their learning capabilities.

One of the tools combining technology and literacy skills is the educational electronic book. The E-book integrates different multimedia features, such as: a narrator, highlighted text and animation as well as educational aspects, such as: a dictionary and educational games that enrich the learning experience. Little is known in the literature on the contribution of multimedia features integrated in an E-book for the advancement of literacy.

Results of prior studies examining the exposure of typically developed students and students at risk for learning disabilities to an educational E-book exhibited an improvement in the literacy discipline, however, the contribution of the E-book to students with symptoms of ADHD has not yet been examined.

This study involved second-grade students with symptoms of ADHD and students without symptoms of ADHD. In cases where students have not been diagnosed by a doctor, the term "students with and without ADHD" is commonly used. ADHD is measured according to the student's functioning. In order to be able to relate to attention, concentration or integrated disorder, the student must show

characteristics of attention and / or characteristics of hyperactivity and impulsivity (APA, 2013). Accordingly, the students' parents and the class teacher were asked to fill out a questionnaire that examined the existence of symptoms of ADHD. In addition, all students were also tested in the CCPT test (Tsal, Shalev & Mevorach, 2005).

Therefore, the goals of the current study are: 1. To examine the effects of using an educational E-book on literacy (dictation, identification of words, vocabulary and reading comprehension) among students with symptoms of ADHD compared to students without symptoms of ADHD. 2. To assess the unique influence of multimedia features integrated into an educational E-book (a book with a narrator, a book with narrator and dictionary and a static book) on the literacy abilities of students with symptoms of ADHD compared to students without symptoms of ADHD. 3. To identify whether and to what extent do multimedia features integrated into an E-book contribute to the level of the cognitive load of all the participants in the current study.

To our best knowledge, this is the first study examining the effect of exposure to an educational E-book among students with symptoms of ADHD.

In the study participated 117 second grade students, from 5 different schools around Israel. Out of all students, 47 showed symptoms of ADHD, and 70 did not show symptoms of ADHD. The participants include 58 girls and 59 boys. Two screening tests were conducted on all participants with the purpose of identifying signs of ADHD disorder: parental and educator questionnaire based on the disability signs as appearing in the DSM-5 and a test examining continuous visual attention (CCPT; Tsal, Shalev, & Mevorach, 2005). Later, TONI-4 test, Illinois test for

'Auditory Association' and a reading test for the evaluation of cognitive levels were conducted, for the purpose of screening students whose cognitive and reading levels did not match the expected levels of their peers. At the end of the screening tests, three literacy pretests were conducted on the students: dictation, word recognition and vocabulary. Next, the students were exposed to one of the E-book versions of 'Ariye Ba-Leilot' ('a lion in the nights') by author Meir Shalev, that were rearranged for the purpose of this study. After the intervention, the students underwent the same literacy and reading comprehension tests. At the end of the measuring phase the students participated in a group interview which allowed for an assessment of the cognitive overload.

The results of the current study clarify both its novelty as well as its theoretical and practical meanings in regard to the hypotheses and the study questions. As hypothesized, with symptoms of ADHD exhibit lower literacy capabilities than students without symptoms of ADHD. In the spelling test, students exposed to the E-book improved their achievements more than students who were exposed to the static book. In the word recognition test, the E-book integrating a narrator + dictionary was found to have added value to just a dictionary. In both these groups, the students improved their achievements in the integrated group. In the word recognition group, the students with symptoms of ADHD exhibited greater improvement than students without the symptoms, likely, due to the need to lean on additional aid to help them better their achievements. In the vocabulary test, the dictionary had a significant role in both study groups, seeing as both students with and without symptoms of ADHD, exhibited better achievements after the intervention, as a result of being exposed to an E-book with a narrator + dictionary. The findings of the study in the reading