The Fostering Literacy through E-book Based Activities in Children with Learning Disabilities vs. Children on the Autism Spectrum

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Abstract

The aim of the present study was to examine the impact of electronic books (e-books) on literacy achievements among two special-needs populations with developmental difficulties in language and literacy: students with autism spectrum disorder (ASD) and students with learning disabilities (LD).

LD students typically struggle with literacy problems that impede their ability to develop fluent reading and to comprehend what they read. Accordingly, their reading is slow and laborious. Their struggles reflect the undue stress placed on all of their attention resources as they decode reading, after which no attention resources remain to comprehend what they have read. Several studies have found that LD children function less well in academic domains due to developmental delays based on neurodevelopmental disorders. Cognitively, they function at a basic level, and they tend to show delays in response characteristics, in working and short-term memory, in automatic processing, in perception, and in the time it takes to get organized. The main causes of reading difficulties in LD children are their troubles with phonological awareness (Yeh, 2003) and memory processes (Shamir, Segal-Drori, & Goren, 2017). These students often perform successfully on lower-order tasks such as dividing words into syllables and rhyming, but they have trouble with higher-order, phoneme-related tasks (Catts, Nielsen, Bridges, Bontempo, & Liu, 2015).

Some ASD students have difficulty acquiring and comprehending language in several research measures: at the decoding level (Wei et al., 2015); in reading fluency (Kamps et al., 1994), and in understanding texts (Ricketts et al., 2013). Furthermore, children on the autism spectrum lack a homogeneous cognitive profile, and exhibit cognitive impairments of a high-level, called executive functions, which include: rigid and concrete thinking; difficulties perceiving the whole picture; difficulty organizing and sequencing; and difficulties in generalizing. Additionally, school-age students with ASD exhibit reading difficulties, have difficulty performing integration processes between the phrases and the sentences in the text, and applying cognitive flexibility (O'Connor & Klein, 2004). These children struggle with difficulties in inference-making, understanding information, abstract information processing, and drawing conclusions (Huemer & Man, 2010).

The present study pioneers an examination of the contribution of using an e-book to foster literacy among students belonging to these two populations. It is worth noting that both populations exhibit literacy difficulties; however, as previously stated, their difficulties are of different derivations. The study's target population included 60 students aged 6–7

years, studying in the first grade in state-secular or state-religious schools: 30 students with learning disabilities, and 30 students on the autism spectrum. The groups were matched by age, and IQ was verified. Some of the participants were in inclusive classrooms, while the others studied in special education classes located in regular schools. The participants in each of the two groups, LD and ASD, were randomly divided into two sub-groups: a group that studied the regular classroom curriculum (the control group) and another group that was exposed to e-book-based activities. The students in the groups exposed to e-book-based activities viewed, read, and played with the electronic version of the book *Ha-traktor be-argaz ha-chol* [The tractor in the sandbox] by Meir Shalev (Shamir and Korat, 2004).

The research hypotheses were that:

1. Differences would be found between the groups that underwent intervention and the groups that did not undergo intervention in phonological awareness (recognizing a single consonant; dividing words into two syllables; and dividing words into three syllables), where greater improvement would be found in the intervention group than in the control group, which was not exposed to the intervention.

2. Differences would be found between the groups that underwent intervention and the groups that did not undergo intervention in literacy (identifying words; vocabulary; and the ability to understand context), where greater improvement would be found in the intervention group than in the control group, which was not exposed to the intervention.

In addition to these hypotheses, the contribution of an e-book intervention was examined vis-à-vis reading comprehension in both experimental groups—ASD and LD. No hypothesis was raised concerning this research.

First, at the pre-intervention stage, the children were administered verbal and non-verbal IQ tests in order to assess their suitability to participate in the study. In addition, the parents of the children with ASD completed a Behavior and Social Communication Questionnaire to validate the autism diagnosis. In the second stage, literacy tests (phonological awareness, vocabulary, reading words, and comprehending what was read) were administered to all the children (both the experimental group and the control group) to determine their level of achievements in the various tests (see below). These literacy tests were administered again post-intervention, to assess the effect of the intervention. The test that assessed story comprehension was only administered post-intervention, and only to the experimental group.

The findings of the study indicate that being exposed to e-book-based activities improved the students' achievements in both study populations in the measures of

phonological awareness, in vocabulary, and in story comprehension. Furthermore, the findings of the study also attest to the contribution of the intervention to reading comprehension; however, it must be noted that in some of the measures (ability to identify a single consonant, vocabulary, and story comprehension), the children with ASD showed higher levels of achievement than the LD students.

The current study is unique in that it deals with the correlation between exposure to an e-book and literacy improvement among two special-needs populations (LD students and students with ASD).

Because LD students and students with ASD struggle with literacy, it is important to continue to study the conditions and methods of intervention that may foster these competencies among these populations. Furthermore, the findings of the current study indicate that it is important to address the unique needs of these special populations; to allocate suitable technological tools, such as e-books; and even to design intervention programs tailored to meet their needs. These steps will foster the students' academic competence and bring out the best of their abilities.

The findings obtained in the current study join a growing body of knowledge regarding the potential of using e-books as an assistive learning tool for all students, particularly those from special-needs populations such as LD and AS