

Pre-K and K eBooks

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Abstract

A recent study (Harvey, 2014) suggested that no significant difference occurred in comprehension or retelling of a story when students read electronic books (eBooks) rather than print picture books. Since this study was conducted with two age groups: pre-kindergarten and kindergarten students, further investigation was conducted using the data to distinguish the age effect on the scores using both eBooks and print books. An ANOVA used randomized groups of 15 from each grade level. A significant difference was noted at the .05 level of significance between the means of the two different age groups. The pre-kindergarten students scored higher, using the eBooks.

Introduction

The number of preschoolers using electronic books, digital books with pages that can turn and are known as eBooks, has grown. Intense marketing which has promised that eBooks provide storybooks that can be read independently has been a factor. "A national survey targeting American children ranging from birth to six years of age, revealed that 20% of three- to four – year-olds and 10% of five-to-six-year-olds used e-Books daily and, on average, spent 36 minutes and 47 minutes, respectively, interacting with them" (Vandewater, Rideout, Wartella, Huang, Lee, & Shim, 2007). Certainly, the number of preschoolers using eBooks has grown even more over the past seven years since this study was published.

A recent study compared comprehension and retention scores from print books and electronic books. Three books were read to one-half of the students in print form and to the other half of the students in electronic form. Questions were asked and data were compiled on these responses from 45 children who were randomly chosen. Three weeks later, the students reread the same three books in the alternate form. Again, the same questions were asked and recorded. Examiners read the print books to the students while the students were allowed to navigate the eBooks independently after an initial orientation. The eBooks offered oral readings with familiar voices but had no other interactive features which might have been distracting. The students who used the eBooks had a higher listening comprehension score, but the difference was not significant. Kindergarten scores were different from pre-Kindergarten. Therefore, a further investigation of the difference between age groups was warranted.

The population of the study was made up of pre-kindergarteners and kindergarteners from two rural, Southwest New Mexico communities made up of a majority of third-generation Hispanics. The average per capita income of the area was \$21,726 and five percent of the population was under the age of five.

Discussion

The earlier study (Harvey, 2014) showed higher scores using the eBooks, but not significantly higher. Based on preferences of the brain and its evolution, brain researchers would concur with the results of higher comprehension scores due to reading electronic books. Pictures are prevalent in eBooks, and these pictures move when manipulated by touch. Medina (2008) argues that vision trumps all other senses and is “probably the best single tool we have for learning ” (Medina, 2008, p. 233). In other words, visual stimuli will be attended to primarily over other stimuli, especially when the visual stimulus moves, as it does when using eBooks. Medina argues that attending to visual information is a survival mechanism, which is why it accounts for over 50 percent of neural real estate and resources (Medina, 2008). Pictures consistently trump text or oral presentations. This is so common that cognitive scientists have a name for it: pictorial superiority effect (Stenberg, 2003). For example, there is evidence that people can remember 2,500 pictures with about 90 percent accuracy several days after seeing them (Standing et al., 1970). Pictures are not only easier to remember, they’re significantly more likely to be stored and much more likely to be retrieved. “This has profound implications for a print-based society” (Frey, & Fisher, 2010, p. 107).

However, what effects would digital books have on the brain at different stages of its development? To investigate the effect of age on the use of eBooks, Wood, 2005, used a group of 80 students from a school in the UK. “Participants were first subdivided into two age groups: 40 five year olds and 40 six year olds. Then each of the age groups was subdivided into another set of two groups of 20: 1) the ‘talking book’ intervention, and 2) the comparison group who received one-to-one reading support from an adult using print books.” (Davis, 2005, p. 3) The students in the original group were paired with similar students based on gender and pre-reading scores which were wide-ranging. The results of the study “showed similar changes in reading strategies in pre- to post-testing, with the exception of children in the five-year-old ‘talking book’ group who showed significant improvements in decoding.” (Davis, 2005, p. 3) The younger students using eBooks reportedly surpassed the others with rhyme detection and decoding.

Lewin (2000) concluded similar results with a small group size of sixteen children, aged five to six years old. This group used talking eBooks daily for a month. “It was found that the eBooks were useful in supplementing lessons in the classroom and that the children improved in their cognitive skills” (Chau, 2012, p. 3).

This pattern of younger children scoring higher when using eBooks continued with the Korat study (2010) composed of 40 kindergarteners and 50 first-graders. “Both age groups exhibited good progress in their word meaning knowledge from the eBooks, while the

kindergarten children exhibited more significant progress in word reading than the first graders” (Korat, 2010, p. 29). Again, younger students seemed to gain more benefit from the multimodal aspect of instruction with eBooks.

Results and Conclusions

Using a simple t test, no significant difference was produced between the means of the pre-kindergarten and the kindergarten groups. However, the pre-kindergarten eBook scores were higher with $t= 2.12$ and a critical value of 2.14.

Since a Type 1 error is likely when using a t test with multiple measures, an ANOVA was then employed. The ANOVA produced a significant difference between age groups with $F= 9.96$ and the critical value for $F=8.57$ at the .05 level of significance.

These results encourage the use of eBooks with emergent readers who can independently read stories in addition to regularly reading with their parents. This lends credence to Levin (2013) who cautions in her book, *Remote Control Children*, “What children are experiencing and learning through media can be a cause for concern . . . about how the influence of media and technology on children surfaces at school and home, affecting children's thinking, behavior, interests, and relationships.” (Levin, 2013, p. 6) Therefore, parents should make careful choices when selecting eBooks.

Table 1

Means and Standard Deviations for scores from students using paper books and scores from students using eBooks.

Tests	N	Mean	Standard Deviation	Range
Kinder Paper scores	15	33.66	5.06	29 - 40
Kinder eBook scores	15	33.6	5.76	23- 42
Pre-K Paper scores	15	26.33	5.6	21-32
Pre-K Paper scores	15	28.73	5.07	21-36

Table 2

T tests comparison of the means of the student scores using paper books and student scores using eBooks. Pearson Correlation Coefficients between student scores using papers books and student score using eBooks

Tests	t-Test	Pearson r test
Kinder eBook scores	r .70 **	t .38
Print scores	n 15	n 15
Pre-K eBook scores	r .70 **	t 2.12
Print scores	n 15	n 15

*p<.05 **p<.01

Table 3

ANOVA for scores from K students using eBooks and print books and scores from Pre-K and students using eBooks and print books.

Source of Variation	Sum of Square	Degrees of Freedom	Mean Square	F	Fcv
	SS	df	MS		
Between	601.37	3	200.46	9.96*	8.57
Within	1127.19	56	20.13		
Total	1728.59	59			

*p<.05 **p<.01

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