The Effects of Electronic Books Designed for Children in Education
Michelle Chau, FIS2309, Design of Electronic Text

Abstract
Electronic books are quickly becoming more prominent in the field of education because of their advantages over traditional printed textbooks. As more electronic textbooks are being produced and utilized in classrooms, we must investigate just how useful and effective they are in teaching young children the important skills they need for higher learning. This paper reviews some of the current views on the topic for teaching and learning and discusses how electronic books can be integrated into the classroom learning environment. Research has shown that when used as a teaching supplement, electronic books have a positive impact on learning. They can be valuable in helping children with their early literacy development, reading comprehension, and language development.

Keywords: Electronic books, textbooks, education, learning, children

Introduction
Electronic books (or e-books) can be defined as any group of text in a digital format that is to be read and displayed on a computer screen. They can be accessed in a myriad of different ways including through the internet, on a CD-ROM or by many of the portable e-book readers available on the market. Many types of content are also available for free download or purchase including popular fiction, non-fiction, as well as educational titles (Maynard, 2005, p. 103). This emerging technology has opened the possibility for a large range of new learning experiences for students because of its advantages over traditional printed textbooks. Electronic books often contain rich multimedia features that cannot be found in textbooks. These frequently include recordings of the text read-aloud, lively animations, music, video and various sound effects. Young children are found to especially respond well to these enhanced features (Korat, 2008, p.111). Many companies are now producing more electronic textbooks for use in classrooms as researchers believe that they can prove to be excellent supplementary material for teachers, as well as being quite effective in early literacy development, reading comprehension and language development for young children (De Jong, 2004; Grant, 2004; Grimshaw, 2007; Higgins, 1999; Korat, 2008; Lewin, 2000; Maynard, 2005). This paper highlights the successes of children’s interactions with electronic books in their learning environments.

Studies on children’s interactions with e-books:
Grimshaw (2007) believes that rich multimedia features such as audio narration, sound effects and animations embedded into electronic books can very much help children improve their reading comprehension skills. The reasoning is that these features support the text, help the child "decode" new words and children actually improve on their understanding of the text (p.584). If a book has audio narration and also highlights the text as it goes along, the child is able to follow along much easier. Sound and 3-D animation in the electronic text can help illustrate meaning to young children and can provide better examples in comparison to a traditional 2-dimensional book. Voice narration also aids children in pronunciation of particular words and helps with understanding of syntax. Children also respond well to these features because if they need help defining or pronouncing the words, they can instantly access help for...
themselves within the electronic book. There is the added advantage of a degree of privacy as many children are shy and reluctant to ask a teacher for help in a classroom setting. Some children are impatient, choosing to ignore the fact that they do not understand the text, and will just keep on reading anyway (p.585). When children are motivated to read and to do so without fear of failure, they also tend to excel in reading at or above their grade level (p.586). Electronic texts can provide this kind of support to them because it actively engages their minds.

Many researchers acknowledge the difficulty in measuring comprehension of text (Grimshaw, 2007; Grant, 2004; Higgins, 1999). It can be very complicated simply because of many of the other complex variables involved, one of which is memory. Children can often forget parts of the narrative when a person asks them to re-tell the story or answer questions based on their reading of a text for purposes of testing. Just because they may forget some of the events of the reading, it does not necessarily mean they failed to grasp the concepts of the story. Grimshaw’s 2007 study on children’s reading and comprehension skills based on print versus electronic text attempts to resolve this issue by allowing children to have access to the text as they are being tested. They also challenge the children in their study to make inferences to test their deeper understanding of the story. They did not want to have the children simply practice information retrieval (p. 586). They tested children under several different conditions including having them read the electronic text of the storybook with and without narration, animations and sound effects. Although the results showed that children took longer reading from a computer screen when compared to a printed book, the children who read from the book took longer to answer the comprehension test. The children who had been placed in the test group that had access to a CD-ROM version of the story with narration turned on generally did the best on the comprehension test. However, no other significant results could be seen amongst the other groups. Some useful and pertinent observations from the test included that the children made very good use of the electronic dictionary that was easily accessible within the CD-ROM version of the text (p. 595). This far exceeded any use that came from the paper version of the dictionary. Children also generally like following the text of a traditional printed book with their finger. They were unable to do so with the electronic text that was displayed to them on the computer, and this must have factored into the slower reading time as well (p. 596). Additional students also mentioned that narration in the electronic version helped them when they did not know the pronunciations of certain words (p. 597).

Maynard (2005) also conducted a study comparing how much children learn from electronic text in comparison to printed text. This test differentiates itself from other tests in the fact that children were tested both on an individual basis as well as learning in groups. Half the children used a printed book to answer questions and the other half used an electronic CD-ROM, which was filled with animations, sound effects, music and video. The results showed that those who used the electronic textbook did better on the comprehension tests than those who used the printed textbook even though they did take longer to find the relevant answers to the questions they were asked. The researcher observed that the children who were working with the CD-ROM version of the text seemed to be more productive and were quieter using the text in groups. They all took turns rotating around the computer to ensure everyone had a turn accessing the text. It was a very different scenario compared to the students using the printed textbook. These children seemed bored and uninterested easily. The researcher did concede that there might have just been a “novelty effect” (p. 110) with the students using the CD-ROM version of the textbook. Another point to note is that the children who were using the CD-ROM version had to ask several times for help including questions on how to navigate back to the different sections that they needed as there are no simple search ability. The children using the textbook needed no help using it, as children are
generally familiar and competent in learning to use the contents and index pages of a book. This is a clear advantage that this medium has over electronic text (p. 111).

De Jong’s study on children’s understanding of stories presented to them electronically posits that additional features such as sound effects and animations actually can interfere with children’s comprehension of the text (2004, p. 381). She believes that they can easily get distracted and miss important plot elements. Although animations and such found in electronic books are without a doubt, appealing and attractive to children, De Jong says children understand the story more when an adult reads the text to them in a story time setting (p. 381). She completed a study in 2004 examining whether or not there are differences in comprehension with children listening to a narration of a story from an electronic text and children having the same text read to them by an adult. The researcher asked the children to re-tell the story that they had just heard (whether it was electronically, or through an adult) to them orally again and their results were coded. Her belief is that electronic books can certainly supplement children’s education, but is still no true replacement for an adult reading them a storybook.

The results of a study done by Korat (2008) showed that children exposed to electronic books showed improvement in word meaning, recognition and phonological awareness. The study’s participants were children with varying degrees of literacy skills from both low to middle class income families. They were assigned to use an electronic book in different activity modes such as “read story only” and “read with dictionary” (p. 115). To measure whether or not the children had improved on their literacy skills having used the electronic book over a period of time, assessments were done on whether or not children understood definitions of specific words, word recognition and phonological awareness (p.116-117). The results demonstrated that children did show improvement in understanding the meanings of words after they had worked through the electronic book (p. 121). The best results came from the group who worked with the electronic book in the “read story with dictionary” mode, as they were able to have instant access to the definitions of words that were unfamiliar to them.

Higgins (1999) conducted a study to find out if vocabulary-building activities are effective when paired with animation in electronic books. In the control group, the children listened as the computer read a page of a poem to them, and then they watched animated definitions of specific new words on-screen. The researcher asked if that helped them understand the meaning the word. If they said “no”, they were permitted to access the animation again. In the experimental group, a researcher was able to speak and interact with the children if they viewed the animation and they still did not understand the meaning of the word. They could give a definition and also provide the children with a synonym (p. 427). Several days later, the children that participated in the study were tested to see if they could define certain words that were in the previous readings. The results of this study indicated that the children who had adult help and other instructional activities performed better on the test. This shows that vocabulary-building activities can be supplemented with the aid of electronic books to produce the best results.

Electronic books have also proven to be able to help children with brain developmental disabilities such as autism. One study learned that comprehension and reading skills of autistic children increased when they began to learn with computers and electronic books. Their electronic program consisted of flashcards with words on them, letter identification and short reading passages. The children showed improvement in their development of vocabulary (Grant, 2004, p. 305). Children with other physical and learning disabilities can also benefit from using electronic books in the classroom. Their ability to translate text-to-speech gives young readers confidence and greatly boosts their self-esteem and projected self-
worth (Rhodes, 2008, p. 256). Lewin (2000) also conducted a study where 16 children aged 5-6 years old used talking electronic book software daily for a month. It was found that they were useful in supplementing lessons in the classroom and that the children improved in their cognitive skills.

Hill (1996) says electronic books are more appealing to children than traditional printed books. They bring the story to life to children in a rather lively way. It presents to them a brand new perspective and makes learning a magical experience. We should not worry about whether or not they will replace books and think of them more as another engaging way for children to learn. They can just insert the CD-ROM into their own computer and learn independently through these images and words. Their learning is not so limited anymore and their imaginations are free to roam.

Conclusion:
The topic of electronic texts and their advantages in education is a rich and fertile ground for further study and analysis. The multitude of attitudes and viewpoints presented here is just a starting point. Although many researchers agree that children's enjoyment of electronic books might just be the novelty factor, there are also documented cases where electronic books can support literacy and further language development. The added functionality and interactivity available in electronic textbooks can greatly benefit children. Most children are already exposed to computers and technology in our evolving fast-paced world, and they generally enjoy interacting with electronic books very much. They show more cooperation with their peers and retain more information after using an electronic book. Electronic textbooks can have the ability to support learning and comprehension levels seem to increase when children use them in classrooms. Teachers and other educators should look at perhaps implementing electronic texts in their teaching methods in the near future if they have not done so already.

Works Cited


