Abstract

CD-ROM storybooks, often referred to as electronic texts, e-books, and interactive stories, are learning tools with supplemental features such as automatic reading of text, sound effects, word pronunciations, and graphic animations which support the development of reading skills and comprehension in beginning readers. Some CD-ROM storybooks also provide a definition of the word to aid in vocabulary acquisition. However, over-reliance on these features may hinder development of a young reader’s decoding skills and use of context cues. Many CD-ROM storybooks contain incidental hotspots, such as dancing flowers and hidden characters, which distract from the storyline and take reader’s attention away from comprehension. These incidental features may prolong the reading event causing fatigue and loss of focus. In sum, the features provided by CD-ROM storybooks offer valuable support for the acquisition of reading skills when coupled with supervision to monitor overuse and direct instruction in comprehension strategies.

Keywords: Automatic word/phrase reading, CD-ROM Storybooks, Comprehension, Electronic text, Reading, Self-paced reading, Technology

The International Society for Technology in Education (ISTE) recommends students demonstrate an understanding of the nature and operation of technology and considers it vital that students have opportunities to use technology during their school years. Technology is playing an increased role in classrooms across America to engage students and to provide access to learning experiences (International Society for Technology in Education, 2002). This increased use of technology has impacted our society’s definition of literacy. This is due in part to the transition from “traditional, print-based literacy to electronic representations of text” (McKenna, Reinking, Labbo, & Keiffer, 1999, p. 111). In response to these changes in text format and modes of acquiring information, the International Reading Association urges researchers to explore topics on technology and literacy in order to understand the impact of technology on literacy and literacy instruction (International Reading Association, 2002).

These changes in instruction and increased use of technology are not limited to middle school and high school classrooms. The National Educational Technology Standards (NETS) Project (2007) provides standards that list what students should be able to do with technology at certain grade clusters. The recommendation for beginning readers, typically in the NETS grade cluster of pre-K – 2, is that students should use developmentally appropriate multimedia resources to support learning. Interactive, electronic texts are one way teachers can help beginning readers advance in technology skills while promoting the goals of their reading program. Formats of electronic texts vary. Formats range from simply displaying text on a computer screen similar to a bound book to the inclusion of features within the text that allow readers to become actively involved in the story. The focus of this article is on CD-ROM-
based storybooks which are a prevalent type of interactive, electronic text found in primary classrooms, and the implications for use of this instructional technology.

CD-ROM storybooks, often referred to as electronic texts, e-books, and interactive stories, have features which support developing reading skills and comprehension in beginning and struggling readers (Labbo, 2000; Labbo, 2005; McKenna, 1998; Pearman, 2008; Pearman & Lefever-Davis, 2006; Reinking, 1997). For example, most CD-ROM storybooks have an automatic read feature and many have audio and graphic animations where book characters talk and settings come alive. They may also contain “hotspots” or cues which can be activated to produce animated graphics, sound effects, word pronunciations, and games. Certain versions of CD-ROM storybooks will present word definitions along with the pronunciations to provide additional scaffolding. Another advantage for young readers is the ability to use these features on demand leading to greater learner control. These features will be described in more detail as their advantages and disadvantages are discussed.

**Automatic or Selected Word/Phrase Reading**

CD-ROM storybooks often contain a setting that allows the entire story to be read aloud automatically while highlighting relevant parts of the text. In much the same manner as a person-to-person read-aloud, this computer simulated read-aloud experience provides a model of reading fluency for beginning readers. The computer sets the reading pace, correctly pronounces words, and reads with prosody. Young readers hear the way the story is supposed to sound. The read-aloud experience also aids comprehension by removing the burden of decoding, thus freeing the cognitive energy of the learner to focus on the plot of the story (Reinking, 1997). In addition, the computer pronunciation of text as it is highlighted allows readers to hear the words spoken in context as they are highlighted which provides a simultaneous auditory and visual link to foster an awareness of letter-sound relationships. This feature is particularly helpful in building phonemic awareness and phonics skills if the CD-ROM storybook is set to highlight individual words instead of entire sentences.

Additional features found on particular versions of CD-ROM storybooks provide deeper support. Readers may choose to have the word merely pronounced or may choose to have the word segmented into syllables. For example, a reader may click on a word or picture for a pronunciation. If the button is not released, the computer will stretch out the word pronunciation and segment the word into syllables. Some CD-ROM storybooks, such as those produced by Discis™, allow the reader to obtain a definition of the word along with the pronunciation, allowing learners to self-select when they need help with vocabulary (Labbo, 2005). A study by Higgins and Hess (1998) reported that third graders using supplemental features of CD-ROM storybooks outperformed students in the control group in defining vocabulary words.

Some researchers have concerns about the overuse of these features (Birkerts, 1995; Lewin, 1996; Labbo, Leu, Kinzer, Teale, Cam-mack, Soterius & Sanny, 2003). Readers may rely on the computer to read the story without developing their own decoding skills and may continually request vocabulary definitions without attempting to use context clues or to figure out word meanings on their own. Failure to develop these skills and strategies will harm the reader in the long term. In a study by Lefever-Davis and Pearman (2005), this type of superficial learning was exhibited by young readers. They repeatedly requested the pronunciation of the same word and never acquired the ability to recognize the word when it next appeared in the story.

**Audio and Graphic Animations**

Most CD-ROM storybooks contain sound effects and graphic animations that can be distinguished as supplemental or incidental. Supplemental graphics and audio effects support comprehension, promote the storyline, set the story tone, and prompt readers to focus on events (Lefever-Davis & Pearman, 2005; Trushell, Maitland, & Burrell, 2003). Audio features aid comprehension by signaling the mood of the story and by cueing readers when an important event is going to occur. An example of this was given by a young reader. He said he knew something scary was going to happen in the story because of the music. He rubbed his hands together in excitement waiting to see how the story unfolded (Lefever-Davis & Pearman, 2005). Audio and graphic animations also support vocabulary development. Learners who encounter a word they are unfamiliar with have the chance to view an animation of the word which clarifies its definition. For instance, watching characters spin and dance on the screen gives a visual dimension to the definition of joyful and watching characters react in fear clarifies the meaning of words such as terrified or intimidated.

Incidental animations and audio effects are those which do not advance the storyline. Examples of these types of effects are a bird flying across the sky, a flower dancing in the garden, the sun moving in and out from behind a cloud, or a bicycle bell jingling. Trushell, et al., (2003) propose that these animations do not reinforce story events and may actually distract the reader by taking their attention away from

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