Exploring the Role of Digital Children's Literature in the Technology-Based Literacy Instruction

İhsan Seyit Ertem
Gazi University
iertem@gazi.edu.tr

ABSTRACT
The purpose of the study was to present a comprehensive review of researches and practices on digital children's literature and technology-based literacy instruction in classroom. Studies on the technology based literacy instruction were investigated in word reading, phonological skills, fluency, and reading comprehension. The research questions that guided this study include: a) What role does digital children's literature plays in literacy instruction? b) How can technology-based literacy instruction assist to teachers? d) What are the teachers' beliefs, opinions, and motivators to use technology in classroom? Semi-structured interviews were conducted with two elementary teachers to gather more in-depth and specific information about the role of technology for literacy instruction. The primary objective of the interview is to record, analyze and interpret these two teachers' experiences, opinions, and perspectives with regard to using technology in classroom. Open coding was used to find important points. The findings of study indicated that technology can enable students to do such things as develop word recognition, fluency, reading comprehension and motivation. Teachers have positive attitude and they are enthusiastic to use technology in the classroom. In the digital age, teachers need to consider use digital children's literature in their own classrooms. This transformation in literacy holds great promise for normal readers as well as struggling readers.
Keywords: Children's literature, digital literacy, elementary school teacher, storybook, technology based literacy instruction.

New generation has experienced the digital world as a natural part of their daily lives and regularly access resources in digital format. This generation use Facebook, MySpace, Wikipedia, Google and the other resources to communicate, socialize with friends or find the answers to their questions. They read materials on the Internet for school and for free time and they use more frequently than traditional materials (Houston, 2011).

In the twenty-first century, important and radical changes are occurring in the area of literacy. Digital technology is changing the nature of literacy (Reinking, McKenna, Labbo, & Kieffer, 1998). Literacy in new digital age, the New London Group engaged in the implications of broad social, cultural, technological change for conception of literacy. The New London group expressed particular attention to multimedia, electronic hypermedia, and the shift from print-based literacy towards digital texts, on-screen texts and literacies (New London Group, 1996).

Digital children literature, interactive electronic storybooks offer a chance for learners to become familiar with stories in a new format. Traditional literacy instruction now can be taught within technology based literacy. Electronic storybooks are now seen as an essential way to combine concepts of learning theories and curriculum objectives into a computer based settings and multi-literate environments (Chen, Ferdig & Wood, 2003). Digital literature is

widely used in classrooms to encourage engagement of children with storybooks and to promote children's literacy development. Research findings show that high quality and interactive electronic storybooks support children's literacy development through the use of scaffolding, the supporting vocabulary development, engagement and comprehension (Ertem, 2010; Moody, 2010). However, findings also show that lower quality digital features of electronic storybooks such as animations and sounds distract children's vocabulary development, engagement and comprehension (Moody, 2010).

Technology-based literacy instruction

Digital literacy has been defined by Calvani, Cartelli, Fini & Raineri (2008) as an umbrella framework for a number of complex and integrated sub-disciplines, or literacy comprised of skill, knowledge, ethics and creative outputs in the digital network environment. Computer technologies changed learning environment, classrooms and teacher, student habits. Computers provide individualized instruction, motivating students, promoting positive attitudes toward learning, facilitating collaborative social behavior, providing learner-controlled instruction and making learning more interesting. Computer technology can be useful for reading instruction. Because digital sources provide endless repetition; dynamic highlighting tracks the text individualized reading experience. Repeated reading is a valuable instructional strategy that helps students to develop reading fluency and improved reading comprehension. When technological environment offers through rereading the same passage, students decline the number of word recognition errors, improve reading speed and increase oral reading fluency and expression. (Silver-Pacuilla, Ruedel & Mistret, 2004).

CD-ROM storybooks are well matched for phonemic awareness, phonics, fluency; vocabulary, and comprehension (Pearman & Lefever-Davis, 2006). In addition to providing practice in developing reading fluency, CD-ROM storybooks can help poor readers' vocabulary development (Pearman & Lefever-Davis, 2006). The ability to recognize sound-symbol relationships is essential, but it is not enough for comprehension. Students must also activate their prior knowledge and use context hints to comprehend what they read. There is growing indication that computer-supported effects such as animation and sound allow students to make these connections (Matthew, 1997). Greenlee-Moore and Smith (1996) indicate that the use of interactive CD-ROM storybooks may help improve reading comprehension for elementary students. In addition, CD-ROM storybooks develop the story setting through animated graphics and sound effects indicating story mood and events and thus supporting comprehension Visual aids in electronic CD-ROM storybooks are helpful for understanding text and building coherent mental representation. Multimedia presentation, which includes text, graphics, sound, and animated images, is also helpful motivation for a struggling reader who is particularly uninterested (Ertem, 2009).

Digital literature for children

Chen et al.(2003) separated four groups of electronic storybooks according to their features and characteristics. These groups are interactive toys and games, CD-ROMs, Web-based storybooks, and story-sharing tools. Interactive toys and games tell children stories or help develop children's story sharing abilities. Main characteristics of interactive toys and games are game-access learning, interaction between computational artifacts and the user, nonlinear user control, feedback based programs, human experience in real life, closed environments, human experience in real life, closed environments, real world simulations, and recording and storage capability (p.4). CD-ROM storybooks are reading software for children in illustrated storybooks that help children develop visual recognition. Electronic storybooks are mainly designed to integrate text, graphics, animations, music and other multimedia components in order to bring support to the story line Children could read the stories on their own or listen to the stories read and activate dialogue or animated part of illustration. In addition, some CDs also contain games and other interactive features based on the story (Unsworth, 2003).

Web-based storybooks can be categorized three subgroups as one-dimensional, multi-dimensional and hypermedia. One-dimensional storybooks integrate a paper based storybook into hypertext on the internet. Multi-dimensional storybooks are accompanied by graphics, animations and audio. Teachers can make multi-dimensional storybooks with the use of animation and recorded narrations and music. This simple media integration can be attractive for children. Hypermedia storybooks contain a narrator, characters, plot structure and other essential story telling items. This kind of storybook puts together a high-level of graphics, animations, audio, video products, and interactivity. Story sharing books contain an open ended environment on the internet, feedback programs, non-linear story playing, human user control, self-expression, including plot writing, composition, arrangement, and reshuffling (Chen et al., 2003, p. 5-6-7).

Houston (2011) explains that digital format of children's literature presents chance for children experience the themes, settings, and characters of books in exciting ways. Digital libraries have a wide variety of public and school library uses. Digital resources are visually loaded and contain nice pictures, illustrations, or graphic design elements with music, video, image, spoken word which express multiple layers of meaning. Text features of digital sources are interactive and nonlinear as well as containing visual hyperlinks and social networking.

Electronic and digital storybooks are becoming essential in developing children's literacy skills. Research studies have presented evidence of positive results in

utilizing digital storybooks for literacy gaining (Chen, Ferdig & Wood, 2003). Research studies also indicated that children interact with digital storybooks in a different way than traditional printed books. Children apply digital materials nonlinear, using hyperlinks to move from page to page or topic to topic as opposed to traditional books. Recent years, some collections of digital children's literature are becoming available freely. For example, in 2002, International Children's Digital Library (ICDL) was designed by researchers from the University of Maryland. The library is one of the most popular and accessible collection of international digital children's literature. There are around four thousand titles in fifty-four different languages. The pages are brightly colored, visual design attractive to children. The children can access literature by titles, keyword, language, geographical region, genre, cover and age etc. This digital library is very useful for teachers, children and parents who looking for reading and cultures in many languages (Houston, 2011).

Figure 1. International children's digital library (ICDL)

Goal of the International Children's Digital Library (ICDL) is to build a collection of books that represents historical and current books from the world (http://en.childrenslibrary.org). This library aims to have every culture and language represented so that every child can know and appreciate the riches of children's literature from the world community. ICDL supports the world's children in becoming effective members of the global community who exhibit tolerance and respect for diverse cultures, languages and ideas by making the best children's literature available online free of charge.

Figure 2. Simple search

The library pursues its vision by building a digital library of outstanding children's books around the world and supporting communities of children in exploring and using this literature through innovative technology designed in close partnership with children with children (International Children's Digital Library, n.d.) (See Figure 1, 2 and 3).

In addition, the digital collection of children's literature from selects Florida universities such as the Baldwin Library at the University of Florida, Florida Atlantic University, Florida State University, and the University of South Florida is another valuable source for children's literature (http://palmm.fcla.edu/juv). This digital collection contains six hundred titles from the seventeenth through twentieth centuries. It is best of the Web for children's resources because people can access by browsing all titles or authors using an alphabetical list, or through the full text, author, citation, or title search fields (Houston, 2011).

Figure 3. Front cover

Storyjumper is another place to create and discover digital stories for kids (http://www.storyjumper.com). Thanks to this website people can build and publish their own children's book. This is also great tool for the classroom. Teachers, children and parents can easily create cover pages, add text, and upload drawings or photos to illustrate the story (Storyjumper, n.d.) (See Figure 4).

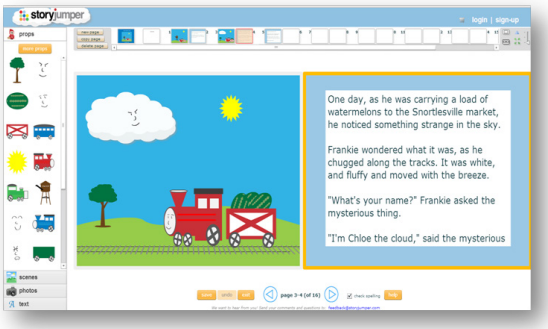

Figure 4. Storyjumper

MakeBeliefsComix.com provides to people create their own world of comic strips by giving them a choice of characters with different moods and the chance to write words and thoughts for them (http://www.

makebeliefscomix.com). Creativity and exploring new possibilities are two basic ideas of website. This website also offers many ways to use for educators, parents and educational therapist: 1) Students can create an autobiographical comic strip talking about themselves and their families or summarizing the most important things about their lives. 2) Students can create a comic strip story using new vocabulary words that are being thought. 3) Student can able to work collectively to create their comic strips. 4) The website helps students practice conversation with filling in talks and thought balloons. 5) Use the cartoon strips to introduce students to creative writing and the pleasure of using their imaginations fully (Makebeliefscomix, n.d.) (See Figure 5).

Figure 5. Makebeliefscomix

Purpose of Research

The purpose of this study is to present a comprehensive review of researches and practices on digital children's literature and technology based literacy instruction in classroom. Studies on the technology based literacy instruction were investigated in word reading, phonological skills, fluency, and reading comprehension. The research questions that guided this study include: a) What role does digital children's literature plays in literacy instruction? b) How can technology-based literacy instruction assist to teachers? d) What are the teachers' beliefs, opinions, and motivators to use technology in classroom?

Related Literature

Lewin (2000) reported one of researches about the effect of reading software in United Kingdom classrooms. Her study was concerned with the use of different software to supplement literacy instruction. The first aim was to investigate how the software could be integrated successfully in the primary classroom. She used two versions of the software were compared using both qualitative and quantitative methodologies. The software provided hints to low reading level children to support independent word identification. Criterion referenced tests were used to assess phonic knowledge. Additionally, two standardized tests were used. And also the children were interviewed on their attitudes to books and reading. The results from this article suggest that electronic books can complement teaching approaches in infant classrooms and can positively affect both cognitive and affective learning outcomes. Also the teachers gave positive feedback about these software as well as children. This study is a great example of software's contribution to low reading level children to encourage independent word identification. Using the software like this not only encourage children to use variety of reading cues for decoding but also provide to the teachers a time to deal with the other instructional activities. Children with more advanced reading skills may benefit from hints to support independent word identification. The software could be used also for children's writing. Some of children even second graders confused the similar letters such as b-d, p-q in their writing. Computer-based tools can help to decrease these type errors and visual confusions.

A study conducted by Greenlee-Moore & Smith (1996) to explore the effects of interactive CD-ROM software on children's reading comprehension. The interactive CD-ROM software caused higher scores on comprehension questions related to the story on more difficult and longer narratives.

Kathryn Matthew (1997) conducted a study comparing the reading comprehension of third-grade students who read CD-ROM storybooks with those who read traditional printed books. The students' story retelling scores on the two CD-ROM storybooks were compared to traditional print storybooks. Students scored significantly higher on retellings when reading the CD-ROM stories. Pearman conducted a study (2003) on second grades students with oral retellings. The results of the study indicate that interactive, electronic text may facilitate reading comprehension for students that are reading below grade level or are struggling with developing reading skills and strategies.

Labbo and Kuhn (2000) found that while considerate CD-ROM talking books supported the children's understanding and retelling of the story and involved in meaning making process, inconsiderate talking books fostered children's passive viewing and did not support their story understanding.

Scoresby (1996) assessed the effects of animation and reading ability on recall of illustrated and non-illustrated text information. The results of the study indicate that readers who viewed animations being able to recall fewer story details once the story was complete.

Underwood (2000) compared both electronic (talking book software) and paper format designed to provide supplementary reading practice. Underwood (2000) reported that pupils' recall of the story of an interactive talking book was poor, even though, children found the talking books highly motivating. De Jong and Bus (2002) observed 4–5-year-old children exploring electronic books that included games and other activities. They found that the children's understanding of the content of the story was less well supported by the electronic version compared to the regular book format.

Trushell, Burrell, and Maitland (2001) study exami-

ned Year 5 primary pupils' behaviors when reading and their recall of an interactive storybook. Pupils from three Year 5 classes participated in the study. Data were collected by observations and multiple-choice questions. This study found that pupils' recall of the storyline of an interactive storybook was poor and interactive storybook may provide mere entertainment. The findings of studies present those mostly hopeful results relevant to the use of new digital technology to improve children's literacy development. However, the digital sources can sometimes serve as a distraction from the storyline.

Methodology

In this study two sources were used: Review of existing studies, and data from teachers. Semi-structured interviews were conducted with two elementary teachers to gather more in-depth and specific information about the role of technology for literacy instruction. The teachers have four and nine years teaching experience. The primary objective of the interview is to record, analyze and interpret these two teachers' experiences, opinions, and perspectives with regard to using technology in classroom. After the interviews were completed, each of the audiotapes was transcribed. Following this, each of the transcripts was read a number of times, accompanied by the audiotapes. The purpose of this accompaniment was to describe and clarify subject's experiences without any previous assumptions as to their meanings. I used open coding to find important points. Throughout the readings and coding, number major themes developed.

Interview Questions

a) Personal: How long have you been a teacher? What grade levels have you taught? Do you have had any in-service training how to use technology in literacy instruction?

b) Experiences and beliefs: Do you use any technology in the classroom? Has the use of technology changed the way you teach? How do the children respond to computers, or other technology in the class? Is technology-based literacy instruction a good alternative for reading difficulties? Do you believe that digital children literature can help students' literacy development? Why? How technology can help students with literacy problems? Which areas spelling, comprehension, or writing?

c) Assessment: Do you use any technology in assessment? In what ways?

d) Resources and policy: What kinds of resources and technology did you wish you had? (Technical support, homework grader, more computers, more user friendly software, etc.) Who makes decisions about classroom equipment acquire?

Conclusion and Discussion

Digital children's literature and digital libraries are getting popular and having a wide variety of public and school library uses. Digital resources are visually loaded and contain nice pictures, illustrations, or graphic design elements with music, video, image, spoken word which convey multiple layers of meaning. Text features of digital sources are interactive and nonlinear as well as containing visual hyperlinks and social networking. Many of the digital children's literature collections have been translated into different languages. In the digital age, teachers need to consider growing collections of access and use digital children's literature in their own classrooms (Houston, 2011).

Although reading educators have had a long-standing interest in the use of technology for helping readers (Reinking, McKenna, Labbo, & Kieffer, 1999), currently, only little attention has focused on use of assistive technology in instruction that make it possible for students to learn from digital children's literature to develop their decoding, fluency, writing and comprehension skills. In recent years, a variety of instructional involvements that utilize technology for enhancing reading performance have gained widespread acceptance for struggling readers in developmentally appropriate reading activities.

Traditional approaches to literacy instruction have not produced successful results in regular classrooms. Spear-Swerling and Sternberg (1996) supported this idea; the great majority of children do not have neurological problem or reading difficulty. They do have problem with literacy instruction, standardize tests, and school curriculum. The assistive technologies might provide for higher quality instruction. In addition, poor readers benefit most from larger amounts of higher quality literacy instruction than is normally needed for other children to succeed (Allington & Cunningham, 1996, p. 197).

Research evidences show that technology-based literacy approach is a good alternative and recent projects have yielded promising results (Alvermann, Moon, & Hagood, 1999; Lewis, 1998; Reinking, McKenna, Labbo, & Kieffer, 1999), however, all teachers do not agree with this idea, they think technology-based literacy approach is not alternative but it is a good piece of literacy instruction. Technology-based instruction is not just for students with reading problems but also normally progressing students may benefit from technology-based instruction (Olson, Wise, Ring, & Johnson, 1997). Also, the teacher supports this idea; she says "All teachers should use technologies as tools for the education of all students, not just students with special needs. Everyone stands to benefit when technologies are used; when used effectively, such programs can level the education playing field for all students. Even students who are doing well, with a little extra help might do better."

Teachers have positive attitude and they are enthusiastic to use technology in the classroom. The teacher says "we try to provide a wide variety of instructional opportunities for children and technology is giving us a great opportunity to do that." They explain that they do not have enough background knowledge about using technology. They have not joined any in-service training program yet. In their classroom they use computer

not all the time, they need different computer software for different skills. The software which is available in their school is mostly focused on simple tasks such as some comprehension, listening, auditory skills, and working on phonics. They think sometimes technology can be helpful and they don't think technology may be huge impact the way they teach. The children respond computer positively, they love it. They think technology especially computer is a good motivator for children. The teacher says "I think engagement of kids in technology is very important aspect. That this is something that kids want to have access to. They want to have their turn at the computer. They want to use the technology to learn as efficiently and as effectively as possible." The teachers don't think the computer as an alternative for reading instruction but they think computer is a good piece of it. They do not use computer for assessment. The teachers need computer software providing more practice. They wish have some software, and programs which are kids friendly as well as more computer and technician. The teacher explains "I don't know a whole lot about what pieces of infrastructure technologically need to be in school. I need to go and find that out from somebody else. So I need to rely on someone who knows a lot more than I do about the technology." Also, the biggest thing they need is a new device that provides text support. The elementary school teacher added "We have some children with attention problems. This group might be benefit more from the technology."

The findings of review are technology can enable students to do such things as develop word recognition, reading comprehension and motivation. Another finding is the main advantage of the technology is the cost. One-on-one instruction with a human tutor is very high and impossible to many children with literacy difficulty. Computer-based remedial instruction can be a more affordable and widely available replacement for or supplement to individual teacher-based remediation. Most often, the funds are simply not available for technology that would enable a student or students to experience success in school or life. The other findings are:

- Teachers agree that technology has enormous potential for (1) inspire motivation; (2) increase self-esteem; and (3) adjustable to the individual.
- Upper elementary students with low reading ability may have much to gain from software designed to literacy instruction.
- Computers have used in a variety of ways to support writing, and to provide instruction in component writing skills (Graham, Harris, MacArthur & Schwartz, 1991).
- Computer Assisted Instruction has significant effect for not only regular students but also for low ability students' phonological awareness and decoding (Roth & Beck, 1987).

In conclusion, there is no reason to limit the benefits of technology to the literacy problems. Children read poorly because of poor schools, poor literacy instruction, poor teachers, and poor curriculum. Children benefit from the instructional support that can be provided through technology like computer and the other software. Our knowledge of how technology can best assist the struggling reader is still limited and technology is not a solution for all of the problems faced by the struggling reader. But still the fate of the student who has reading difficulties remains in the hands of insightful teachers who use technology in classroom. The transformation in literacy holds great promise for usual readers as well as struggling readers.

Technology continues to evolve in its power, speed, simplicity, and availability and it will continue to offer more sophisticated tools for facilitating literacy acquisition, enabling literate activities, and decreasing print-based barriers. Educators should consider to the use of technology in literacy instruction and it offers many potential benefits for their students. However, it needs to be focus on specifically determining what kinds of technology that enhances literacy performance of students.

References

Allington, R. L., & Cunningham, P. M. (1996). *Schools that work: Where all children read and write.* New York: Harper Collins College Publishers.

Alvermann, D.E., Moon, J.S., & Hagood, M.C. (1999). *Popular culture in the classroom: Teaching and researching critical media literacy.* Newark, DE, and Chicago, IL: International Reading Association and the National Reading Conference.

Calvani, A., Cartelli, A., Fini, A., & Ranieri, M. (2008). Models and instruments for assessing digital competence at school. *Journal of e-Learning and Knowledge Society*, 4(3), 183-193.

De Jong, M. T., & Bus, A. G. (2002). Quality of book-reading matters for emergent readers: An experiment with the same book in a regular or electronic format. *Journal of Educational Psychology*, 94, 145-155.

Ertem, I. S. (2009). *Investigating the effects of electronic cd-rom storybooks and traditional print storybooks on reading comprehension of fourth grade struggling readers.* Unpublished doctoral dissertaion, University of Florida.

Ertem, I. S. (2010). The effect of electronic storybooks on struggling fourth-graders' reading comprehension. *The Turkish Online Journal of Educational Technology,* 9(4),140-155.

Graham, S., Harris, K., MacArthur, C. A., & Schwartz, S. S. (1991). Writing and writing instruction with students with learning disabilities: A review of a program of research. *Learning Disability Quarterly*, 14, 89-114.

Greenlee-Moore, M., & Smith, L. (1996). Interactive computer software: The effects on young children's reading achievement. *Reading Psychology*, 17(1), 43–64.

Houston, C. (2011). Digital books for digital natives. Children & Libraries: *The Journal of the Association for*

Library Service to Children. 9(3), 39-42.

International Children's Digital Library (n.d.). Retrieved from http://en.childrenslibrary.org

Labbo, L.D., & Kuhn, M.R. (2000). Weaving chains of affect and cognition: A young child's understanding of CD-ROM talking books. *Journal of Literacy Research,* 32, 187-210.

Lewin, C. (2000). Exploring the effects of talking book software in UK primary classrooms, *Journal of Research in Reading*, 23(2), 149-157.

Lewis, R. B. (1998). Assistive technology and learning disabilities: Today's realities and tomorrow's promises. *Journal of Learning Disabilities*, 31(1), 16-26.

Makebeliefscomix (n.d.). Retrieved from http://www.makebeliefscomix.com

Matthew, K. (1997). A comparison of influence of interactive CD-ROM storybooks. *Journal of Research on Computing in Education*, 29(3), 263-276.

McKenna, M. C., Reinking, D., Labbo, L. D., & Kieffer, R. D. (1999). The electronic transformation of literacy and its implications for the strugging reader. *Reading and Writing Quarterly,* 15, 111-126.

Moody, A. K. (2010). Using electronic books in the classroom to enhance emergent literacy skills in young children. *Journal of Literacy and Technology*, 11(4), 22-52.

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review,* 66(1), 60-92.

Olson, R.K., Wise, B.W., Ring, J., & Johnson, M. (1997). Computer-based remedial training in phoneme awareness and phonological decoding: Effects on the post-training development on word recognition. *Scientific Studies of Reading*, 1, 235-253.

Pearman, C. (2003). *Effects of electronic texts on the independent reading comprehension of second grade students.* Unpublished doctoral dissertation, University of Arkansas.

Pearman, C.J., & Lefever-Davis, S. (2006). Supporting the essential elements with CD-ROM storybooks. *Reading Horizons*, 46(4), 301-313.

Reinking, D., McKenna, M. C., Labbo, L. D., & Kieffer, R. D. (Eds.) (1998). *Handbook of literacy and technology transformations in a post-typographic world.* Manwah, NJ: Erlbaum.

Roth, S. F., & Beck, I. L. (1987). Theoretical and instructional implications of the assessment of two microcomputer word recognition programs. *Reading Research Quarterly*, 22(2), 197-218.

Scoresby, K. J. (1996). *The effects of electronic storybook animations on third graders' story recall.* Unpublished doctoral dissertation, Brigham Young University.

Silver-Pacuilla, H., Ruedel, K., & Mistret, S. (2004). *A review of technology-based approaches for reading instructions: Tools for researchers and vendors.* (National Center for Technology Innovation). Retrieved from http://www.cited.org/library/site/docs/AReviewTechnology-BasedApproaches_final.pdf

Spear-Swerling, L., & Sternberg, R. (1996). *Off track: When poor readers become "learning disabled."* New York: Westview Press.

Storyjumper (n.d.). Retrieved from http://www.storyjumper.com.

Trushell, J., Burrell, C., & Maitland, A. (2001). Year 5 pupils reading an interactive storybooks on CD ROM: Losing the plot? *British Journal of Educational Technology,* 32(4), 389-401.

Underwood, J. (2000). A comparison of two types of computer support for reading development. *Journal of Research in Reading,* 23(2), 136-148.

Unsworth, L. (2003). Reframing research and literacy pedagogy relating to CD narratives: Addressing radical change in digital age literature for children. *Issue in Educational Research*, 13(2), 55-70.