

TAKING A CLOSER LOOK AT READING ONLINE

By

MARY MCNABB

Director, Learning Gauge, Inc. USA.

ABSTRACT

This article reviews the author's work as an evaluator for Internet-related school improvement initiatives in the USA. One of the latest research areas has to do with the processes associated with reading online. Because online information is fundamentally hypertextual, reading online is different from reading printed books. Evidence suggests reading via the Internet requires new metacognitive monitoring abilities, awareness of choice-making among hyperlinks on a web page, and internal narration to synthesize hypertextual information. These points contrast with the more familiar processes associated with reading print. The article explores the current understanding about the nature of read online and poses questions for further investigation.

INTRODUCTION

Many educational leaders and policymakers recognize the potential benefits the Internet holds for schools. A recent global study confirms that the Internet is profoundly influencing the competencies students would need to succeed in the future marketplace (Kozma, 2003). At the same time, many nations are recognizing an increase in functional literacy demands. These demands are spurred on, in part, by the widespread influence of the Internet (Leu, 2000).

During the 1990s, America invested in connecting all public schools to the Internet so that every student would have access to online learning opportunities. Today 22 states have established virtual schools and online learning accounts for more than 25% of academic opportunities in American schools. Currently 77% of schools report that at least half of their teachers use the Internet during instruction (Education Week, 2005). Since the Internet became available in our schools, federal, state and local education agencies have formed partnerships with corporations to develop online curriculum. Given the growing importance of online learning in schools and ICT networks in the global marketplace, researchers are also starting to ask deeper questions about the processes, knowledge and skills associated with reading online. Questions recently posed (McNabb, 2005) include: What is the fundamental nature of online reading processes? How does comprehension develop online? What abilities are prerequisite to derive

meaning from online hypertexts? If hypertext brings forth each student's individual reading path, then what are the characteristics of appropriate methods of measurement for online reading comprehension? This article begins to address these questions with the hope of stimulating further investigations by researchers and teachers alike.

The Changing Nature of Reading

For centuries, the printing press has shaped reading materials into uni-linear narratives structures such as fictional stories, historical chronologies, problem-solving or compare and contrast rhetorical structures. Print authors use established rhetorical structures to create narratives that readers recognize and use as scaffolds for their comprehension. Readers of print commit to memory narrative conventions and that knowledge helps readers



Students from Dr. McNabb's visit with educators dedicated to bringing technology to poor schools in India.

becoming fluent. Readers of print count on the author providing a focus for the narrative, a coherent sequence of ideas to follow, and carefully chosen vocabulary in context to aid readers' comprehension. Unless taught otherwise, readers of print often apply these same expectations to the Internet.

Unlike print, online information has multiple layers of text structure. The rhetorical structure of online information is hypertextual (in this context I am using hypertext to also refer to its multi-modal or hypermedia counterpart). Bolter (1998) observes that "hypertext undermines the rhetorical foundation for the teaching of writing that is, the need for a unified point of view and a coherent thesis" (p. 10). Landow (1992) explains that hypertexts allow readers choices, which make reading multi-linear and multi-modal. Online hyperlinks connect printed words with audio, video, pictorial or kinetic texts. Landow (1992) explains traditional reading conventions and strategies apply only within a single lexia (or web page) of hypertext. Kinzer and Leander (2003) reviewed research about how readers make meaning as they move from one hypertext link to another and found that reading hypertext is much like writing or co-authoring. I suggest we do not yet know enough about online reading to have adequate vocabulary to describe it. There is enough evidence, however, to support the claim that because the fundamental structure of hypertext is more complex and interactive than print, some aspects of reading online differ from reading printed books.

During my own experience observing many classrooms in which students (ranging from grades 5 through 12) use the Internet, it became clear that some students recognize an incoherent hyperlink path while others do not. Some are aware of how to backtrack to previous web pages or jump track to a search engine when their online comprehension begins to break down. These are strategies for online reading that I discovered while looking over the shoulders of students and watching their online reading paths. I conducted think aloud procedures with students to confirm these observations. Hypertext forces readers to make choices about which link to click and why. Students who monitor their comprehension are able to explain why they select one hyperlink instead of another. They have a viable

rationale for making choices that provides them with a coherent narrative flow of ideas. Their reading purpose steers those choices. Other students, I have observed, click about aimlessly. These students lack an ability to focus when reading online, which suggests the absence of an internal narrator. They may also lack an intrinsic reading purpose or sufficient prior knowledge about a topic to complete an online reading assignment. Without the awareness of how to monitor their comprehension, students use their online reading time unproductively.

If teachers do not monitor students' online reading processes or outcomes, they are unaware of the cognitive demands students face while reading online. Comprehending hypertext requires a high level of reader focus and engagement in critical analysis of information. The sheer volumes of loosely associated information accessible by clicking on hyperlinks or using an online search engine places new demands on the reader's mental energy and active working memory. Students who struggle with spatial processing or attention dysfunctions may also experience difficulty reading online (McNabb, 2006). Reading online generates more rapid information processing cycles than reading print. It requires students to develop their own rhetorical structure. It requires student possess the ability to decode new vocabulary and language conventions found in multi-cultural contexts. Online reading involves synthesizing multiple perspectives, evaluating information for bias or unreliability, and making sense of disjointed associations encountered among a myriad of online reading options.

Heller (1990) reviewed early studies about reading hypermedia CD-ROMs. She found evidence of reader disorientation, cognitive overload, lack of commitment, and unmotivated rambling (also known as surfing) among students. Subsequent research indicates these early findings persist in more recent findings about the nature of hypertext and hypermedia (Kamil, Intrator, & Kim, 2000; McNabb, 2006; Reinking & Bridwell-Bowles, 1996; Walz, 2001). Some students may be apt enough at teaching themselves the basics of Internet surfing but may not be able to progress on their own to higher levels of comprehension online. Teachers need to look closely at

students' online reading processes in order to distinguish between aimless surfing and academic reading.

The benefits of online learning activities are primarily governed by students' online reading processes. At a glance, online reading and information research activities may appear a snap for students. This is what Mitra found in his famous Hole in the Wall Experiment (Judge, 2000). Mitra chose four 9th graders from a middle class school in India and asked them to use the Internet to research answers to 10th-grade test questions from a physics teacher. The students had five questions on viscosity to address and did not have prior knowledge of the subject. The students had two hours to find the answers to the questions using the Internet. In the end, they answered all questions correctly. The physics teacher even held a 30-minute discussion with the students to verify their knowledge. Students explained their answers to the test questions and also told the teacher several things about viscosity that he did not know, but verified as correct.

Mitra concluded that the Internet is capable of multiplying the effectiveness of teachers. I agree to the extent that when students are well-prepared for these types of critical reading and information search tasks, they can perform excellently. Mitra's study suggests that teachers can influence students' online reading success by taking care to shape the questions they pose to students. The following section suggests additional ways teachers can facilitate students' comprehension online.

Suggestions for Teaching Online Reading

When designing online assignments, such as Web Quests, teachers can apply the method of supportive text. Research conducted by Anderson-Inmann and Horney (1998) involving at-risk readers with a range of reading deficiencies is applicable here. In their research, students used "supportive text" features of digitally altered reading materials. Supportive text features include hyperlinks to new vocabulary definitions, for example. Illustrations, graphic concept maps, summaries, translations and expanded explanations are other types of supportive text featured (Anderson-Inman and Horney). In a similar series of descriptive studies, McKenna (1998) found positive benefits of using hypertexts to scaffold at-risk readers'

comprehension of "talking books." His students listened and viewed video or graphics along with reading print.

In addition to carefully designing collections of online reading materials to support students' literacy development at various levels, teachers can demonstrate metacognitive monitoring strategies for students. Teachers accomplish this with an overhead projector displaying a series of Web pages and conducting a think aloud to explain reading choices, reasons for backtracking, and methods for evaluating online information. Reading strategies for the Internet that involve students in critical thinking help develop their metacognitive monitoring abilities. Metacognitive monitoring involves awareness of one's cognitive focus, hypertext choice-making, and adaptability. Metacognitive monitoring provides the basis for decisions about which hyperlink to click next and why. The desired result is a coherent narrative from each student that synthesizes the lexia they have read online. Teachers can use the assignment in Table 1 to help students develop their strategies for reading online.

Schools without an existing technology infrastructure can skip the old process of wiring their buildings and leap frog to a more flexible technology infrastructure that uses wireless Internet networking and portable computers (laptops and Pocket PCs) powered by battery. Portable computers are advantageous because they can easily move from student-to-student. In addition, it is no longer necessary to purchase educational software since the Internet can provide a more up-to-date variety of educational resources. When funds are scarce, a school's best investment is one portable computer station that has

Student Tasks	Teacher Tasks
Online readers are required to:	Provide online readers time to:
Summarize in their own words the meaning of each lexia (web pages) they read	synthesize their summaries into a cohesive narrative and receive instructive comments
create a concept map representing their hyperlink path	review their concept map and receive guidance form a reading buddy
describe reasons for their choices in their hyperlink path	pose questions that provide a focus for further online reading about the subject

Table 1. Displays a sample assignment to provide students with opportunities for developing their metacognitive monitor abilities necessary for reading online.

Internet access, a projector, and a hand-held student response system. With this technology package, a teacher can engage a whole group of students in online reading activities. The student response system supports interactive assessments that can generate individual student comprehension results in real-time so teachers can monitor students' comprehension misconceptions and accomplishments.

End Point

The Internet is a complex, dynamic literacy environment. It can shift and expand a student's world with a click of the mouse. It requires readers to transfer prior knowledge and adapt their reading skills within a variety of social contexts. Successful online readers are astute at recognizing when their comprehension is waning. They are focused on evaluating the credibility and pertinence of online resources while navigating through hyperlinks. They make inferential leaps between lexia of information in an effort to synthesize information across multiple sources. My observations indicate that not all students are as well prepared as were Mitra's students for independent Internet use. Students new to the Internet do need direct instruction and guidance as they develop their metacognitive abilities for reading online.

References

- [1]. Anderson-Inman, L., & Horney, M.A. (1998). Transforming text for at-risk readers. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Keiffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. 15-44). Mahwah, NJ: Erlbaum.
- [2]. Bolter, J.D. (1998). Hypertext and the question of visual literacy. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Keiffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. 3-13). Mahwah, NJ: Erlbaum.
- [3]. Education Week. (2005). Electronic transfer: Moving technology dollars in new directions. Technology Counts 2005. Retrieved online March 20, 2006 from <http://www.edweek.org/ew/toc/2005/05/05/index.html>.
- [4]. Heller, R. S. (1990). The role of hypermedia in education: A look at the research issues. *Journal of Research on Computing in Education*, 22(4), 431-441.
- [5]. Kamil, M.L., Intrator, S., Kim, H. (2000). The effects of other technologies on literacy and literacy learning. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson, & R. Barr (Eds.), *Handbook of reading research*, Vol. 3 (pp. 771-788). Mahwah, NJ: Erlbaum.
- [6]. Kinzer, C. & Leander, K. M. (2003). Reconsidering the technology/language arts divide: Electronic and print-based environments. In D. Flood, D. Lapp, J. R. Squire, & J. M. Jensen (Eds.), *Handbook of research on teaching the English language arts* (pp. 546-565). Mahwah, NJ: Erlbaum.
- [7]. Judge, P. (2000, March 2). A lesson in computer literacy from India's poorest kids. *Business Week Online*. Retrieved October 20, 2002, from <http://www.businessweek.com/bwdaily/dnflash/mar2000/nf00302b.htm>
- [8]. Landow, G.P. (1992). *Hypertext: The convergence of contemporary critical theory and technology*. Baltimore, MD: Johns Hopkins University Press.
- [9]. Kozma, R.B. (Ed.). (2003). *Technology, innovation, and educational change: A global perspective*. Eugene, OR: International Society for Technology in Education.
- [10]. Leu, D.J., Jr. (2000). Our children's future: Changing the focus of literacy and literacy instruction. *The Reading Teacher*, 53(5), 424-429.
- [11]. McNabb, M.L. with Thurber, B.B., Dibuz, B., McDermott, P. & Lee, C.A. (2006). *Literacy Learning in Networked Classrooms: Using the Internet with Middle-Level Students*. Newark, DE: International Reading Association.
- [12]. McNabb, M.L. (Fall, 2005). Raising the Bar on Technology Research in English Language Arts. *Journal of Research on Technology in Educational*, 38(1), pp. 113-119.
- [13]. McNabb, M.L., Hassel, B., & Steiner, L. (June, 2002). Literacy learning on the net: An exploratory study. *Reading Online*. International Reading Association [Available online at <http://www.readingonline.org/articles/mcnabb/>].
- [14]. McKenna, M. (1998). Electronic texts and the transformation of beginning reading. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Keiffer (Eds.), *Handbook of*

ARTICLES

literacy and technology: Transformations in a post-typographic world (pp. 45-59). Mahwah, NJ: Erlbaum.

[15]. McNabb, M.L., Hassel, B., & Steiner, L. (June, 2002). Literacy learning on the net: An exploratory study. *Reading Online*. International Reading Association [Available online at <http://www.readingonline.org/articles/mcnabb/>].

[16]. Reinking, D., & Bridewell-Bowles, L. (1996). Computers in reading and writing. In R.Barr, M.L. Kamil, P.B.

Mosenthal, & P.D. Pearson (Eds.), *Handbook of reading research*. (Vol. 2, pp. 310-340). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

[17]. Walz, J. (March 2001) Reading Hypertext: Lower Level Processes. *Canadian Modern Language Review*, 57(3). Retrieved online September 20, 2005 from <http://www.utpjournals.com/jour.ihtml?p=cmlr/cmlr573.html>

ABOUT THE AUTHOR

Dr. Mary McNabb is currently the director of learning Gauge Inc., providing evaluation, assessment development and professional development services to educators and policymakers working on school improvement initiatives involving technology. She is the primary author of a new book from the International Reading Association titled Literacy Learning in Networked Classrooms. Dr. McNabb previously served as Director of Applied research in educational technology for the north central Regional Educational Laboratory (NCREL) and co-authored a number of print and digital products on planning and evaluating educational uses of technology for school improvement. While at NCREL, she partnership with the US Department of Education's Office of Technology to chair regional conferences on state-level evaluations for technology in education. She held a one year term as research scientist at the university of Denver Research Institute where she served on the core group of evaluators for the national Preparing Tomorrow's Teachers to Use Technology (PT3) grant program. She also has served on other PT3 projects including the National Educational Technology Standards for Teachers and the How People Learn Pt3 grants. She is a research reviewer fro ISTE's Center for Applied Research in Educational Technology and was research editor for ISTE's Leading and Learning with Technology Journal in 2000-02.

