The New Literacies of Online Reading Comprehension and the Irony of No Child Left Behind: Students who Require our Assistance the Most, Actually Receive it the Least

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To appear in: Lesley Mandel Morrow, Robert Rueda, & Diane Lapp. *Handbook of research on literacy instruction: Issues of diversity, policy, and equity*. New York: Guilford.

Abstract

Online reading comprehension differs in important ways from offline reading comprehension. This chapter reviews the research showing that the Internet is this generation's defining technology for literacy and learning. It then uses a new literacies of online reading comprehension perspective to explore research on the differences that take place during online reading comprehension. Finally, it shows how public policies, such as No Child Left Behind, with assessments that only measure offline reading comprehension, actually increase reading achievement gaps, helping the rich to get richer while the poor get poorer. Instructional and research implications are discussed.

Purpose of This Chapter

The purpose of this chapter is to review research on the new literacies of online reading comprehension. Specifically, we address how the new literacies of online reading comprehension are related to issues of diversity, equity, and public policy. The review suggests that educators, researchers, and policy makers must begin to recognize the Internet as a reading comprehension issue, not simply as a technology issue. Failing to recognize the Internet as a reading comprehension issue leads to the installation of public policies that actually hold back diverse literacy learners in economically challenged school districts. These policies ensure that the rich get richer and the poor get poorer in developing the new forms of online reading comprehension required for learning in the 21st century. If we hope to prepare underserved populations for the reading and learning demands of the 21st century, we must begin to include the new literacies of online reading comprehension into our reading standards, assessments, curriculum, and instructional practices. This chapter identifies a robust agenda for both instruction and research to ensure that diverse students in our most economically challenged school districts are fully prepared for their literacy future. This review of research is organized around several key ideas:

- The Internet is the defining technology for literacy and learning of our time.
- The Internet requires additional skills and strategies for successful online reading comprehension.
- Our failure to understand the Internet as a reading comprehension issue has produced policies that actually work to perpetuate achievement gaps among poor and diverse students.
- Important implications can be drawn from this perspective that inform research and classroom practice .

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The Internet Is The Defining Technology For Literacy and Learning Of Our Time

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We begin this chapter with a central claim: The Internet has become the defining technology for literacy and learning in the twenty-first century (Friedman, 2005; International Reading Association, 2002; Partnership for 21st Century Skills, 2004). One way to understand this fundamental change may be seen in Table 1.

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Put simply, literacy is rapidly shifting from page to screen. Table 1 shows that one sixth of the world's population, 1.3 billion individuals, now use the Internet to read, write, communicate, learn, and solve important problems online (Internet World Stats: Usage and Population Statistics, 2008). Moreover, the number of Internet users has increased by nearly 300% over the last seven years. If this rate continues to increase, more than half of the world's population will be using the Internet in seven additional years and nearly the entire world will be using the Internet 10-15 years from now. Never in the history of civilization have we ever seen a new technology for literacy adopted by so many, in so many different places, in such a short period of time (Leu et al., 2007). This generation of educators, researchers, and policy makers has the important responsibility to help us successfully transit this period of profound change as literacy shifts from page to screen. Most importantly, we must do this is a manner that ensures equity for

all segments of our society.

It is impossible to anticipate all of the changes in the social and cultural practices that will result from such an important shift in the contexts for literacy. Nevertheless, we know they will be profound since we see the beginning of these changes in three areas that direct change throughout the world:

- the reading habits of adolescents;
- the technologies of literacy used in the workplace;
- public policy responses by nations outside the U. S.

The Changing Nature In The Reading Habits Of Adolescents

Adolescents regularly signal important generational shifts in language, style, music, and other important aspects of culture (Lenhart, Madden, & Hitlin, 2007; Rainie, 2002, 2007). Perhaps more than any other age group, adolescents direct cultural change within societies; they are the harbingers of our future. We see this taking place now in the changing social practices of literacy as the Internet enters their lives (Lankshear & Knobel, 2006; Leander, 2008).

Adolescents, for example, read online at a rate far greater than other segments of the population (Roberts, Foehr, & Rideout, 2005). This trend represents an important divide in the generational privileging of texts, from those that appear offline to those that appear online. What is especially striking is that this pattern appears to be a global phenomenon. In Accra, Ghana, for example, more than half of 15-18 year olds report having previously gone online (Borzekowski, Fobil, & Asante, 2006). In the United Kingdom, 74% of children and young people ages 9 to 19 have access to the Internet at home (Livingstone & Bober, 2005). In the United States, 87% of all students ages 12 to 17 report using the Internet, and nearly 11 million do so daily (Lenhart, Madden, & Hitlin, 2005).

In addition, adolescents in some nations use online information sources for school assignments more than offline sources, again signaling a shift in the generational privileging of texts. Seventy percent of students with home access to the Internet in the U. S., for example, reported using the Internet in 2001 as the primary source for information on their most recent school report or project, but only 24% of these students reported using the library for the same task (Lenhart, Simon, & Graziano, 2001).

Perhaps the most telling change in the reading habits of adolescents is that many now spend more time reading online than offline. In the U.S., for example, students aged 8-18 spend 48 minutes per day reading on the Internet and only 43 minutes per day reading offline. (Roberts et al., 2005). Historically, this statistic may represent a singularly important tipping point for literacy, since adolescents are likely to continue privileging online texts throughout their adult lives.

The Changing Nature of Literacy In The Workplace

We also see the shift from page to screen occurring in the workplace. In just one year (August 2000 to September 2001), use of the Internet at work to read, write, and communicate increased by nearly 60 percent among all employed adults twenty-five years of age and older in the U. S. (U.S. Department of Commerce, 2002).

Global economic competition is driving this transformation. As trade barriers have lowered, companies must increase their productivity to survive in a global and more competitive economy. Many of the productivity gains realized during the past decade in economies around the world are due to the rapid integration of the Internet into the workplace (van Ark, Inklaar, & McGuckin, 2003; Matteucci, O'Mahony, Robinson, & Zwick, 2005). It has been used widely to more effectively solve problems and communicate with others.

Of course, effective online information use in the workplace will require students to become proficient in the new literacy skills the Internet requires. As we become increasingly aware of this point, nations outside the U. S. are beginning to alter public policies to prepare workers for participation in an online information economy.

Recent Public Policy Initiative As Nations Respond to The Shift From Page To Screen

Ireland was one of the first nations to expand its investment in education generally, and in the integration of the Internet into classrooms specifically (Leu & Kinzer, 2000). As a result, Ireland's graduates are being prepared in the new literacy skills demanded by a global information economy. Businesses who seek to increase productivity now have an important incentive to relocate to Ireland because it possesses a workforce increasingly skilled in the new forms of online reading, writing, communication, and problem solving. By attracting these companies, Ireland has become one of the fastest growing economies in the world. Ireland, for example, currently manufactures more software than the U.S. (hAnluain, 2001; Harris, 2003; Organization for Economic Development and Cooperation, 2004).

The changes taking place in the Irish economy have not gone unnoticed. Finland, for example, has developed a national training model to provide all teachers with five weeks of paid, release time professional development at integrating the Internet into the classroom (Leu & Kinzer, 2000).

Japan, too, seeks to raise a new generation of citizens who are prepared for a global information economy. Japan has broadband in nearly every home that is 16 times faster than the broadband in US homes for $22 per month (Bleha, 2005). The government subsidizes these costs, knowing that students read far more outside of school than in school. It wants to make the information and learning potential of the Internet available to every student all the time.

Mexico is also responding to these changes. It has established a national policy, e-Mexico, to ensure that every citizen and every school has access to an Internet connection (Ludlow, 2006). The need to prepare students to compete in a global information economy drives Mexico's public policy initiatives in this area.

All of these events demonstrate that our literacy lives are changing in fundamental ways. The Internet makes our world flat, leveling the playing field for all nations (Friedman, 2005). This is especially true if we understand the Internet as a reading comprehension issue. The Internet, after all, is just the latest in a long line of technologies for information and communication that have included cuneiform tablets, papyrus and ink, velum scrolls, codexes, and books. The skills required to obtain and use information on the Internet are no more technology skills than the skills required to read another technology, the book. The Internet is a reading comprehension issue, not a technology issue, for our schools. New literacies of online reading comprehension are necessary to take full advantage of information on the Internet.

The Internet Requires Additional Skills And Strategies For Successful Online Reading Comprehension

To capture the changing nature of literacy online, many have begun to use the term *new literacies*. *New literacies* means many different things to many different people, however. It is sometimes used as a single construct, across disciplines. This has led to confusion since the term has somewhat different meanings, unique to each area of research in which it is employed. To some, new literacies are seen as new social practices (Street, 1995, 2003). Others see new literacies as important new strategies and dispositions essential for online reading comprehension, learning, and communication (Coiro, 2003; Leu, Coiro, Kinzer, & Cammack,

2004). Still others see new literacies as new Discourses (Gee, 2003) or new semiotic contexts (Kress, 2003; Lemke, 2002). Still others see literacy as differentiating into multiliteracies (The New London Group, 1996) or multimodal contexts (Hull & Schultz, 2002) and some see a construct that juxtaposes several of these orientations (Lankshear & Knobel, 2006). When you include these different definitions of *new literacies* with terms such as ICT Literacy (International ICT Literacy Panel, 2002) or informational literacy (Hirsch, 1999; Kuiper & Volman, 2008; Webber & Johnson, 2000), the construct of *new literacies* becomes even more challenging to understand.

To support better theory development and inform the broad sweep of new literacies research, a recent review (Coiro, Knobel, Lankshear & Leu, 2008) concludes that most new literacies perspectives share four assumptions:

1. new literacies include the new skills, strategies, dispositions, and social practices that are required by new technologies for information and communication;
2. new literacies are central to full participation in a global community;
3. new literacies regularly change as their defining technologies change; and
4. new literacies are multifaceted and our understanding of them benefits from multiple points of view.

While these are the common assumptions of a broad definition of new literacies, there is considerable work taking place in many different areas, each with its own, additional assumptions, unique to separate areas of inquiry. This suggests that, from a theoretical view, we need to be precise about the specific form of new literacies that we refer to.

We use a new literacies theory of online reading comprehension (Castek, Leu, Coiro, Gort, Henry, & Lima 2008; Coiro, 2003; Henry, 2006; Leu et al., 2004; Leu et al., 2007b) in this chapter to explore the changes to reading comprehension that take place as our reading world migrates from offline texts to the Internet. This perspective frames online reading comprehension as a process of problem-based inquiry involving the new skills, strategies, dispositions, and social practices that take place as we use the Internet to solve problems.

What differs from earlier models of traditional print comprehension is that the new literacies of online reading comprehension are defined around a problem as well as a process of self-directed text construction (Coiro & Dobler, 2007). This self-directed, text-construction process occurs when readers navigate through an infinite information space to construct their own texts online, as they read to solve problems. During this process both new and traditional reading comprehension skills are required. The overlap between online and offline reading enriches, but also complicates, our understanding of reading comprehension in the 21st century.

Within this perspective, Leu et al. (2004) define the new literacies of online reading comprehension around five processing practices that we engage in while reading on the Internet: (a) identifying important questions; (b) locating information; (c) critically evaluating information; (d) synthesizing information, and (e) communicating information. Within these five areas reside the skills, strategies, and dispositions that are distinctive to online reading comprehension as well as others that are important for offline reading comprehension.

Online readers construct meaning in two different, but intersecting ways. First, online readers construct mental models of meaning as they process the information they encounter. This is similar to what they do when reading offline (Bransford, Brown, & Cocking, 2000; RAND Reading Study Group, 2002). In addition, however, online readers also physically construct the

texts that they read by the choices they make as they follow different links online to solve an information problem. We refer to these as intertexts. Online readers dynamically construct the intertexts that they read as they move from site to site while offline readers typically read the texts that others have constructed for them. Thus, the construction of meaning during online reading comprehension becomes much more complex. This is due to the fact that the construction of a mental model taking place in our minds also directs the choices we make about the intertext that we construct. This multiple-layered and transactional process of meaning construction, always driven by a question or problem, appears to be an important source of the differences between online and offline reading. What, specifically, takes place during each of the processing elements of online reading comprehension?

Identifying Important Questions

Reading comprehension on the Internet always begins with a problem. It may be a relatively simple one such as: "What is the cheapest flight to California?" or "What would be a good recipe for dessert?" It may also be a complex one such as: "How can we end global conflict?" As a result, online reading comprehension may best be understood as a problem-based learning task situated within the social practices, texts, and contexts that define the reading act. Taboada and Guthrie (2006) show that reading initiated by a question or problem differs in important ways from reading that does not. This is an important, initial source of the differences between online and offline reading comprehension.

Locating information

Beginning with a problem, and then using a complex and infinite informational space to solve it, means that reading skills required to locate information become essential to online reading comprehension. New reading skills required to locate information are an important aspect of online reading comprehension and we include these in our model. Some of these strategies have been studied by scholars in information science or library and media studies (e.g. Bilal, 2000, Hsieh-Yee, 2001) and used by library media specialists.

Initial work (Henry, 2006; Leu et al., 2007a) suggests there are at least four general types of reading comprehension skills associated with locating information on the Internet: 1) knowing how to read and use a search engine; 2) reading search engine results; 3) reading a web page to locate information that might be present on that page; and 4) making an inference about where information is located by selecting a link at one site to find information at another site. Often these intersect.

Consider, for example, knowing how to read and use a search engine to locate information. We frequently find students in economically challenged school districts who never use a search engine. Instead, they use what we call a "dot com" strategy within the address bar of a browser, inserting "www + topic + .com" to locate information through the browser window (Leu et al., 2007a). This may be very effective when locating information on a favorite pop star (e.g., www.britneyspears.com) but it is usually ineffective for locating content area information (e.g., www.iraqwar.com). We have also found that many students do not actually read search engine results (Leu & Zawilinski, 2008). Instead, they use a simple "Click and Look" strategy, beginning at the top of the search result list, clicking on each entry to see what it looks like visually. They do this rather than reading the summary of the result that appears below the link. Both "dot com" and "click and look" strategies make it hard to efficiently locate useful information related to a specific question. They are typical of unskilled online readers.

It is becoming clear that the skills required to locate information may be "circuit breaker" skills; having good online reading skills related to locating information leads to successful online

reading comprehension, while lacking them often leads to failure. Put another way, if you cannot locate information related to your problem, you cannot determine the answer and, in essence, you cannot read online. There may be a useful analogy here to decoding skills during offline reading comprehension, where it is very difficult to successfully comprehend offline text without adequate decoding skills. Both decoding and locating skills can short circuit the reading comprehension process.

Critically Evaluating Information

Once you locate information, you need to know how much you can count on it. Is it accurate? Is it reliable? How was it shaped by the person who created it? Does it meet your needs? The range of potential sources online is so vast and the range of perspectives is so diverse that the ability to read and critically evaluate information becomes especially important. While critical evaluation is a skill we want all readers to develop for both offline and online texts, it becomes especially important online where increasingly sophisticated critical thinking is required.

Synthesizing Information

Synthesis is a central component of online reading comprehension; it is also one of the most challenging to study. Much of synthesis takes place in the mind of the reader. The process happens so quickly and is extremely hard to observe in ways that provide visible patterns.

No two readers construct the same online intertext, even though they may have the same question or problem to solve. How they make these decisions about which texts to connect and read and which links to follow as they seek an answer is one aspect of synthesis that we need to understand better. While choosing texts to read occurs offline, of course, this does not happen to nearly the same extent, with nearly the same speed, nor with units of text that are nearly so short. Intertextuality (Hartman, 1995; 2000) defines online reading; far too often it is merely an offline possibility in school classrooms. We need much more work on the intertextual synthesis of meaning that occurs online during both the construction of mental models of meaning as well as the construction of the intertext from the choices readers make online.

Communicating Information

Finally, our model of online reading comprehension integrates reading with writing and, in an online context that is typically socially constructed, we frame writing as communication. Readers communicate with others as they read to answer a question, solve a problem or share a solution. Many new communication tools are becoming available on the Internet. These tools are useful when seeking to solve a problem, answer a question, or exchange ideas with other near or far. Each new tool requires its own set of strategies. Information networking sites, email, text messaging, chats, blogs, wikis, discussion boards, phone and video conferencing are just a few of the tools individuals use to read, communicate, and construct meaning on the Internet today. Each requires new skills and strategies to use them effectively.

Recent Research Evidence On The Differences Between Online and Offline Reading Comprehension

An emerging line of research has begun to illuminate our understanding of the differences between online and offline reading comprehension, first suggested by the Rand Reading Study Group (2002). This work indicates: (a) online reading comprehension is different from offline reading comprehension (b) the online reading skills of locating and critically evaluating information appear to be especially important components (c) there appear to be significant differences in the online reading comprehension skills of middle school students based on the socio-economic level of their school district and (d) integrating new literacies into content area

literacy classes may dissipate some of the traditional resistance among new teachers toward integrating reading strategies while teaching subject matter knowledge.

Online reading comprehension is different from offline reading comprehension. That online reading comprehension and offline reading comprehension are different is not a trivial matter. Learning is increasingly dependent on the ability to read and comprehend complex information at high levels (Alexander & Jetton, 2002; Bransford, et al., 2000) and the Internet is now a central source of that information (Lyman & Varian, 2003).

What empirical evidence exists to support the conclusion that online and offline reading comprehension are different? One study (Leu et al., 2005), found no significant correlation, among seventh grade students, between performance on a state reading comprehension assessment and a measure of online reading comprehension (ORCA-Blog) with good psychometric properties. These results suggest that new skills and strategies may be required during online reading.

Another result from this study was that, in classrooms with laptops, science content knowledge learning actually decreased for 12 weeks until students had acquired sufficient online reading comprehension skills to benefit from online information. This, too, suggests that additional reading comprehension skills may be required on the Internet.

A final result from this study were videos demonstrating how some of the lowest performing students on the state reading comprehension measure were actually some of the highest performing students on the measure of online reading comprehension. This surprising finding also supports the conclusion that online and offline reading comprehension are somewhat different. (Video examples of online reading comprehension by these students may be viewed at: http://www.newliteracies.uconn.edu/reading.html.)

A second study, conducted by Coiro & Dobler (2007) found that online reading comprehension shared a number of similarities with offline reading comprehension but that online reading comprehension also included a number of important differences, making it more complex.

A third study (Coiro, 2007) used a regression model and found that offline reading comprehension was correlated with online reading comprehension, contributing a significant amount of variance to the prediction of online reading comprehension. It also, however, found an additional, unique, and significant amount of variance was contributed by knowing students' online reading comprehension ability. The results of this study are also consistent with the conclusion that new skills and strategies are required during online reading comprehension.

The online reading skills of locating and critically evaluating information appear to be especially important components. A preliminary study of think aloud verbal protocols during online reading comprehension (Zawilinski & Leu, 2008) is beginning to outline the types of online reading comprehension skills that are distinctive and essential to successful online reading comprehension. This study is showing that two areas in particular, locating information and critically evaluating information, appear to be skill areas that impede successful online reading comprehension in important ways. If you cannot locate information related to your problem, you cannot read online. In addition, if you do not think critically about the information that you read online, it is easy to be led astray from effective solutions.

There appear to be significant differences in the online reading comprehension skills of middle school students based on the socio-economic level of their school district. Henry (2007) found significant differences in online reading comprehension ability between middle school students according to the economic status of their school district. The same pattern appeared

among the teachers of these students. Those in affluent school districts were more skilled at locating information and critically evaluating information. Interviews with principals indicated that computers in schools not meeting adequate yearly progress indicators were primarily used for rote drill and skill (i.e. Accelerated Reader) activities in an attempt to increase offline reading achievement scores.

Integrating new literacies into content area literacy classes may dissipate some of the traditional resistance among new teachers to integrate reading strategies while teaching subject matter knowledge. A research project funded by the Carnegie Corporation of NY studied the integration of online reading comprehension into pre-service teacher preparation in secondary mathematics, science, English, and reading (Hartman, Leu, Olson, & Truxaw, 2005). Two findings stand out. One was that a case study assignment, comparing think-aloud data of their pupils' reading of content area material in both online and offline contexts, dissipated much of the traditional resistance among new teachers to integrating reading strategies while teaching subject matter knowledge. New teachers became very interested in understanding more about reading from this experience. In addition, the intervention altered how these new secondary teachers envisioned the role of reading comprehension in their future teaching.

Some classroom contexts appear to be especially important in supporting the acquisition of online reading comprehension. Castek (2008) examined the contexts and conditions that facilitated acquisition of online reading comprehension in a 4th and 5th grade combination classroom over the course of three instructional units lasting 15 weeks. Three elements were determined to be most supportive of students' new literacies acquisition: extensive opportunities to apply new learning independently following teacher-guided instruction, multiple opportunities to collaborate with other students with varying levels of skills and experience, and integrating activities that consistently challenge learners to extend the boundaries of what they currently know and can do online. Teacher and peer-to-peer scaffolding were both needed for students to acquire online reading comprehension strategies. While teacher scaffolding was most effective in the early stages of acquisition, peer-scaffolding played a more substantial role in supporting online student learning, once basic computer efficiency skills were acquired.

This study also investigated the extent to which 15 weeks of Internet integration increased students' content learning during an inquiry unit. While a statistically significant difference was evident on a performance based classroom project over and above the performance of a control population, robust and lasting performance gains on a conceptual knowledge measure were not detected between groups. This finding suggests that instruction in online reading comprehension requires extended scaffolding if it is to support content learning most effectively.

Summary. One pattern in all of these studies is that online reading comprehension is not isomorphic with offline reading comprehension; new reading comprehension skills are required online. Another is that the complexity of the online reading task appears to determine the extent to which online reading is either similar or different from offline reading. Performance with simpler, online reading tasks may correlate more with offline reading (e.g., Coiro, 2007); more complex online reading tasks will not (e.g., Leu et al., 2005). A third is that online reading comprehension may have unexpected consequences as well as opportunities. This appears to be the source of a tertiary gap between rich and poor school districts in online reading ability (Henry, 2007). It also appears to provide some special opportunities for the preparation of content area teachers. Finally, we are also beginning to discover the different contexts that appear to support students in acquiring the new literacies of online reading comprehension.

The Failure of State Standards and State Reading Assessments To Include The New Literacies of Online Reading Comprehension

It is increasingly clear that the Internet is a powerful new context for reading and learning. It is also clear that online reading comprehension is not the same as offline reading comprehension. Nevertheless, state reading standards and state reading assessments have yet to include any of the new skills important to online reading comprehension. These continue to be based on the reading of paragraphs from traditional text sources with traditional types of assessment tasks. Consider, for example, these observations that have not changed since they were first observed several years ago:

1. Not a single state in the U.S. measures students' ability to read search engine results during state reading assessments (Leu, Ataya, & Coiro, 2002).
2. Not a single state in the U.S. measures students' ability to critically evaluate information that is found online to determine its reliability (Leu, et al., 2002).
3. Not a single state in the U.S. measures students' ability to compose clear and effective email messages in their state writing assessment (Leu, et al., 2002).
4. Few, if any, states in the U.S. permit all students to use a word processor on the state writing assessment (Leu, et al., 2002).

The failure, in the U.S., to include skills important to online reading comprehension in state reading standards and assessments is surprising given the rapid penetration of the Internet into our lives.

Our Failure To Understand The Internet As An Online Reading Comprehension Issue Has Produced Policies That Actually Work To Increase Achievement Gaps Among Poor and Diverse Learners

Policies such as No Child Left Behind seek to close achievement gaps, especially in reading. Ironically, however, when these policies are combined with state standards and assessments that fail to include online reading comprehension skills they actually increase achievement gaps between students. It is the cruelest irony of No Child Left Behind that students who need to be prepared the most at school for an online age of information, are precisely those who are being prepared the least.

How does this happen? First, consider children in our poorest school districts. These children have the least amount of Internet access at home. Cooper (2004), for example found that half of all households with incomes below $30,000 had no Internet at all at home while half of all households with incomes above $75,000 had broadband. This is one aspect of a very real digital divide.

A second aspect results from the failure of schools in poorer districts to integrate the Internet into the curriculum. Unfortunately, our poorest schools are under the greatest pressure to raise scores on tests that have nothing to do with online reading comprehension. As a result, these schools focus instruction completely on offline reading skills. Why should they do anything else? Online reading comprehension is not tested; it contributes nothing to Adequate Yearly Progress indicators in these poorer schools. Because instruction is increasingly driven by these state assessments, too few students in our poorest schools are being supported in developing the new literacies of online reading comprehension (Henry, 2007). In short, students in our poorest schools are doubly disadvantaged: they have less access to the Internet at home, and we do not prepare them for the new literacies of online reading comprehension at school.

Consider, on the other hand, students in our most privileged schools. Cooper (2004) indicates that most children from advantaged communities also have broadband Internet connections at home. As a result, teachers feel greater freedom to integrate the Internet into their curriculum and support their students with its use (Henry, 2007); it is easy to assign homework requiring Internet use when you know that your students have Internet access at home. Lazarus, for example, found that 63 percent of children from households earning more than $75,000 annually report that they use the Internet at school compared to only 36 percent of children from households earning less than $15,000 annually. Moreover, advantaged districts feel much less pressure in relation to test scores. Their students already perform at high levels on reading assessments. Thus, students in richer districts are doubly privileged: they have greater access to the Internet at home, and they use it more often at school.

This public policy failure has important consequences for education in the twenty-first century when the Internet is now a central source of information (Lyman & Varian, 2003) and learning is increasingly dependent on the ability to read and comprehend complex information at high levels (Alexander & Jetton, 2002; Bransford, et al., 2000). As a result of our collective pubic policy failures, students who require our support the most with the online reading comprehension skills required for the 21st century, end up receiving it the least.

This failure is not inconsiderable and compounds the current reality. Eight million U.S. adolescents are considered illiterate (Biancarosa & Snow, 2004). Almost a third of adolescents cannot read at basic levels (National Center for Educational Statistics, [NCES], 2003). Moreover, nearly twice the number of white, economically advantaged students perform above the basic level as their economically disadvantaged peers, those with the least Internet access at home (NCES, 2003).

With the new reading comprehension skills that the Internet requires the compounded reading achievement gap between students in economically privileged and economically challenged districts will only get larger as online reading comprehension becomes more central to our lives. Each day these policies remain unchanged, we deny our most vulnerable members of our societies important opportunities to learn skills and strategies that are central to success in an online age of information. Their full participation in our collective future is essential to build a world that is more thoughtful, more compassionate, and more connected since the best solutions to problems appear to result from collaborative groups that bring diverse, multiple perspectives to the solution (Page, 2007). These outcomes will be essential to solve the important global problems of health, poverty, sectarian and religious strife, and ultimately war and peace.

Implications For Classroom Practice

The conclusion that online reading comprehension requires additional skills beyond those required for offline reading suggests that there are important changes ahead for classroom instruction. We are only beginning to fully understand these classroom implications. What is clear is that educators need to recognize the Internet as an important text and context in our lives. They must begin to use the Internet as an important source of content for their curriculum. Only then can educators begin to focus on what to teach and how to teach and take full advantage of the information afforded by the Internet.

What To Teach

The emerging research on online reading comprehension indicates that a number of new skills are important to develop if our students are to be prepared for the 21st century (Coiro & Dobler, 2007; Coiro, 2007; Henry, 2007; Castek, 2008; Leu, et al., 2007a). This is especially

true for the diverse population of students in our most economically challenged schools. It is not that the skills required for offline reading comprehension no longer are necessary. Indeed, these will continue to be important during both offline and online reading comprehension. Recent research indicates, however, that additional reading comprehension skills are required online.

Take just one area of online reading comprehension: critical evaluation. Critical evaluation is important during offline reading but it is even more essential during online reading and new skills are required. In the online world, of course, anyone may publish anything. Thus, online reading comprehension requires our students to be especially skeptical about information they read, continuously thinking about author, information, and motive. They also need to know how to locate the source of any information and how to find out about that person, with the Internet, to see how the information is being shaped. This seldom happens, unfortunately. Approximately 75% of people in the U.S. do not regularly check the source of the health information they read online (Fox, 2006). New online reading comprehension skills and strategies are also required as readers use the Internet to define problems and then locate, synthesize, and communicate information.

While new skills are required during reading comprehension, new opportunities are also available. The Internet can be an especially powerful tool for English Language Learners (Castek et al., 2008) since students can find and read texts in both languages, take advantage of online translators, and try out English conventions when communicating online.

Issues of How To Teach

Emerging research on how to teach online reading comprehension (Leu & Reinking, 2005-2008) suggests that online reading comprehension might best be developed through problem-based activities in small groups within classrooms, often with 1-1 laptops, where students share and exchange successful strategies. One instructional model, Internet Reciprocal Teaching (Leu, Coiro, Castek, Hartman, Henry, & Reinking, in press) is being developed around many of the principles on which Reciprocal Teaching is based, an instructional approach that appears to have the greatest effect size on comprehension outcomes (Rosenshine & Meister, 1994). Internet Reciprocal Teaching uses a three-phase instructional model:

- Phase One: Direct instruction of essential and basic online reading comprehension skills and online tool use.
- Phase Two: Problem-based learning designed to extend online reading comprehension skill development. This includes daily, small group activities where students are given an information problem and are asked to discover and exchange online reading comprehension strategies used to solve each problem.
- Phase Three: Inquiry projects designed to further extend the development of new reading comprehension skills and strategies and their exchange in small groups.

While a description of this instructional model is available (Leu, et al., in press) much remains to be learned about how best to teach online reading comprehension skills.

The Opportunities That Diversity Provides: Beyond Online Reading Comprehension

Successful use of the Internet is much more than simply acquiring the comprehension skills important to reading on the Internet. These are necessary but not sufficient to be fully prepared for a lifetime of online literacy and learning. While many other elements will be required, it is likely that an important one is understanding how best to take advantage of the opportunities that diversity provides to develop richer and better solutions to the complex problems that we face in

our world. Recent work (Page, 2007) indicates that better solutions emerge when different points of view, frequently from different cultural traditions, are brought to the same table to solve a problem. In a globalized world, it will be increasingly important that our students understand this lesson and have experiences in working online with other students, from multiple cultural and linguistic traditions, around the world. It is likely that collaborative instructional models such as Internet Project (Leu, Leu, & Coiro, 2004) may be especially useful. Online projects are increasingly available on the Internet at locations such as ePals (epals.com), GlobalSchool.Net, KidsProj (www.kidlink.org/KIDPROJ/), and other locations. These may be used to help us prepare our students for a diverse, online world that will require a deeper appreciation of issues that transcend the different cultural, linguistic, and economic differences they currently experience within a single nation's borders.

Implications For Research

Perhaps the most obvious implication for research on the new literacies of online reading comprehension is that we need much more, highly rigorous, research, very quickly if we expect to chart our path forward with sufficient speed to keep up with the changes taking place in online technologies. Advances in Internet technologies and online information delivery systems wait for no one. While broad theoretical outlines about the nature of online reading comprehension are resolving, the details of this process await additional work. These details will be essential to assessment, instruction, and research.

Most important is that we need to more fully understand the apparent gap in the opportunities that students from rich and poor districts receive to develop online reading comprehension skills. Equity and diversity issues are paramount for societies that profess egalitarian ideals. In an age in which one's ability to use online information profoundly determines success in learning and life, it is a cruel irony, indeed, that policies organized around offline reading actually deny opportunities for students who need our assistance the most with online reading.

A central line of research that needs to be rapidly carried forward is to develop assessments of online reading comprehension that are reliable, valid, and easy to score. Current Online Reading Comprehension Assessments, or ORCA's, (Castek, 2008; Coiro, 2007; Leu, et al., 2005; Leu & Reinking, 2005), present online reading comprehension tasks within the open Internet and are typically based on rubric scoring procedures. This has proven useful for initial studies (Castek, 2008; Coiro, 2007) that looked intensively at smaller numbers of students and where the costs of labor-intensive scoring procedures were not prohibitive. As we scale up, we will require assessments of online reading comprehension administered across districts, states, and nations (Henry, 2007). This will require assessments that are much less labor intensive than ORCA assessments. and also take place in a closed, simulation of the Internet. These would be less subject to a small change on the Internet that could disrupt the design of an open Internet assessment.

Currently, several assessments have been developed like this. ETS has developed the iSkills Assessment (www.ets.org/ictliteracy/) and an assessment of online reading comprehension in closed environments is being developed for the PISA 2009 International Reading Assessment. The U.K. appears to have developed something similar in their Key Stage 3 ICT assessment (See http://www.naa.org.uk/naaks3/default.asp) and the Progress in International Reading Study (PIRLS) may be considering the development of a similar assessment instrument (Kennedy, personal correspondence), again in a closed environment.

Two issues remain to be evaluated, however. First, do these assessments represent the essential elements of online reading comprehension? Because they have been developed in closed environments and not the full complexity of the Internet, they have a tendency to limit tasks that fit best within bounded contexts, such as the reading of spreadsheet data sets or the evaluation of given Internet sites rather than the location and evaluation of information within the fully realized richness and complexity of the Internet. Second, to what extent does performance on more limited tasks such as these correlate with actual online reading comprehension performance?

Finally, important research must also be conducted to more completely understand instructional practices that support the development of online reading comprehension skills in classrooms. This line of research is likely to be extensive and demand extraordinary effort, given the complexity of classroom contexts and the diverse needs of learners. Emerging work Castek, 2008; Coiro, 2007; Dalton & Proctor 2008; Henry, 2007) may provide useful initial direction. However, we need to rapidly expand these early efforts to more fully understand the potential of student online collaboration across national boundaries, especially if we hope to fully realize the potential of diversity for increasing literacy and learning opportunities for all students.

Summary and Conclusion

The Internet is rapidly becoming a central context for literacy and learning. It also appears to require new literacies for proficient online reading comprehension and learning. Public policies in some nations appear to increase online reading achievement gaps between rich and poor, ironically while they purport to close them. The literacy community must rethink what it means to be a reader in the 21st century if we hope to prepare all students for the new literacies of online reading comprehension.

A second issue also arises: Unless the literacy community begins to rethink the nature of reading, literacy researchers and practitioners will become increasingly marginalized during the important public policy debates that lie ahead, losing the opportunity to influence events in school classrooms. Others, outside the literacy research community, will fill the vacuum and define online reading, writing, and communication for us and without us. Research communities in assessment (International ICT Panel, 2002), library and media studies (American Association of School Librarians & Association for Educational Communications and Technology, 1998), educational technology (International Society for Technology in Education, n.d.), and learning research communities (Partnership for 21st Century Skills, 2003) are already beginning to do so. If this trend continues, we will be left alone to study reading issues defined by our past, not our future and, once again, the reading research community will be left out of important public policy decisions that profoundly affect issues of literacy and diversity for classrooms, teachers, and students. Clearly, we have much to do together.

References

American Association of School Librarians and Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning*. Chicago: American Library Association.

Alexander, P.A., & Jetton, T.L. (2002). Learning from text: A multidimensional and developmental perspective. In M.L. Kamil, P. Mosenthal, P.D. Pearson, and R.Barr (Eds.) *Handbook of reading research, Volume III* (pp. 285-310). Mahwah, NJ: Erlbaum.

Bilal, D. (2000). Children's use of the Yahooligans! Web search engine: Cognitive, physical, and

affective behaviors on fact-based search tasks. *Journal of the American Society for Information Science*, 51, 646-665.

Bleha, T. (2005, May/June). Down to the wire. *Foreign Affairs*. Retrieved December 15, 2005, from http://www.foreignaffairs.org/20050501faessay84311/thomas-bleha/down-to-the-wire.html

Bransford, J.D., Brown, A.L., & Cocking, R.R. (2000). *How people learn: Brain, mind, experience, and school (expanded edition)*. Washington, DC: National Academy Press.

Biancarosa, G., & Snow, C. (2004). *Reading next: A vision for action and research in middle and high school literacy, A report to the Carnegie Corporation of New York*. Retrieved April 15, 2008 from http://www.all4ed.org/publications/ReadingNext/

Borzekowski, D., Fobil, J., & Asante, K. (2006). Online access by adolescents in Accra: Ghanaian teens' use of the Internet for health information. *Developmental Psychology, 42,* 450 – 458. Retrieved December 1, 2006, from http://www.apa.org/journals/releases/dev423450.pdf

Castek, J. (2008). *How are the new literacies of online reading comprehension acquired by 4th and 5th grade students? Exploring the contexts that facilitate learning.* Unpublished doctoral dissertation, University of Connecticut, Storrs, Connecticut.

Castek, J., Leu, D. J., Jr., Coiro, J., Gort, M., Henry, L. A., & Lima, C. (2008). Developing new literacies among multilingual learners in the elementary grades. In L. Parker (Ed.) *Technology-mediated learning environments for young English learners: Connections In and out of school*. (111-153). Mahwah, NJ. Lawrence Erlbaum Associates.

Coiro, J. (2003). Reading Comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher, 56,* 458-464. Retrieved November 1, 2006 from http://www.readingonline.org/electronic/elec_index.asp?HREF=/electronic/rt/2-03_Column/index.html

Coiro, J. (2006). *Measuring Internet comprehension: Accessing, evaluating, and communicating information*. Poster presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Coiro, J. L. (2007). *Exploring changes to reading comprehension on the Internet: Paradoxes and possibilities for diverse adolescent readers.* Unpublished doctoral dissertation. University of Connecticut, Storrs, Connecticut.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly. 42,* 214-257.

Coiro, J., Knobel, M., Lankshear, C. & Leu, D. (2008). Central issues in new literacies and new literacies research. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies (*pp. 25-32*)*. Mahwah, NJ: Erlbaum.

Cooper, M. (2004). *Expanding the digital divide & falling behind on broadband: Why telecommunications policy of neglect is not benign.* Washington, DC: Consumer Federation of America. Retrieved April 17, 2007, from http://www.consumerfed.org/pdfs/digitaldivide.pdf

Dalton, B. & Proctor, P. (2008). The changing landscape of text and comprehension in the age of new literacies. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies (*pp. 297-324*)*. Mahwah, NJ: Erlbaum.

Estabrook, L., Witt, E., Rainie, L. (2007). *Information Searches That Solve Problems.* Pew Internet & American Life Project: Washington, DC. Retrieved December 20, 2007, from: http://www.pewinternet.org/pdfs/Pew_UI_LibrariesReport.pdf

Fox, S. (2006). *Health search 2006.* Pew Internet & American Life Project: Washington, DC. Retrieved April 15, 2008 from http://www.pewinternet.org/pdfs/pip_online_health_2006.pdf

Friedman, T. L. (2005). *The world is flat: A brief history of the twenty-first century.* New York: Farrar, Straus & Giroux.

Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York: Palgrave Macmillian.

hAnluain, D. O. (December 5, 2001). Irish betting on biotech. *Wired*. Retrieved October 15, 2005 from http://www.wired.com/news/medtech/0,1286,48632,00.html.

Harris, W.C. (2003). Foresight predicates commitment. *fst Journal: The Journal of the Foundation for Science and Technology. 18*(2). Retrieved October 15, 2005 from http://www.foundation.org.uk/pdf18/fst18_2.pdf.

Hartman, D. K. (1995). Eight readers reading: The intertextual links of proficient readers reading multiple passages. *Reading Research Quarterly, 30*, 520–61.

Hartman, D. K. (2000). What will be the influences of media on literacy in the next millennium? *Reading Research Quarterly, 35*, 280–2.

Hartman, D., Leu, D.J., Olson, M.R., Truxaw, M.P. (2005). Reading and writing to learn with the "new literacies": Preparing a new generation of teachers and researchers to develop literate American adolescents. A research grant funded by Carnegie Corporation of New York.

Henry, L.A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher, 59*, 614-627.

Henry, L.A. (2007). *Exploring new literacies pedagogy and online reading comprehension among middle school students and teachers: Issues of social equity or social exclusion?* Unpublished doctoral dissertation, University of Connecticut, Storrs, Connecticut.

Hirsh, S. G. (1999). Children's relevance criteria and information seeking on electronic resources. *Journal of the American Society for Information Science, 50*, 1265–83.

Hsieh-Yee, I. (2001). Research on Web search behavior. *Library & Information Science Research, 23*, 167-185.

Hull, G., & Schultz, K. (Eds.). (2002). *School's out! Bridging out-of-school literacies with classroom practice*. New York: Teachers College Press.

International ICT Literacy Panel. (2002, May). *Digital transformation: A framework for ICT literacy*.RetrievedMay1,2007,from: http://www.ets.org/Media/Tests/Information_and_Communication_Technology_Literacy/ictreport.pdf

International Reading Association. (2002). *Integrating literacy and technology in the curriculum: A position statement.* Newark, DE: International Reading Association.

International Society for Technology in Education. (n.d.). *National foundation standards for all students.* Retrieved December 5, 2005 from http://cnets.iste.org/currstands/cstands-netss.html

Internet world stats: Usage and population statistics. (n.d.) Retrieved March 15, 2008 from http://www.internetworldstats.com/stats.htm.

Jones, S., Madden, M. (2002). *The Internet Goes to College: How Students are Living in the Future with Today's Technology.* Pew Internet & American Life Project: Washington, DC. Retrieved February 10, 2008, from: http://www.pewinternet.org/pdfs/PIP_College_Report.pdf

Kress, G. (2003). *Literacy in the new media age*. London: Routledge.

Kuiper, E., & Volman, M. (2008). The web as a source of information for students in K–12 education. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies (*pp. 241-266*)*. Mahwah, NJ: Erlbaum.

Lankshear, C. & Knobel, M. (2006). *New literacies, Second Edition.* Maidenhead: Open University Press.

Leander, K. M. (2008). Toward a connective ethnography of online/offline literacy networks. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies (*pp. 33-66*)*. Mahwah, NJ: Erlbaum.

Lemke, J. L. (2002). Travels in hypermodality. *Visual Communication, 1*, 299–325.

Lenhart, A., Madden, M., & Hitlin, P. (2005). Teens and technology. Washington, DC: Pew Internet and American Life Project. Retrieved April 15, 2008, from http://www.pewinternet.org/pdfs/PIP_Teens_Tech_July2005web.pdf

Lenhart, A., Madden, M., Rankin Macgill, A., & Smith, A. (2007). *Teens and social media.* Pew Internet & American Life Project: Washington, DC. Retrieved December 20, 2007, from: http://www.pewinternet.org/pdfs/PIP_Teens_Social_Media_Final.pdf

Lenhart, A., Simon, M., & Graziano, M. (2001). *The Internet and Education: Findings of the Pew Internet & American Life Project.* Washington, DC: Pew Internet & American Life Project. Retrieved April 15, 2008 from http://www.pewinternet.org/report_display.asp?r=39

Leu, D. J., Jr. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M. L. Kamil, P. Mosenthal, P. D. Pearson, and R. Barr (Eds.) *Handbook of Reading Research, Volume III* (pp. 743-770). Mahwah, NJ: Erlbaum.

Leu, D. J., Ataya, R., & Coiro, J. (December, 2002). *Assessing assessment strategies among the 50 states: Evaluating the literacies of our past or our future?* Paper presented at the 18th National Reading Conference. Miami, FL.

Leu, D. Castek, J., Hartman, D., Coiro, J., Henry, L., Kulikowich, et al., (2005). Evaluating the development of scientific knowledge and new forms of reading comprehension during online learning. Final report presented to the North Central Regional Educational Laboratory/Learning Point Associates. Retrieved May 15, 2006 from http://www.newliteracies.uconn.edu/ncrel.html.

Leu, D. J., Coiro, J., Castek, J., Hartman, D., Henry, L.A., & Reinking, D. (in press). Research on instruction and assessment in the new literacies of online reading comprehension. In Cathy Collins Block, Sherri Parris, & Peter Afflerbach (Eds.). *Comprehension instruction: Research-based best practices.* New York: Guilford Press.

Leu, D. J., Jr. & Kinzer, C. K. (2000). The convergence of literacy instruction and networked technologies for information and communication. *Reading Research Quarterly, 35,* 108-127.

Leu, D.J., Jr., Kinzer, C.K., Coiro, J., Cammack, D. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R.B. Ruddell & N. Unrau (Eds.), *Theoretical Models and Processes of Reading, Fifth Edition* (1568-1611). Newark, DE: International Reading Association.

Leu, D. J., Jr., Leu, D. D. & Coiro, J. (2004). *Teaching with the Internet: New literacies for new times* (4th ed.). Norwood, MA: Christopher-Gordon.

Leu, D. J. & Reinking, D. (2005-2008). *Developing Internet Comprehension Strategies Among Adolescent Students At Risk to Become Dropouts.* A research grant funded by the U. S. Department of Education, Institute of Education Sciences.

Leu, D.J., Reinking, D., Carter, A., Castek, J., Coiro, J., Henry, L., et al. (April 11, 2007a). *Defining Online Reading comprehension: Using think aloud verbal protocols to refine a preliminary model of internet reading comprehension processes*. Paper presented at The American Educational Research Association. Chicago, IL.

Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B., Liu, Y., et al. (2007b). What is new about the new literacies of online reading comprehension? In L. Rush, J. Eakle, & A. Berger, (Eds.). *Secondary school literacy: What research reveals for classroom practices*. (37-68). Urbana, IL: National Council of Teachers of English.

Livingstone, S., & Bober, M. (2005). *UK children go online*: *Final report of key project findings.* Project Report. London: London School of Economics and Political Science.

Ludlow, A. (March 2, 2006). *Rolling out the national e-Mexico system*. Paper presented at the Digital Cities Convention. Houston, TX. Retrieved March 15, 2006 from http://www.w2idigitalcitiesconvention.com/02282006/e_s/emexico.html

Lyman, P. & Varian, H. R. (2003). *How Much Information 2003?* Berkeley, CA: University of California, Berkeley. Retrieved April 1, 2008 from http://www.sims.berkeley.edu/research/projects/how-much-info-2003/

Matteucci, N., O'Mahony, M., Robinson, C., & Zwick, T. (2005). Productivity, workplace performance and ICT: Industry and firm-level evidence for Europe and the US. *Scottish Journal of Political Economy 52,* 359–86.

National Center for Education Statistics [NCES] (2003). *The nation's report card: Reading highlights 2003*. Washington, DC: U.S. Department of Education. Retrieved October 15, 2004 from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004452

The New London Group. (2000). A pedagogy of multiliteracies designing social futures. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 9–37). London: Routledge.

Olson, M. R. & Truxaw, M. P. (in press). Invisibility of text and preservice science and mathematics teachers: The development of discursive meta-knowledge. *Journal of Adolescent and Adult Literacy.*

Organization for Economic Development and Cooperation (2004). *OECD Information Technology Outlook.* OECD Turpin, England. Retrieved October 15, 2005 from http://www.oecd.org/dataoecd/20/47/33951035.pdf

Page, S. E. (2007). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools and Societies.* Princeton University Press. Princeton: NJ.

Partnership for 21st Century Skills. (2004). *Learning for the 21st century.* Retrieved August 15, 2006 from http://www.21stcenturyskills.org/reports/learning.asp

Rainie, L. (2006). Digital Natives Invade the Workplace. Pew Internet & American Life Project: Washington, DC. Retrieved January 15, 2008, from: http://www.pewinternet.org/ppt/New%20Workers%20--%20pewresearch.org%20version%20_final_.pdf

RAND Reading Study Group. (2002). *Reading for understanding: Toward an R&D program in reading comprehension.* Santa Monica, CA: author.

Roberts, D.F., Foehr, U.G., & Rideout, V. (2005). *Generation M: Media in the lives of 8-18 year olds.* Kaiser Family Foundation. Retrieved Jan 28, 2008 from http://www.kff.org/entmedia/7251.cfm

Rosenshine, B., & Meister, C. (1994). Reciprocal teaching: A review of the research. *Review of Educational Research, 64,* 479–530.

Taboada, A. & Guthrie, J. (2006). Contributions of Student Questioning and Prior Knowledge to Construction of Knowledge From Reading Information Text. *Journal of Literacy Research, 38,* 1-35.

Street, B. (2003). What's "new" in new literacy studies? Critical approaches to literacy in theory and practice. *Current Issues in Comparative Education*. *5*, 77–91.

Street, B. V. (1995). *Social literacies: Critical approaches to literacy in development, ethnography and education*. London: Longman.

U. S. Department of Commerce: National Telecommunications and Information Administration (2002). *A nation online: How Americans are expanding their use of the Internet.* Washington, DC: author.

van Ark, B., Inklaar, R., & McGuckin, R. H. (2003). ICT and productivity in Europe and the United States: Where do the differences come from? *CESifo Economic Studies. 49*, 295–318.

Webber, S., & Johnson, B. (2000). Conceptions of information literacy: New perspectives and implications. *Journal of Informational Science, 26,* 381–97.

Zawilinski, L. & Leu, D. J. (March 27, 2008). *A taxonomy of skills and strategies from verbal protocol of accomplished adolescent Internet users*. Paper presented at The American Educational Research Association Conference. New York, NY.

Table 1. Internet Usage Statistics As Of January 1, 2008. (Internet World Stats: Usage and Population Statistics, 2008)

World Regions	Population (2007 Est.)	Population % of World	Internet Usage, Latest Data	% Population (Penetration)	Usage % of World	Usage Growth 2000-2007
Africa	941,249,130	14.2 %	44,361,940	4.7 %	3.4 %	882.7 %
Asia	3,733,783,474	56.5 %	510,478,743	13.7 %	38.7 %	346.6 %
Europe	801,821,187	12.1 %	348,125,847	43.4 %	26.4 %	231.2 %
Middle East	192,755,045	2.9 %	33,510,500	17.4 %	2.5 %	920.2 %
North America	334,659,631	5.1 %	238,015,529	71.1 %	18.0 %	120.2 %
Latin America/Caribbean	569,133,474	8.6 %	126,203,714	22.2 %	9.6 %	598.5 %
Oceania / Australia	33,569,718	0.5 %	19,175,836	57.1 %	1.5 %	151.6 %
WORLD TOTAL	6,606,971,659	100.0 %	1,319,872,109	20.0 %	100.0 %	265.6 %