Strategic and efficient reading comprehension is the uncontested aim of all reading, whether it occurs silently or orally, and whether the material being read is offline or online. Although we know of the myriad processes that must occur in the mind of a reader to make sense of text while reading silently, we are just now coming to understand the nature of these processes while reading silently online. Because of the influx of new technologies, today’s readers navigate a complex set of decision-making and problem-solving skills (Leu, O’Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009) and that readers essentially create their own texts as they locate resources, evaluate them critically, synthesize ideas across sites, and communicate about them (Leu et al., 2008). These decisions are made as readers react either strategically or with a trial-and-error response to text as they read silently online. Educators are coming to find that online comprehension strategies, developed through instruction and experience, can lead to effective and efficient comprehension of information accessed through digital formats.

Given emerging research that online reading comprehension requires skills and strategies that are complex, some of which are unique to the online context (Coiro, 2007), a central question is, How do we build into the literacy curriculum opportunities for students to acquire the requisite skills and strategies for online reading comprehension? Further, what classroom reading activities encourage students to read a broad range of texts both online and offline?

This chapter discusses how the Internet is shaping the way we read, write, and communicate and how it is transforming the way educators teach literacy in
today's schools. Changes to the literacy landscape are framed in a perspective of new literacies of online reading comprehension (Leu, O'Byrne, et al., 2009). We introduce findings from a three-year research initiative that sought to develop an instructional model that supports students in acquiring the skills and strategies essential for online reading comprehension. We discuss how communities of readers are transformed when reading shifts from page to screen. Included are practical suggestions for ways educators can integrate the types of sustained reading and writing experiences that will increasingly define literacy in the 21st century. Recommendations for the development of literacy standards, assessments, and school policies are also addressed.

The Changing Literacy Landscape

The Internet is an increasingly important source of information and is central to all aspects of daily life (International Reading Association, 2009; International Society for Technology in Education, Partnership for 21st Century Skills, & State Educational Technology Directors Association, 2007; National Council of Teachers of English, 2007; National Telecommunications and Information Administration & Economics and Statistics Administration, 2002). Its widespread use is fundamentally redefining what it means to be literate in the 21st century (Roberts, Foehr, & Rideout, 2005). However, instruction in our literacy classrooms is slow to respond. The RAND Reading Study Group (2002) summarizes its concerns, stating that “accessing the Internet makes large demands on individuals' literacy skills; in some cases, this new technology requires readers to have novel literacy skills, and little is known about how to analyze or teach those skills” (p. 4). Research is beginning to emerge about the contexts and conditions that facilitate learning these novel skills and strategies and how to create those contexts within classrooms (see Castek, 2008).

The New Literacies of Online Reading Comprehension

Online reading comprehension instruction is informed by theoretical work in new literacies (Coiro et al., 2008; Cope & Kalantzis, 2000; Gee, 2003; Kress, 1999; Lankshear & Knobel, 2006; Leu, O'Byrne, et al., 2009; The New London Group, 2000; Street, 1998). New literacies theory suggests that the nature of literacy is rapidly changing and transforming, as new information and communication technologies emerge.

Within this broader context of new literacies theory, a more specific theory of online reading comprehension has also emerged (Castek & Carter, 2006; Coiro, 2003; Henry, 2007; Leu, Kinzer, Coiro, & Cammack, 2004; Leu, O'Byrne, et al., 2009). This theory frames online reading comprehension as a process of problem-based inquiry, with the major skill sets clustering in the following areas:
(a) developing questions, (b) locating information, (c) evaluating information, (d) synthesizing information, and (e) communicating information. During this process, additional online and traditional offline reading comprehension skills are required, often in complex and interrelated ways.

Providing Time in School for Students to Read Offline and Online Is Critical

According to some researchers, middle school and high school students spend more time reading teacher-made handouts or textbook passages (Orange & Horowitz, 1999; Weinstein, 2002) than real-world materials (Wade & Moje, 2000). For these reasons, it is important for elementary, middle, and high school students to develop skills for critically reading and thoughtfully communicating about texts by engaging with them in a sustained manner and being driven by authentic purposes.

Primary sources and real-world materials are prevalent and plentiful online, making the Internet the ideal context for reading materials on numerous topics that meet readers' interests. Providing purposeful opportunities for students to read online encourages them to interpret, analyze, and engage with multiple forms of text and exchange perspectives with those inside and outside the classroom.

Comprehension Processes Common to Reading Offline and Online

There is much that must occur internally while one reads. Some of these are skills, such as decoding and word recognition, that become automated in skilled readers and therefore come to require relatively little cognitive effort. However, and depending on the skill of the reader and the complexity or novelty of the text, there are cognitive strategies that must be explicitly taught by educators and practiced by students in order for them to become useful to attaining high levels of successful and efficient reading comprehension. Many of the strategies that are important to deriving meaning from print text are also important to comprehending online text, such as questioning, predicting, and making inferences. However, important differences in online text comprehension exist (Coiro, 2003; Leu et al., 2007). Examining these differences has led to research efforts aimed at better understanding what is required for online reading comprehension (Leu, Reinking, et al., 2003).

Strategic Offline Reading

Because narrative text is linear and must be read from beginning to end without skipping paragraphs or pages to make sense, online and offline (i.e., print) narrative reading can be assumed to be somewhat similar. Although the online format
introduces interactive options for reading narrative text, the Internet has become a compelling resource for reading and communicating about expository text. The purposes for reading, use of background knowledge, and relevant cognitive strategies to support comprehension lend themselves to different strategic behaviors in online versus offline formats.

First, offline expository texts are written in a page to page and front to back configuration, but they do not have to be read in a linear fashion. Authors organize printed information in a variety of ways, depending on their goals and preferences, and they use various text structures to indicate how the information is presented (e.g., table of contents, headings and subheadings, indexes). In addition, authors can support readers in understanding the text by providing glossaries or visual aids such as diagrams, charts, pictures, or photographs. However, the texts, headings, and written or visual supplements are unchangeable and given in a fixed order.

The reader, depending upon his or her individual goals, then reads all or part of the text provided to gain a general understanding of the topic or to answer specific questions. For example, the reader who wishes to learn more about an interesting but novel topic might choose an appealing informational text and leaf through its pages to observe the pictures, photographs and captions, and chapter headings. Deciding that the book is indeed a good introduction to the topic, the reader may begin with the first section, where the author most likely has made an attempt at hooking the reader on the significance of the topic and providing a road map of the sections that follow. The reader may then choose to skim or carefully read other sections according to personal interests or to simply fill in gaps in understanding. The reader is constructing a model of the factual and conceptual knowledge provided by the text, scanning at times to find quick answers to questions, or reading more deeply where aspects of the passage are particularly interesting. However, no matter how comprehensive or cursory the author's presentation, the information remains fixed in its content and structure.

**Strategic Online Reading**

Although we know a great deal about what strategic offline readers do to actively construct meaning from text, our knowledge of skills and strategies for online reading is just emerging (Coiro, 2007; Coiro & Dobler, 2007; Eagleton & Dobler, 2007). It is our view that online reading differs from offline reading in that it requires multiple levels of decision making (Landow, 1994; Reinking, 1992, 1998). The vastness of the information available online requires that readers develop skill in narrowing and discriminating the field to address the particular purpose for reading as well as developing strategies for evaluating the accuracy and usefulness of the information found.

Even when investigating the same topic, a text that is read by two readers may be markedly different because of the decisions each reader makes when locating websites and navigating webpages. Although the purposes for reading, such
The findings highlight the importance of developing media-skills to engage and communicate information effectively. Students who frequently engage in media-skills, such as reading online, have developed a better understanding of how the online environment is structured and can use this to their advantage. These students are better equipped to solve problems, acquire knowledge, and develop strategies for complex tasks. The findings show that students who engage in media-skills have developed useful strategies for managing and synthesizing information, while students who do not engage in these activities struggle to develop effective strategies for managing information. The findings also suggest that students who engage in media-skills have a better understanding of how the online environment works and are better equipped to navigate through it. The findings suggest that the online environment is dynamic and ever-changing, and that students need to develop strategies for managing this complexity. The findings also suggest that students who engage in media-skills are better equipped to answer a particular question, might be more confident online, and can use the additional time available to explore other areas of information. The findings highlight the importance of developing media-skills to engage and communicate information effectively. The findings suggest that students who engage in media-skills are better equipped to solve problems, acquire knowledge, and develop strategies for complex tasks. The findings also suggest that students who engage in media-skills have developed useful strategies for managing and synthesizing information, while students who do not engage in these activities struggle to develop effective strategies for managing information. The findings show that students who engage in media-skills have a better understanding of how the online environment works and are better equipped to navigate through it. The findings also suggest that students who engage in media-skills are better equipped to answer a particular question, might be more confident online, and can use the additional time available to explore other areas of information. The findings highlight the importance of developing media-skills to engage and communicate information effectively.
research provided a foundation to developing this taxonomy and supported further research into instructional models for teaching online reading comprehension. Information regarding the identification of these students, the nature of the tasks they completed, and the taxonomy can be found at www.newliteracies.uconn.edu/iesproject/.

What We Learned From Verbal Protocols With Skilled Online Readers

Developing Questions. In the TICA research, we presented our 53 focal students with three online tasks: two involved researcher-designed problem sets and the third was a student-generated online search. When these students were interviewed about the types of questions they had in mind when beginning an online search, they reported that they approach tasks differentially for teacher-designed and personal searches. Their responses indicated that when they do have a question in mind, it is nearly always because they are investigating a teacher-selected question. As one student stated when asked if she has a specific question in mind when beginning an online search, “When I’m searching on the Internet and it’s an assignment that’s directed at a question...I would actually type in a question, like ‘how do penguins take care of their young?’”

Depending on whether the task was open (i.e., allowing a choice of topic or research focus) or closed (i.e., posing a question for which there is one correct answer), students were observed to search and to read differentially online. (For a discussion of task types, please see Turner & Paris, 1995.) Closed tasks that require such specific information as “How do penguins take care of their young?” sometimes lead to the type of cursory reading that students display when asked to answer the questions at the end of a social studies chapter: Instead of carefully reading the information presented, the student frequently scans a passage to find the requested information and offers little in the way of critical engagement with the text. However, when the question was of interest to the student, as when our focal students were asked to conduct a search about a personally relevant topic, the student often demonstrated thoughtful search strategies and careful reading of both the results pages and the websites chosen.

When searching online for their own personal interests, students reported beginning with a search of the general topic, as indicated in the following exchange:

Researcher: What if it was something that you were just interested in on your own?

Student: I usually take a topic approach ‘cause I usually, like, if I wanted to find like spiders, I’d type in spiders.

Although teacher-designed projects often prompt students to search with a specific question in mind, the students we interviewed rarely reported doing so on their own. Their home Web-surfing habits were frequently reported as occurring when
they were “just bored” and that they enter names of people, bands, sports teams, or interesting words or phrases they have encountered that day and “click around.” This form of “schema diving” was widely reported by our focal students as a recreational form of online browsing and as a form of reading for pleasure.

**Locating Information.** The strategic importance of developing suitable questions before beginning an online search for information is revealed in students’ strategies for determining keywords and phrases for locating appropriate information to answer their questions. For example, online readers may attempt to find websites using a less effective “dotcom” strategy, whereby they enter the topic as a URL (i.e., uniform resource locator, or Web address) into the address bar of a Web browser. For example, a student attempting to locate information about spiders might enter “www.spiders.com” into the address bar, which would lead to a website for a consulting firm rather than a site about arachnids.

Effective searches were more likely to occur when students were familiar with how search engines work and how to turn their questions into keywords or phrases, which most often employs a topic and a focus word. The topic allowed the search engine to find results that lead to general websites, whereas the focus word allowed the user to narrow the number of results, or hits, to a more manageable and useable number. For example, a student who was interested in determining which spiders are the most poisonous might enter the word spider into a search bar and receive 19,200,000 entries on the results page. However, a search for *spiders poisonous* would narrow the results to 3,670,000 entries, while reordering the keywords as *poisonous spiders* would further narrow the results to 860,000 entries. Effective and efficient searches require both a clear conception of what is sought and an understanding of how search engines order the search results.

Once a results page was provided by the search engine, the truly strategic reading began. Although some students expressed a belief that their carefully chosen search terms listed the most appropriate website first, others read the descriptions underneath the entries carefully. In a search to discover who invented algebra, the following student used the results descriptions to narrow down potential websites to answer her question:

**Student:** OK. Well, I went to Ask.com, and then I typed in “who invented algebra” and um now I’m just looking to figure out which one I think’s the best. Hmm. I’m thinking that I’ll go to this one.

**Researcher:** Why are you thinking you like that one?

**Student:** Um, it says they invented algebra. I just wanna look at it and see what it says. [reads from site] And right here it says they have hmm...in the algebra...Hmm...I’m gonna go back.

**Researcher:** Now tell me what you’re thinking about.

**Student:** Um, I’m looking for another site ’cause that one didn’t really have the information I wanted. I’m going to click on this link, because...
it actually has what I actually typed in there. I'll click on this one, because it says "who founded algebra."

A less effective strategy for choosing likely websites for information is called the "click and look" strategy, in which the reader proceeds systematically through the search engine results in a first-to-last listwise search. This trial-and-error approach often results in spending unnecessary time in waiting for website to load and then scanning the page to determine its usability in addressing the question at hand.

TICA researchers (Coiro, Malloy, & Rogers, 2006) identified the following three search-and-locate tactics as evincing a higher degree of strategic thinking:

1. Description reading—Action based on specific reading of search results (e.g., identifying boldfaced words from keyword input, related words)
2. Touring results page—Action based on scrolling through results page prior to close reading or change of keywords (e.g., taking a virtual text walk)
3. URL reading—Action based on specific reading of URLs (e.g., identifying certain elements of URLs, such as the top-level domains of .com, .edu, .gov)

Strategic online readers often exhibit knowledge of the particular text structures offered on webpages that can help them to locate information. Our students were familiar with how to navigate tabs, headings, and links and would frequently remark on pictures, images, or videos. One strategy that we noticed savvy readers using is a text walk, or tour, of the webpage from top to bottom and side to side, moving the cursor over headings and features to preview drop-down menus and other information that would appear when “mousing over.” Students reported that they used these text walks to determine the usability of a page and to assess its organizational structure. If more specific information was desired, the text structures offered could be used to narrow down where the information might be. If students were looking for general information about a topic, they might begin to read the text on this page, or if more specific information was required, they might click through to other layers of the site on the basis of their assessment of the menu options and links. Rarely did students open a webpage and begin reading the text from top to bottom. If students were reading for a specific answer to a question, they would often scan the text quickly, looking for keywords and phrases that would lead them to the desired information. However, when reading for more generalized or open-ended understandings, students read more carefully, often using the cursor to follow the line of the text as they read.

Evaluating Information. The students who participated in our research were less sophisticated about determining the reliability of websites. In the first of our verbal protocol activities, they were asked to judge the reliability of a website titled Help Save the Endangered Pacific Northwest Tree Octopus From Extinction! (zapatopi.net/treeoctopus/), a hoax site that provides information about an allegedly endangered
species of octopus that live in pine trees in the Pacific temperate rainforest. Prior to being given this task, our students were asked to tell the researcher what they knew about the octopus. Every student described a clear awareness of the creature as being a sea dweller. However, as the site is convincingly presented and provides photographs of an octopus in a pine tree, nearly every student in our sample judged the site to be somewhat or very reliable and the information to be true—often scratching their heads at the wonder of it all. The face validity of a website is a powerful and misleading feature for most students, and they would justify their judgment of reliability by stating that the site provided a great deal of good scientific information, pictures, and intact links, as demonstrated by the following posttask interview:

Student: Yeah. Um, number three. The reasons for my answer [to the prompt “Why I think the site is reliable”] is that they have a lot of other links [types this] and that they also have pictures that you can see. [types this] Alright.

Researcher: OK. Now what if I told you that this was a bogus site?

Student: I don't know. [laughs]

Researcher: Did you see enough that you believe that it's true? Because you had some questions as you worked.

Student: Um, I don't know, 'cause it would seem real, because it was talking about where they live and how they move.

Researcher: Right!

Student: And all the extra information in here.

Researcher: Mm hmm—it's a very good-looking site, isn't it?

Student: Yes. [laughs]

Before and after the “Tree Octopus” task, students were asked to define what they thought the word reliability meant in relation to Internet sites. The terms that emerged most frequently included accurate, truthful, and trustworthy. When students were asked how they would go about determining a website's reliability, the approach of comparing across sites was most frequently cited. Students also indicated that they check the webpage’s source or author, ask a teacher or parent, refer to a book, or just use common sense. However, in the case of the Pacific Northwest Tree Octopus, students' common sense did not prevail.

The ability to effectively evaluate the accuracy, usefulness, and potential biases of online resources is a clear area of need for all online users, including the students we selected for our study. The critical reading skills that we incorporate in our instruction for print text sources, such as recognizing bias and stance, are entirely applicable in online settings. However, because of the accessibility of the online environment for authors with various purposes and knowledge bases, educators need to provide explicit and scaffolded instruction for evaluating the accuracy, biases, and usability of online sources. To this end, resources to support teachers in
delivering instruction aimed toward the development of critical evaluation of online
texts are becoming available (see Coiro, 2009; Eagleton & Dobler, 2007).

It was surprising to many of our student participants that such clearly inac-
curate information could be presented online in such a convincing manner. Truly,
anyone can print anything on the Internet, and it is the reader’s responsibility to
determine the worth of the information. As a result of this awareness, our tax-
onomy skills and strategies for online reading comprehension instruction includes
the following learning targets:

- Determining accuracy—Evaluating the extent to which information con-
tains factual and updated details that can be verified by consulting alterna-
tive or primary sources
- Determining bias—Evaluating information in relation to the stance an
author takes (i.e., the lenses, viewpoint, or agenda embedded within the
information)
- Determining relevancy—Evaluating information in relation to its utility or
relevancy to the question or problem (i.e., the information’s level of impor-
tance to a particular reading purpose or stated information need)
- Determining site reliability—Evaluating the trustworthiness of a website on
the basis of its publisher and author information

Synthesizing Information. Synthesis involves integrating separate pieces of infor-
mation and using that information to come to a new understanding. Successful on-
line reading comprehension requires the ability to synthesize efficiently (Jenkins,
2006). The Internet introduces challenges with synthesis, because vast amounts
of information can be accessed and readers need to determine what is relevant
and how much is needed to draw a conclusion. These resources can take a variety
of forms and can range from highly related to highly disparate, depending on the
choices that readers make (Castek, Zawilinski, McVerry, O’Byrne, & Leu, in press).
Because very little is known about the processes readers use as they synthesize
information online, the verbal protocols from highly skilled online readers were
particularly helpful in pinpointing instances of synthesis and examining what
is involved in synthesizing across online information sources. One such instance is
illustrated in the following think-aloud:

Student: I’m going to Ask.com. I’m going to search for “y
yellow tang”...find
“yellow tang.” [pause] I’m going to back up and type in yellow tang

Student: [After locating a website from a list of search results] Lipstick tangs
belong in a large aquarium and generally do well with other large
nonaggressive fishes. Lots of free space must be provided as well as
algae on which they graze. The salinity of 1.023 is preferred.

Student: I have no clue what salinity is so I think I might just search it.
[searches for the term salinity on Google and clicks on one of the
resulting sites] And this one says it means to surface salinity.
[after going back to the original site] I guess it has to do with salt, dissolve salts. [searches on dictionary.com] Yes, it is. Salinity.

Student: [When wrapping up] I learned that salinity is the amount [pause] of salt found in water. I found that pretty interesting, because I had no idea what it is.

Communicating Information. Online readers do not just read, they communicate with others continuously as a means of processing what they are learning. In the process, they incorporate new opinions and consider new information that has come their way. Online reading and writing are so closely connected that it is not possible to separate them; we read online as authors and we write online as readers (Huffaker, 2004, 2005; McVerry, 2007; Zawilinski, 2009). Thus, the communication processes involved in using a range of online tools appear to be inextricably linked to aspects of online reading comprehension (Boyd & Ellison, 2008; Forte & Bruckman, 2006; Lewis & Fabos, 2005).

Vehicles for online communication include podcasts, blog postings, instant messages, e-mails, and videos. Shared-writing spaces such as wikis and Google docs and social networks such as Ning.com offer multiple platforms for online communication exchanges—and new forms are evolving and emerging daily. To examine the unique processes students use to communicate information, students were asked to research a topic and share the information they learned with another seventh-grade class. Options for communicating their information were offered and included posting to a class blog, composing to a class e-mail address, or communicating in real time with a member of the class using an instant messenger function—none of which were widely used in the participating schools. The following exchange follows a skilled online reader through the decisions she made in using a blog to communicate the results of her online research.

Student: I'm gonna go to the blog. Um, how do you post a comment?
Researcher: That's a good question. Can you figure that out or think out loud the decisions you're making on your own?
Student: Um, I'm wondering where it is. It's usually in the front, um, um, go to comments and see if that's post a comment. There we go. I'm gonna go to this.... Copy that. Whoops. I'm gonna paste it right here.
Researcher: Could you tell me about what you are going to do now?
Student: Um, I'm gonna log in and publish and see if that works, and I think I'm gonna post as anonymous and publish my comment. [checks the blog] Um, yep it's up there.

Cultivating Communities of Readers

New definitions of literacy in the 21st century position reading as more than a set of skills and strategies (Lankshear & Knobel, 2006) and literacy education as more
than a means of promoting academic achievement (Hiebert, 1991). The RAND Reading Study Group (2002) drew attention to the importance of reading comprehension as a social activity and asserted that text, the activity, and the reader are all situated within a larger sociocultural context. The social context, in particular, influences how learners make sense of, interpret, and share understandings. Over a period of years, Guthrie and McCann (1996), Raphael, Florio-Ruane, and George (2001), and Daniels (2002), guided teachers' implementation of social reading activities such as book clubs, literature circles, cooperative book discussion groups, and idea circles. Without regard to the structure these reading activities take in an individual classroom, the purpose is the same—to create a community of readers who construct understandings together. Participation motivates students to read for a range of purposes, use knowledge gained from previous experiences to generate new understandings, and actively engage in meaningful social interactions around reading. These activities tangibly illustrate to students that sustained reading has a social purpose and is more than a solitary, self-fulfilling activity.

Integrating these social learning activities fulfills an important need, because many students, especially adolescents, are driven by social interaction. One such indication is the proliferation of teen activity on social networking sites (Lenhart, Smith, Macgill, & Arafeh, 2008). Many adolescents spend their time connecting with friends by texting on cell phones, instant messaging, and using websites such as Facebook, MySpace, and Twitter and are highly skilled in creating their own communities and establishing affinity groups within those networks to connect with others and exchange ideas.

Despite the proliferation of skilled Internet use among adolescents, the majority of students attend schools where they are required to “disconnect” (Selwyn, 2006) and rely solely on face-to-face communication as the primary means of sharing ideas. This paradox brings to mind several important questions for educators:

- What benefits to literacy and learning could be realized if students were encouraged to merge their powerful social networking skills to support their academic pursuits?
- In what ways could social networking skills and the strong desire students possess to develop vast social networks be used to have a positive impact on literacy learning and academic achievement?
- How can teachers cultivate online communities of readers who collaborate, problem solve, and negotiate multiple perspectives?

The answers to these questions may be more easily found if, as educators, we are willing to change our collective mind-set toward the use of the Internet in school. Although nearly 100% of all U.S. classrooms have one or more Internet-connected computers available for student use (Wells & Lewis, 2006), few teachers are knowledgeable about how to guide students' active participation in today's networked world. As a result, literacy educators play a vitally important role in...
paving the road for Internet integration in our teaching and learning practices in a manner that supports literacy growth and learning.

Despite this important call to action, many educators lack familiarity or preparation in teaching the skills and strategies required for online reading, writing, and collaboration. Even those who consider themselves experienced in this arena recognize that the online literacy landscape is complex and constantly changing. Perhaps a better way to navigate these changes is to become comfortable in learning them along with students. Leu (1996) reports that this sort of learning is frequently constructed through social interactions in classrooms, not only among students but also between teachers and students. In fact, encouraging students to take on a leadership role in sharing their online skills and strategies has proven to be a beneficial means of promoting acquisition of the new literacies of online reading comprehension (Castek, 2008). The findings from this study suggest that students learn online reading comprehension skills best from other students, within the context of challenging activities designed by the teacher. Increased levels of challenge appeared to prompt students to try multiple approaches to making sense of complex information and encouraged them to think deeply about solving problems. Such an environment encourages sharing and learning by teachers and students alike as new ways to engage with and communicate texts evolve.

**A Fundamental Shift From Page to Screen**

The Internet has become today's technology for literacy and learning, offering classrooms a wide range of reading options and providing new opportunities for social interaction and collaboration with others (Boling, Castek, Zawilinski, Barton, & Nierlich, 2008; Coiro, 2003; Zawilinski, 2009). By developing communities of readers online, networks extend far beyond classroom walls and include members of the worldwide online community (see Greenhow, Robelia, & Hughes, 2009). Providing opportunities to communicate and collaborate with their peers from other schools nationally and globally helps to broaden perspectives and exposes students to different ways to approach and solve problems. By creating an online learning network, students can collaborate, using forums such as e-mail, blogs, and wikis to create, invent, and showcase their work in ways that promote engagement and advance learning outcomes. These tools, when chosen thoughtfully and accompanied by explicit instruction in the new literacies of online reading comprehension, can become fertile ground for students acquiring the skills necessary to communicate and collaborate in a global marketplace.

**Developing an Online Community of Readers in Your Classroom**

In the following sections, we suggest ways to extend the practice of silent reading by creating a community of readers online through implementation of online book clubs, online pen pals, and collaborative online projects.
Online Book Clubs. Online book clubs celebrate great books by assembling a diverse audience to discuss and appreciate them. Participation has the potential to promote higher level thinking, communication skills, deeper understanding of text, and strong social reasons for reading, because it involves a process of constructing and sharing meanings gained with others. ePals Book Club (www.epals.com) promotes sharing ideas about books and invites students of all ages to simultaneously participate in book discussions. Students discuss their favorite books and authors, submit short stories and poetry, and share the books they love with others. Planet Book Talk (www.planetbookclub.com) makes it possible for students to read comments other students have posted about books, access book reviews written by students of all ages, and post their own book review. Online book clubs such as these illustrate how communities of readers are flourishing online.

Online Pen Pals. The ePals Global Community connects classrooms around the world by offering safe, teacher-monitored e-mail accounts. Teachers can easily pre-screen students' accounts, making it possible to spot problems and encourage positive communication. Integrating e-mail exchanges into your classroom program is particularly powerful in providing authentic purposes for sharing ideas, using language, and developing literacy among students of all ages.

Charron (2007) conducted a four-month study of an online pen pal program. Thirteen thousand students in 12 elementary schools, 3 middle schools, and 2 high schools participated. The social nature of learning was evident in the engagement and enthusiasm students displayed as they corresponded with their online pen pals. Results indicated that the use of the Internet for e-mail exchanges positively affected students' written-language production. In addition, students reported increased motivation in sustained reading and composing. Exchanges promoted problem solving and supported critical thinking in written-language acquisition.

Collaborative Online Projects. ePals also offers easy-to-implement projects for classroom collaboration, such as Digital Storytelling, Black History, and Biodiversity. Participation in collaborative online projects such as these transforms school-based learning into events that are meaningful, authentic, and social. By supporting students' engagement in collaborative activities, educators capitalize on their interests and motivation to share their learning.

Participation in online social action projects provides opportunities for young people to transform the world around them and makes it possible for them to see themselves, their abilities, and their school activities in a different light. Not only does this give students the opportunity to effect change and gain valuable experience with the new forms of online communication that are quickly defining our world, but also it builds confidence that the skills they are learning have value beyond the classroom. The United Nations has organized a Cyberschoolbus Global Teaching and Learning Project (cyberschoolbus.un.org/) as a means of exposing students to issues of global concern. Social action projects such as Feeding Minds Fighting Hunger (www.feedingminds.org/) provide resources to learn about
current international issues that plague our world. These projects seek solutions to problems such as world hunger and racial or ethnic discrimination and promote the advancement of universal human rights. Placing students in the role of problem solvers empowers them to find ways to use what they are learning in school to change the reality of the world around them, and perhaps their futures.

Despite our enthusiasm for integrating these online literacy activities throughout the school day, we recognize the barriers that currently exist that impede widespread implementation. Though some may stem from limited Internet access in schools or filters meant to ensure child safety, others may stem from U.S. policies or competing reform efforts. The section that follows discusses the reforms needed to support teachers as they forge new ground in preparing students for the reading experiences that will define their future.

**Literacy Standards, Assessments, and School Policies**

Research in the new literacies of online reading comprehension reveals an important concern for any society based on egalitarian principles—U.S. public policies in reading may actually serve to increase achievement gaps, not close them (Leu, McVerry, et al., 2009). The problem stems from the fact that none of the current state reading assessments measure any of the novel skills required for successful online reading comprehension. The following observations have not changed since they were first observed several years ago (Leu, Ataya, & Coiro, 2002):

- Not a single state in the United States measures students' ability to read search engine results during state reading assessments.
- Not a single state in the United States measures students' ability to critically evaluate online information to determine its reliability.
- No state writing assessment in the United States measures students' ability to compose effective e-mail messages.
- Few, if any, states in the United States permit all students to use a word processor on the state writing assessment.

These state reading assessments and public policies resulting from No Child Left Behind legislation are actually helping the rich get richer and the poor get poorer. How does this happen? Students in the poorest school districts in the United States have the least amount of Internet access at home (Cooper, 2004). Unfortunately, the poorest schools are also under the greatest pressure to raise scores on tests that have nothing to do with online reading comprehension (Henry, 2007). As a result, there is little incentive to teach the new literacies of online reading comprehension because they are not tested. Thus, students in the poorest schools become doubly disadvantaged: They have less access to the Internet at home, and schools do not always prepare them for the new literacies of online reading comprehension at school.
Now, consider students in the most privileged schools. Cooper (2004) indicates that most students from advantaged communities 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 one knows that students have Internet access at home. Lazarus and Wainer (2005), for example, found that 63% of students from households earning more than $75,000 annually reported that they used the Internet at school, compared with only 36% of students from households earning less than $15,000 annually. Thus, students in richer districts become doubly privileged: They have greater access to the Internet at home, and they use it more often at school.

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. This public policy failure has important consequences for education, because the Internet is now a central source of information and learning is dependent on the ability to read and comprehend complex information at high levels (Alexander & Jetton, 2000; Bransford, Brown, & Cocking, 2000).

Conclusion and Future Research Recommendations for Online Reading Comprehension

In this chapter, we have examined the changing literacy landscape and reviewed what we know about the skills and strategies of online reading comprehension as they are distinguished from offline formats. We have also addressed how communities of readers are transformed when reading shifts from page to screen and suggested ways to help students develop the literacy skills essential for online reading comprehension.

We recognize that most of the silent reading instruction and practice in classrooms is designed to enhance offline reading competency; however, we suggest that informed instruction and engaging practice in the silent reading of online formats are of critical importance as well. In terms of future research, there are several areas where advancements in the area of online silent reading would lead to improved instruction in the classroom.

First, there is a need for the continued development of curriculum and instruction that would guide teachers at the late elementary and middle/high school levels to specifically address silent online reading comprehension with their students. A well-developed pedagogy for integrating online and offline reading and communication skills would enhance the synergistic properties inherent in addressing these two formats concurrently. For example, reading for bias and accuracy is just as important in print text as it is on the webpage. The processes for determining these qualities may require different skills; however, the need to read critically in all contexts is paramount. The nature of reading informational text, whether online or offline, requires a conditional knowledge of both skimming and
careful reading skills, and although the decisions made regarding the text may lead to different actions between the two formats, these are skills that efficient and strategic readers require.

Further, future research may uncover more about how the structure and organization of various digital formats affects how readers process and understand what they read. Does the reader process information differently according to the visual layout of the page, wiki, or blog, or through the layering of texts that are accessed only through tabs and hyperlinks? More important, how do we learn to adapt to the continually changing formats that present themselves as contexts for learning? Are there transferable sets of skills or knowledge that can be transported from existing digital formats to newer ones?

Finally, are there aspects of online reading that support the growth of offline reading skills for struggling readers, English Learners, or the aliterate? If so, how can we incorporate these aspects into our increasingly inclusive classrooms? Likewise, are there motivational elements of online reading that can be useful for these groups of students?

As we grapple to understand the constantly changing textual landscape that develops in a digital climate, researchers and educators must embrace a formatively inquisitive stance toward investigating the skills and strategies required of our citizens of tomorrow. With little time to breathe between innovations, we must come to understand the nature of the skills required to adapt to newer and newer literacies and create instruction that addresses the requisite comprehension skills and strategies. Using a formative method in a variety of classrooms to systematically design the most promising instructional strategies may lead us more quickly to the classroom instruction we need to develop. The success of our students in navigating the 21st-century landscape hangs in the balance.

**QUESTIONS FOR PROFESSIONAL DEVELOPMENT**

1. How can we support teachers in expanding options for purposeful reading both online and offline? Think of ways that you can provide relevant and authentic tasks for questioning, locating, evaluating, synthesizing, and communicating information using online and offline formats, perhaps by incorporating some of the suggestions provided in this chapter.

2. How do we support students as they participate in online reading communities? Preparing our students for a tech-savvy world requires that they become accustomed to the venues for accessing, and methods of sharing, information online. Learning to approach these tasks with thoughtful strategies, a critical eye, and appropriate interactions requires targeted instruction and sufficient time for mastery. Think of ways that you can structure your instructional time and classroom activities to provide these experiences.
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The comprehension, writing, and other tasks in the classroom that are designed to promote higher order thinking are complex and require a deep understanding of the students' current knowledge and abilities. Effective instruction in these areas can be challenging, but with the right strategies and support, teachers can help students develop the skills they need to succeed.