The New Literacies of Online Research and Comprehension: Assessing and Preparing Students for the 21st Century With Common Core State Standards

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As literacy educators, we live in new times, with new literacies. The Internet, a central aspect of literacy and life, continually generates new technologies for information and communication, repeatedly requiring new literacies (Baker, 2010; Lankshear & Knobel, 2006). Being literate today does not necessarily ensure that one will be fully literate tomorrow since new technologies will always appear, regularly requiring additional new literacies. Thus, when we speak of new literacies in an online age, we mean that literacy is not just *new* today; it becomes *new* every day of our lives. How we adapt to new literacies in these new times will define us as literacy educators. Most importantly, how we adapt in the classroom will define our students' futures.

During this period of change, nations around the world have begun to develop specific educational plans, often with a special focus on literacy. Arguably, the most visible have been the Australian Curriculum (Australian Curriculum, Assessment and Reporting Authority, 2012) and the Common Core State Standards (CCSS) Initiative in the United States (National Governors Association Center for Best Practices & Council of Chief State School Officers [NGA Center & CCSSO], 2010). Initiatives like these seek to provide nations with systems of developmental standards to inform instruction. In the United States, the CCSS replace the "big five" of reading (phonemic awareness, phonics, fluency, vocabulary, and comprehension) with a richer, more complex English language arts

framework. Two elements of the CCSS in particular are likely to impact classroom literacy instruction in profound ways:

1. An emphasis on higher level thinking during reading and writing instruction
2. A focus on acquiring skills in the new, digital literacies of online research and comprehension

This chapter explores both of these areas, recognizing that the digital literacies of online research and comprehension require, perhaps, even larger amounts and more complex types of higher level thinking than offline reading and writing. First, the chapter explains why the Common Core Standards have appeared now and why the digital literacies of online research and comprehension as well as higher level thinking are emphasized within. It also shares innovative assessments that evaluate students' abilities to conduct research online and write a short report. Finally, it explores how we might think about evaluating students' abilities with online research and comprehension in ways to inform instruction.

Why Have the CCSS Appeared Now?

Why is it at *this* time that the CCSS have appeared? Why do they include higher level thinking skills and new digital literacies that are important for online research and comprehension? One answer to both of these questions is a simple one—the literacy demands in the workplace have changed because the organization of workplace settings has changed (Kirsch, Braun, Yamamoto, & Sum, 2007; Reich, 1992; Rouet, 2006). Traditionally, industrial-age organizations were organized in a vertical, top-down fashion, where most decisions were made at the highest levels and then communicated to lower levels, limiting innovative or creative contributions throughout the chain of command. However, this approach wasted large amounts of intellectual capital within an organization, limited innovation, and, as a result, failed to maximize either creativity or productivity. Because employees at lower levels of the organization tended to simply follow directions, they were not required to possess or use higher level thinking skills or digital literacies.

Today, global economic competition requires that organizations abandon these traditional command-and-control structures and instead harness all of their intellectual capital, unleash innovation and creativity, and generate greater productivity. Otherwise, in a highly competitive global economy, they are literally out of business.

Organizations in post-industrial economies (Reich, 1992) achieve greater productivity and become more competitive by reorganizing themselves horizontally and organizing much of their work within collaborative teams. In addition to their regular duties, each team is charged with identifying and solving important problems that lead to better ways of producing goods or providing services within their team. High-performance workplaces take advantage of the literacy and problem-solving skills of every employee to increase creativity, innovation, and productivity (Smith et al., 2000). This economic change has important consequences for education.

Schools now need to prepare students with a wider range of higher level thinking and digital literacy skills important to the new workplace settings that have emerged. Skills such as the following become important for schools to consider:

- Identifying important problems
- Locating useful information related to the problems that are identified
- Critically evaluating information that is found, often online
- Synthesizing multiple sources of online information and evaluating arguments to determine a solution
- Communicating effectively to others with digital technologies
- Monitoring and evaluating the results of decisions, modifying these as needed

The transition from an industrial to a post-industrial society has happened rapidly in the United States. Within a single year, for example, Internet use in U.S. workplaces increased by nearly 60% among all employed adults 25 years of age and older (U.S. Department of Commerce, 2002). Companies have had to rapidly restructure into more flattened, decision-making organizations in order to survive. Given the changing nature of the workplace, it is not surprising that the CCSS have emerged today and include an emphasis on both higher level thinking and the digital literacies of online research and comprehension.

It is important to recognize that these changes for school are not confined to a goal of simply creating more productive workers and workplaces. Even more importantly, the Internet provides individuals with opportunities to make their personal lives richer and more fulfilling. This happens while advocating for social justice, refinancing a home, selecting a university to attend, managing a medical crisis, purchasing books, or any one of hundreds of other tasks important to daily life. The CCSS have

emerged as the nation has recognized the changing nature of work and life, and the need for schools to prepare students in new ways.

Higher Level Thinking Skills

The changing nature of work and life make it essential now to prepare students to transcend a simple, factual level of understanding and actually use information in creative and innovative ways to develop new ideas and solve complex problems. This requires higher level thinking skills. What are these? Many (Anderson & Krathwohl, 2001; Geertsen, 2003; Hopson, Simms, & Knezek, 2001) consider higher level thinking skills to include evaluation, synthesis, analysis, interpretation, and application. Viewing reading and writing from this perspective suggests it is important to teach students how to use information to create new knowledge and to communicate new ideas far beyond the simple, literal understanding of a passage. This is why the CCSS now include Anchor Standards (AS) for Reading (R) and Writing (W) that include elements of higher level thinking (see Table 16.1, specifically AS-R 6 and 8 and AS-W 7 and 9).

The New Literacies of Online Research and Comprehension

The CCSS also include digital literacies. How does the nature of reading and writing change on the Internet? What, if any, new literacies do we require? We are just discovering the answers to these questions (Afflerbach & Cho, 2010). Online reading comprehension, it appears, typically takes place within a research and problem-solving task (Coiro & Castek, 2011). Rather than simply reading for a general purpose, online reading comprehension is specifically focused to solve a particular problem or answer a particular question. In short, online reading comprehension is online research. Of course, you may also do this offline, but it is almost always done online.

Online reading also differs from traditional reading because it becomes tightly integrated with writing as we communicate with others to learn more about the questions we explore and as we communicate our own interpretations. E-mail, text messages, blogs, wikis, and many other new tools become important elements of online research and comprehension. Again, you may also do this offline, but it is almost always done online.

Table 16.1. Common Core Anchor Standards (AS) in Reading (R) and Writing (W) That Reflect Higher Level Thinking and the Digital Literacies of Online Research and Comprehension

Reading
AS-R 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
AS-R 2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
AS-R 4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
AS-R 5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
AS-R 6. Assess how point of view or purpose shapes the content and style of a text.
AS-R 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
AS-R 8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
AS-R 9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
AS-R 10. Read and comprehend complex literary and informational texts independently and proficiently.
(NGA Center & CCSSO, 2010, p. 10)

Writing
AS-W 1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
AS-W 2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
AS-W 6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
AS-W 7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
AS-W 8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
AS-W 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
AS-W 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
(NGA Center & CCSSO, 2010, p. 18).

Furthermore, additional skills are required to effectively use new technologies such as browsers, search engines, wikis, blogs, and many others that are used online. Keyword entry in a search engine, for example, becomes an important new literacy skill because search engines are an important new technology for locating information. Other online technologies require additional new strategies during online reading.

Finally, and perhaps most importantly, online reading may require even greater amounts of higher level thinking than offline reading. In a context in which anyone may publish anything, higher level thinking skills—such as critical evaluation of source material and understanding an author's point of view—become especially important online. Moreover, rapid access to many different sources increases the importance of being able to logically integrate multiple source materials. One can quickly see that online reading may require even more higher level thinking than offline reading.

Therefore, a view of online reading comprehension is emerging as one that requires additional new skills, strategies, dispositions, and social practices as we increasingly rely on the Internet to conduct research, solve problems, and answer questions (Leu, Kinzer, Coiro, Castek, & Henry, 2013). In this chapter, we shall refer to this as online research and comprehension. At least five processing practices occur during online research and comprehension: (1) reading to identify important questions, (2) reading to locate information, (3) reading to evaluate information critically, (4) reading to synthesize information, and (5) reading and writing to communicate information (Leu, Kinzer, Coiro, & Cammack, 2004). Within these five areas reside the skills, strategies, and dispositions that are distinctive to online research and reading comprehension as well as others commonly found during offline reading in a complex blending that has yet to be fully understood.

Emerging research in the new literacies of online research and comprehension has provided us with a number of preliminary insights:

- Online research and comprehension are not isomorphic with offline reading comprehension; additional reading comprehension skills appear to be required (Afflerbach & Cho, 2010; Coiro, 2011).

- Some challenged offline readers who possess online research and reading comprehension skills may read online better than other students who lack online reading skills (Castek et al., 2011).

- Prior knowledge may contribute less to online research and reading comprehension than offline reading comprehension because readers may gather required prior knowledge online as a part of the reading paths they follow (Coiro, 2011).

- While adolescent "digital natives" may be skilled with social networking, texting, video downloads, MP3 downloads, and smashups, they are not generally skilled with online information use, including locating and critically evaluating information (Bennett, Maton, & Kervin, 2008).
- Students often learn many online research and comprehension skills from other students within the context of challenging activities designed by the teacher (Kiili, Laurinen, Marttunen, & Leu, 2012; Zawilinski, 2012).

How Are We Doing?

How have we been doing with incorporating these digital and informational literacy skills into our curriculum? As of now, we are not doing very well. While the United States awaits full implementation of the CCSS, state reading standards and state reading assessments have yet to include any online research and comprehension skills. This is surprising, given the fact that several international assessments have already begun to include these skills, such as PISA (Organisation for Economic Co-operation and Development, 2011) and the Programme for the International Assessment of Adult Competencies, (PIAAC Expert Group on Problem Solving in Technology-Rich Environments, 2009).

Moreover, the following observations have not substantially changed since they were first observed a decade ago (Leu, Ataya, & Coiro, 2002):

1. Not a single state in the United States measures students' abilities to read search engine results during state reading assessments.
2. Not a single state in the United States measures students' abilities to critically evaluate information that is found online to determine its reliability.
3. In the United States, no state writing assessment measures students' abilities to compose effective e-mail messages.
4. Few, if any, states in the United States permit all students to use a word processor on their state writing assessments.

The New Literacies of Online Research and Comprehension Are Now Blended Into the CCSS

Perhaps the failure of states to include any digital literacies in their standards is one of many reasons that the CCSS have emerged. We

see a conscious awareness of the need to include online research and comprehension skills and higher level thinking in one of Common Core's "key design considerations," which is "research and media skills blended into the Standards as a whole" (NGA Center & CCSSO, 2010, p. 4). It states,

> To be ready for college, workforce training, and life in a technological society, students need the ability to gather, comprehend, evaluate, synthesize, and report on information and ideas, to conduct original research in order to answer questions or solve problems, and to analyze and create a high volume and extensive range of print and nonprint texts in media forms old and new. The need to conduct research and to produce and consume media is embedded into every aspect of today's curriculum. (NGA Center & CCSSO, 2010, p. 4)

In addition, the Common Core's "portrait of students" who are "college and career ready" also describes the need to include online research and comprehension skills. A key element of this description of students who are college and career ready is as follows:

> They use technology and digital media strategically and capably. Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. (NGA Center & CCSSO, 2010, p. 7)

At least half of the Common Core Anchor Standards contain items, in both reading and writing, that reflect the shift to higher level thinking and online research and comprehension (see Table 16.1).

How Should We Assess Online Research and Comprehension That Requires Higher Level Thinking?

At the time of writing this chapter, assessments for the CCSS had not yet been presented. Therefore, we share here an initial model for assessing higher level thinking and online research and comprehension. The assessments are being developed by the Online Research and Comprehension Assessment (ORCA) Project (Leu, Kulikowich, Sedransk, & Coiro, 2009). This project is developing valid, reliable, and practical performance-based assessments of students' ability to conduct Internet research in science and write a short report of their results. A series of assessments in two different formats (Closed Internet and Scenario-Based,

Multiple Choice) have been developed, tested in cognitive labs, and pilot-tested among 1,200 students. They are now undergoing a final validation trial among representative state samples of 1,600 seventh-grade students in two states (Leu et al., 2012). These assessments are consistent with Common Core's Anchor Standards for Reading and Writing that focus on higher level thinking and the use of digital literacies for online research (see Table 16.1).

The Closed Internet Format (ORCA-Closed) asks students to conduct research and write a short report within a closed online environment, a simulation of the Internet, including a social network with chat capabilities, a search engine, e-mail, blogs, wikis, and over 400 websites. The Scenario-Based, Multiple Choice format (ORCA-Multiple Choice) provides students with the same set of research problems to solve within scenarios where decisions are evaluated from multiple-choice responses. The research problems in both formats come from science and focus on human body systems, a common curricular area for the seventh grade in every state.

During their research, students are evaluated in four areas of the online research and comprehension process: locating information, evaluating information, synthesizing information, and communicating information. You may view a video of one student taking the ORCA-Closed assessment, "Are Energy Drinks Heart Healthy?" by visiting this URL: neag.uconn.edu/orca-video-ira. The beginning sequence of this research activity is illustrated in Figure 16.1.

Locating Information

Figure 16.1 shows the opening sequence of chat messages from Brianna, a system-generated avatar, within a social network. Brianna presents a problem and the research question, directing each student to an e-mail where additional information about the research project may be found. When the student follows Brianna's directions and clicks on the text "Click here," an e-mail inbox appears with several possible messages from which to select. Here we assess the student's ability to evaluate the inbox message list and locate the correct e-mail message to open on the first click. Each student's actions are captured on a "back end" data capture system and scored.

Figure 16.1 also shows the window that appears, containing the e-mail message from the principal that defines the problem and research project. The principal asks the student to conduct research online on the question, "How do energy drinks affect heart health?" and then send a short report to the School Board President, Mrs. Kira Marin, via e-mail.

Figure 16.1. The Beginning Screen Sequences in the Assessment, "Are Energy Drinks Heart Healthy?"

Thal Social Media Site
The Study of Human Body Systems | Gloogle

Kiley Middle School

Brianna Hi there. I am a student at Kiley Middle School.

Brianna The President of the School Board needs your help.

Brianna She wants you to research the question, **How do energy drinks affect heart health?**

Brianna Check your email. Find the message from our Principal, Ms. Torres. When you have read the message, type "OK" below.

Brianna To find the email from Ms. Torres, Click here

Make a comment...

Brianna Are you finished reading? When you are finishe

Email

Inbox

Sent Mail

Inbox

Sent Mail

☐ Torre Smith   school lunch
☐ Ms. Torry   Energy Essay
☐ Pat Torres   *FREE ENERGY DRINKS*
☐ Ms. Torres   Energy Drinks and the Heart

Email   ✕

From: Ms. Torres <dorres@AlbroSchools.edu>
To: Ted <Ted@myschool.com>
Subject: Energy Drinks and the Heart

Good morning,

My name is Ms. Torres. I am the principal at Kiley Middle School.

Mrs. Kira Marin is the President of our School Board. The School Board wants to learn more about having energy drinks at school. We need you to do research on this issue: *How do energy drinks affect heart health?*

Brianna and Jordan will help you do research.

When you are done with your research, send **Mrs. Marin** an email. Tell her what you learned about how energy drinks affect heart health.

Send an appropriate email to Mrs. Marin at kmarin@AlbroSchools.edu.

Thank you!

Ms. Torres
Principal, **Kiley Middle School**

Note. To view a video of this assessment, please visit neag.uconn.edu/orca-video-ira.

Next, Brianna takes each student through several search tasks to locate relevant information for the research project. In each, students are asked to use keywords and a search engine to locate websites. During this portion of the research project, we capture and score students' abilities to define appropriate keywords for different types of search tasks. We also evaluate their ability to read search engine results by capturing and scoring their "first click" choice from the list of search results. Finally, students are evaluated on their ability to locate the URLs of two different sites and send these URLs to Brianna, via chat, when she requests them. "Locate" tasks require higher level thinking skills of evaluation and analysis. The following is a list of the four Locate skills that we evaluate, each related to Common Core AS-R and AS-W; see Table 16.1.) We also identify the primary AS-R and AS-W that each skill most closely represents in **boldface,** with related Anchor skills in *italics*:

1. Given a problem in science and a specific social context, can the student locate the correct e-mail message in an inbox on the first click? (**AS-R 1,** *AS-R 7*; **AS-W 6**)

2. Given a problem in science and a specified informational context, can the student use appropriate keywords in a search engine? (*AS-R 1*; **AS-R 4;** *AS-W 6; AS-W 7*; **AS-W 8;** *AS-W 9*)

3. Given a problem in science and a specified informational context, can the student locate the best site for a task from a set of search engine results on the first click? (*AS-R 1*; **AS-R 7;** *AS-W 6; AS-W 7*; **AS-W 8;** *AS-W 9*)

4. Given a problem in science and a specified informational context, can the student locate and communicate the correct website addresses from two different search tasks? (AS-R 1; **AS-R 4;** AS-R 10; AS-W 6; **AS-W 7;** AS-W 8)

Evaluating Information

In the course of the research project, another avatar appears, and the student is asked to evaluate the source and reliability of one of the websites they located. "Evaluate" tasks require the higher level thinking skills of analysis and evaluation. The following is a list of the four Evaluate skills that we evaluate, each related to Common Core AS-R and AS-W (see Table 16.1.) We also identify the primary Anchor skills for reading and writing that each most closely represents in **boldface,** with related Anchor skills in *italics*:

1. Can the student identify the author of the website? (A**S-R 1;** *AS-W 6;* **AS-W 9**)

2. Can the student evaluate the author's level of expertise? (**AS-R 1;** *AS-R 4; AS-R 8; AS-W 6; AS-W 7; AS-W 8;* **AS-W 9**)

3. Can the student identify the author's point of view? (*AS-R 5;* **AS-R 6;** *AS-W 1; AS-W 6; AS-W 8;* **AS-W 9**)

4. Can the student evaluate the reliability of a website? (*AS-R 4; AS-R 5; AS-R 6;* **AS-R 8** *AS-R 10; AS-W 1; AS-W 2; AS-W 6; AS-W 7;* **AS-W 8;** *AS-W 9*)

Synthesizing Information

For each of the sites that students locate, Brianna asks students to summarize (synthesize) the most important information related to the research question in a notepad that appears. Students are also asked to synthesize information that they recorded in their notepads across two websites and finally provide a final summary, or synthesis, of what they read, across all four sites. In each of these tasks, the information they record in their notepad is captured and scored. "Synthesis" tasks require the higher level thinking skills of analysis and synthesis. The following is a list of the four Synthesis skills that we evaluate, each related to Common Core AS-R and AS-W (see Table 16.1.) Primary Anchor skills for reading and writing that each task most closely represents appear in **boldface,** with related Anchor skills in *italics*:

1. Can students provide a summary of one important element from the first website using their own words that is relevant to the topic or that supports the given claim? (**AS-R 2;** *AS-R 7; AS-W 2; AS-W 6;* **AS-W 9;** *AS-W 10*)

2. Using notes from the notepad or information from the sites themselves, can students use their own words to integrate one detail from each of the first two websites relevant to the topic or that supports the given claim? (**AS-R 7;** *AS-W 2; AS-W 6;* **AS-W 9;** *AS-W 10*)

3. Using notes from the notepad or information from the sites themselves, can students use their own words to integrate one detail from each of the second two websites that is relevant to the topic or supports the given claim? (**AS-R 7;** *AS-W 2; AS-W 6;* **AS-W 9;** *AS-W 10*)

4. Using notes from the notepad or information from the sites themselves, can students use their own words to develop an argument after reading all four websites? (**AS-R 7;** *AS-W 1; AS-W 2; AS-W 6; AS-W 7;* **AS-W 8;** *AS-W 9; AS-W 10*)

Communicating Information

At the conclusion of their online research project, students are asked to write a short report, presenting their results to the President of the School Board, Mrs. Marin. During the e-mail task, four "Communicate" skills are assessed and are listed in the section that follows. Each is related to Common Core AS-R and AS-W (see Table 16.1.) We also identify the primary Anchor skill for writing that each most closely represents in **boldface,** with related Anchor skills in *italics*:

1. Knowing the social content and the audience, does the student include the correct e-mail address in an e-mail message? (**AS-W 6**)

2. Knowing the social content and the audience, does the student include an appropriate subject line in an e-mail message? (**AS-W 6**)

3. Knowing the social content and the audience, does the student include an appropriate greeting in an e-mail message to an important, unfamiliar person? (**AS-W 6**)

4. Does the student compose and send a well-structured, short report of their research in an e-mail with sources and appropriate argument structure, containing at least one relevant claim and at least two pieces of evidence? (**AS-W 7**;*AS-W 8; AS-W 9; AS-W 10*)

Assessments of Online Research and Comprehension: A Double-Edged Sword

Effective instruction cannot take place without effective assessment to inform that instruction, but this can only happen when assessment is used appropriately. Used inappropriately, assessment can corrupt instruction and distort learning toward the mastery of specific, ungeneralizable knowledge. Thus, any literacy assessment is a double-edged sword; its utility is defined by how it is used.

Currently, we have few assessments of online research and comprehension. Without knowing how students perform in these important areas, teachers have little data with which to plan instruction. While assessment is not the only component of effective instruction, it is certainly one important element. Valid and reliable assessments of online research and comprehension that are also practical for teachers to use are essential if we are to effectively prepare students for the new opportunities that define work and life in this century.

The initial assessments developed in the ORCA Project have demonstrated good estimates of reliability and validity (Leu et al., 2012).

We also believe them to be innovative, taking a performance-based approach. Assessments developed in the ORCA Project measure actual online research and comprehension performance within the context of a complete research project, including keyword and search engine use as well as e-mail and wiki communication.

Nevertheless, ORCA Project assessments are not without their limitations. Most prominent, perhaps, is the need to score many of the constructed response items in the ORCA-Closed by hand. We have worked to streamline this task, but many items still require scorers trained to an adequate level of reliability, and each assessment takes about 10 minutes to score. To this end, we have developed similar scenario-based ORCA-Multiple Choice assessments that are quickly auto-scored by our system. We are evaluating this format in relation to the constructed responses of the ORCA-Closed assessments.

It is also important to recognize that any assessment of online research and comprehension will always have a more limited "shelf-life" compared with assessments of offline reading because ever-evolving new literacies are involved. The assessments we have developed will become dated over time. Additional technologies and new literacy practices will appear and become essential to the workplace and to daily life, prompting the need for revising the assessments on a regular basis and also, it should be noted, for revising the Common Core Standards regularly.

As the ORCA Project continues and as we learn more about the assessment of online research and comprehension, we are likely to discover additional limitations that are equally important. Nevertheless, the current assessments provide a useful starting point to understanding the assessment of online research and comprehension within authentic, performance-based tasks.

If used appropriately, assessments of online research and comprehension may lead to more effective instruction in at least two important ways. First, they may be especially useful in helping teachers and parents see and understand the types of higher level thinking and the types of literacy practices that are important to online research and comprehension. It is hard to teach something that is unfamiliar. Perhaps seeing activities such as those involved in the ORCA Project will yield greater understanding by teachers and parents about the types of skills, strategies, and literacy practices that are required during online research and comprehension.

Second, good instruction depends on knowing what students can do and what they have difficulty doing. Assessments of online research and comprehension that are connected to the CCSS provide teachers

with a better understanding of their students' abilities in important new areas for literacy development. They will provide starting points for instruction in classrooms and can support the development of additional skills, strategies, and practices in classroom lessons and activities. Used inappropriately, however, they will only serve to limit our students' abilities, not expand them. This would happen, for example, if the topics in these assessments were the only online research topics assigned during the year or if the assessment's target websites were the only ones used to teach the critical evaluation of source information.

In the very best of worlds, assessments of online research and comprehension will serve to support teachers, parents, and students, showing them what is possible far beyond the specifics of any particular assessment. Good assessments of online research and comprehension demonstrate how skilled online readers may use their online research ability to develop a rich and sophisticated understanding of any area of knowledge that interests them and follow any dreams that they have for their future. It is essential that we quickly develop these to help both teachers and students make these dreams a reality.

TRY THIS!

- Teach the evaluation of search engine results by playing "One Click." Identify a current topic that you are studying in class, such as Japan. Use a search engine to conduct a search using this topic as a keyword. Print out enough hard copies of the search results to provide each student or student pair with a copy. Begin asking questions that require students to make inferences from the search results page to select the one site that meets the criteria you provide (e.g., "Which site would you pick if you wanted to find information that came from the Japanese government about Japanese history?"). Continue asking similar questions, and each time a student answers, ask the student, "How did you figure that out?" This will help identify valuable strategies that students can use during the evaluation of search engine results. After one or two sessions, ask students or teams of students to come up with the "One Click" questions to ask.

- Help students become better searchers by directing them to the resources at Google: Search Education at www.google.com/insidesearch/searcheducation. This site contains lesson plans, live training sessions, and a Google a Day Challenge.

DISCUSSION QUESTIONS

1. We live in a world filled with continually emerging new technologies, each requiring additional new literacies (e.g., Google Docs, Skype, Contribute, Basecamp, Dropbox, Facebook, Foursquare, Chrome, or any one of thousands of mobile apps). Identify the latest new online technology that you have encountered. Which new literacies and strategies does it require? Describe how you are acquiring them. What does this suggest for classroom learning?

2. Visit neag.uconn.edu/orca-video-ira and view the seventh-grade student completing the assessment of online research and comprehension, "Are Energy Drinks Heart Healthy?" What online research and comprehension skills do you see in this video? How is each important for online readers? Do your students have these skills? What might you do to support their development in your classroom?

3. You want to help your students develop communication skills with e-mail, blogs, and wikis, but all are blocked by your school district's filter. You have conducted online research and discovered two child-safe products that you like: ePals and Gaggle. You have set up a meeting with your principal to request that your district conduct a "pilot" of these tools in your classroom. What information will you provide your principal with when you make your request and how would you set up and evaluate the pilot use of these tools in your classroom?

NOTE

REFERENCES

Afflerbach, P.A., & Cho, B.-Y. (2010). Determining and describing reading strategies: Internet and traditional forms of reading. In H.S. Waters & W. Schneider (Eds.), *Metacognition, strategy use, and instruction* (pp. 201–225). New York: Guilford.

Anderson, L.W., & Krathwohl, D.R. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives: Complete edition*. New York: Longman.

Australian Curriculum, Assessment and Reporting Authority (2012). *The Australian Curriculum, version 3.0*. Retrieved December 9, 2012, from www.australiancurriculum.edu.au/Home

Baker, E.A. (2010). *The new literacies: Multiple perspectives on research and practice*. New York: Guilford.

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of*

Educational Technology, 39(5), 775–786. doi:10.1111/j.1467-8535.2007.00793.x

Castek, J., Zawilinski, L., McVerry, J.G., O'Byrne, W.I., & Leu, D.J. (2011). The new literacies of online reading comprehension: New opportunities and challenges for students with learning difficulties. In C. Wyatt-Smith, J. Elkins, & S. Gunn (Eds.), *Multiple perspectives on difficulties in learning literacy and numeracy* (pp. 91–110). New York: Springer. doi:10.1007/978-1-4020-8864-3_4

Coiro, J. (2011). Predicting reading comprehension on the Internet: Contributions of offline reading skills, online reading skills, and prior knowledge. *Journal of Literacy Research, 43*(4), 352–392. doi:10.1177/1086296X11421979

Coiro, J., & Castek, J. (2011). Assessment frameworks for teaching and learning English language arts in a digital age. In D. Lapp & D. Fisher (Eds.) *Handbook of research on teaching the English language arts* (3rd ed., pp. 314–321). New York: Routledge.

Geertsen, H.R. (2003). Rethinking thinking about higher-level thinking. *Teaching Sociology, 31*(1), 1–19. doi:10.2307/3211421

Hopson, M.H., Simms, R.L., & Knezek, G.A. (2001). Using a technology-enriched environment to improve higher-order thinking skills. *Journal of Research on Technology in Education, 34*(2), 109–119.

Kiili, C., Laurinen, L., Marttunen, M., & Leu, D.J. (2012). Working on understanding during collaborative online reading. *Journal of Literacy Research, 44*(4), 448–483. doi:10.1177/1086296X12457166

Kirsch, I., Braun, H., Yamamoto, K., & Sum, A. (2007). *America's perfect storm: Three forces changing our nation's future.* Princeton, NJ: Educational Testing Service. Retrieved December 9, 2012, from www.ets.org/Media/Research/pdf/PICSTORM.pdf

Lankshear, C., & Knobel, M. (2006). *New literacies* (2nd ed.). Maidenhead, Berkshire, England: Open University Press.

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

Leu, D.J., Forzani, E., Kulikowich, J., Sedransk, N., Coiro, J., McVerry, G., et al. (2012). *Developing three formats for assessing online reading comprehension: The ORCA project year 3. Washington,*

DC: American Educational Research Association.

Leu, D.J., Jr., Kinzer, C.K., Coiro, J.L., & Cammack, D.W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R.B. Ruddell & N.J. Unrau (Eds.), *Theoretical Models and Processes of Reading* (5th ed., pp. 1570–1613). Newark, DE: International Reading Association. doi:10.1598/0872075028.54

Leu, D.J., Kinzer, C.K., Coiro, J., Castek, J., & Henry, L.A. (2013). New literacies: A dual level theory of the changing nature of literacy, instruction, and assessment. In D. Alvermann, N.J. Unrau, & R.B. Ruddell (Eds.), *Theoretical models and processes of reading* (6th ed., pp. 1150–1182). Newark, DE: International Reading Association.

Leu, D.J., Kulikowich, J., Sedransk, N., & Coiro, J. (2009). *Assessing Online Reading Comprehension: The ORCA Project* (Research grant funded by the U.S. Department of Education, Institute of Education Sciences). Retrieved December 9, 2012, from www.orca.uconn.edu/orca-project/project-overview/

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects.* Washington, DC: Authors. Retrieved from www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf

Organisation for Economic Co-operation and Development. (2011). *PISA 2009 Results: Students on line: Digital technologies and performance* (Vol. 6). doi:10.1787/9789264112995-en

PIAAC Expert Group on Problem Solving in Technology-Rich Environments. (2009). *PIAAC problem solving in technology-rich environments: A conceptual framework* (OECD Education Working Paper No. 36). Retrieved December 9, 2012, from www.oecd.org/officialdocuments/displaydocumentpdf/?cote=edu/wkp(2009)15&doclanguage=en

Reich, R. B. (1992). *The work of nations: Preparing ourselves for 21st-century capitalism.* New York: Vintage.

Rouet, J.-F. (2006). *The skills of document use: From text comprehension to Web-based learning.* Mahwah, NJ: Erlbaum.

Smith, M.C., Mikulecky, L., Kibby, M.W., Dreher, M.J., & Dole, J.A. (2000). What will be the demands of literacy in the workplace

in the next millennium? *Reading Research Quarterly, 35*(3), 378–383. doi:10.1598/ RRQ.35.3.3

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.

Retrieved December 9, 2012, from www .ntia.doc.gov/legacy/ntiahome/dn/ nationonline_020502.htm

Zawilinski, L. (2012). *An exploration of a collaborative blogging approach to literacy and learning: A mixed method study*. Unpublished doctoral dissertation, University of Connecticut, Storrs.