

Making Sense of

Four strategy lessons move adolescents beyond random surfing to using Internet texts meaningfully.

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Adolescent readers vary tremendously in their ability to locate, understand, and use information online. Recently, I watched a small group of 6th graders searching an informational Web site for facts about hurricanes. Paul confidently navigated back and forth between the site's home page and a series of related pages. I asked Paul why he kept returning to the home page after reading each passage. He explained,

Well, the home page is pretty much the general site with lots of general information on it. The links down the left frame are different topics. If you start at the home page each time, you can click on any of those links to get to more specific links.

Paul was able to efficiently locate the information he needed and move on to the next task.

A few minutes later, I moved to another part of the room to watch Samantha. Samantha was skilled at reading books, but she seemed to have few strategies for making sense of what she was reading on the Internet. She rapidly clicked from one Web page to the next without stopping to read much of anything. When I asked if she was finding what she was looking for, she answered,

I'm not sure. Is this the main page? Hmm. . . . I think this is the main page. No [clicking again], *this* is the main page. . . . Wait, that's not telling me anything either. Oh, hold on, I just went to a totally different Web site. How do I get back?

In just a few clicks, Samantha had become confused about where she was and what she was supposed to be doing. She did not understand how to navigate a Web site's home page or how to recognize important features that could guide her from one choice to the next. As a result, she was unable to locate the information she needed to complete her Internet research assignment.

In my work as a teacher and researcher during the last few years, I have seen similar scenarios. Recent studies indicate clear differences in the quality of strategies that readers use on the Internet (Coiro & Dobler, 2004). Some research suggests that the difficulties experienced by less skilled readers are compounded when reading on the Internet. Less skilled readers tend to lack general background knowledge and interact more passively with text; as a result, when reading on the Internet, they are unsure where to focus their attention and unable to call on alternative strategies if they don't find what they are searching for (Coiro & Dobler, 2004).



A New Kind of Literacy

A growing collection of research suggests that students require new comprehension skills and strategies to effectively read and learn from text on the Internet (Biancarosa & Snow, 2004; Coiro, 2003a, 2003b; Sutherland-Smith, 2002). Reading online is a complex process that requires knowledge about how search engines work and how information is organized within Web sites—knowledge that many students lack. Internet texts also demand higher levels of inferential reasoning and comprehension monitoring strategies that help readers stay on task.

Because today's students need to become proficient in using information

Online Text



Web pages contain text conventions that are unfamiliar even to many tech-savvy students.

online information. Even more surprising, most states have no immediate plans to include these skills within future literacy assessments (Leu, Krzyzek, Ataya, & Coiro, 2002).

To fully prepare students for reading digital text, teachers need to incorporate these new literacy skills into the reading curriculum and support online reading comprehension during content-area lessons. Four challenges face students as they use Internet technologies to search for, navigate,

explore. Students do the activity on paper rather than on-screen so that they can evaluate which links look promising without getting distracted following particular links.

To design the lesson, the teacher conducts a search on the Internet for information relevant to a current theme of study, captures the first few entries from the search list with a screen-capture program, and then prints them out. The teacher prepares questions that guide students to critically examine each entry on the list, noticing text and screen features embedded within the Web site addresses, Web site annotations, and file extensions after each hyperlinked resource. These features help readers make inferences about a Web site's topic, purpose, creator, and audience. Small groups of students share how they answered each question, exchanging strategies for navigating Internet text.

Many students, even those who have frequently searched on the Internet, do not know the meaning of terms like *search engine* and *URL*, so such lessons help bring them up to speed. With a little modeling, students are capable of quickly analyzing and interpreting search results, and their skills vastly improve after only two or three lessons.

For example, Figure 1 (p. 32) shows the first four results of a Google search I conducted using the keyword string "Ancient Egypt sixth grade," as well as a

and communication technologies to succeed both in school and in a knowledge economy, educators will need to consider how to teach and assess online reading. Educational Testing Service, among other groups, is developing models for assessing online digital literacy (2003), and the State Educational Technology Directors Association (2003) has specified frameworks for assessing technology literacy as outlined in the No Child Left Behind Act of 2001. However, not a single state reading assessment in the United States measures strategies needed to navigate and comprehend text online, such as understanding search engine results or critically evaluating the validity of

critically evaluate, and synthesize information. Here I pose each challenge as a question and suggest a corresponding activity that models effective strategies to help students meet that challenge.

Which Link Should I Follow?

One of the most challenging aspects of online reading is understanding how to strategically evaluate a long list of search results to determine which link, if any, to pursue (Coiro & Dobler, 2004; Henry, in press). One critical thinking activity, which I have introduced to many upper-elementary and middle school teachers, encourages students to stop, think, and make predictions about which Web sites to

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FIGURE 1. Reading and Evaluating Search Results Activity

Question/Answer	How do you know?	Why is it important to know?
Which site features information about hieroglyphics? Site 1	<i>I read it in the description after the hyperlink.</i>	<i>The description after the link gives clues to what the site contains.</i>
How many Web sites were found using this search? 147,000	<i>By looking at the top of the search results page.</i>	<i>I should change my search terms to get a more manageable list.</i>
Which site is likely to not be available in three months? Mr. Donn's Ancient History Page	<i>The URL tells me it's an AOL site, and they change a lot.</i>	<i>Interpreting terms in the long URL can suggest whether or not the source is reliable.</i>

The screenshot shows a Google search interface with the query 'Ancient Egypt sixth grade'. The results list includes:

- Ancient Egypt**: A web-based Ancient Egypt curriculum intended for the sixth grade level. Some subjects touched upon are Ancient Egypt, hieroglyphics, hieroglyphic, ...
- Mr Donn's Ancient History Page**: 56 pages - 6th-grade Social Studies Curriculum lesson ideas - Regents Review - Wonderful site! ... Ancient Egypt - Women's Rights (Comparison Egypt & US) ...
- Ancient Egypt Teacher Resource File**: Ancient Egypt: Project page from Mrs. Coburn's sixth grade class, papyrus, ...
- Grade 6: Egyptian Projects and Internet Resources**: Ms Hos-McGrane's Grade 6 Social Studies Class. Welcome to our Ancient Egyptian ...

The first four results of a Google search for "Ancient Egypt Sixth Grade" with related questions and student answers

handout with questions prompting students to analyze features of each entry. I sat with a group of students examining the first four hyperlinks and observed as they answered questions about how many entries in total this search yielded, which sites might contain information on hieroglyphics, and what people or groups created each site.

Even seemingly basic information—such as the fact that about 147,000 sites were found using this search—was not obvious to all students at first. Students realized in their discussion that they must frame the search more narrowly to shrink this list. I helped the students look carefully at the URLs and interpret embedded clues that shed light on the value of each resource—such as the fact that the term “aol” in a URL shows that the link is on an America Online site, probably a personal Web page, and likely to change often. We concluded from the titles of links and descriptions after the links that these sites were probably created by teachers rather than authorities in the field, and further digging

might be needed to unearth sites posted by expert Egyptologists.

How Do I Navigate Within a Web Site?

After readers have selected a relevant Web site, the challenge is to decide what to attend to first after arriving at the site. A natural part of previewing printed text is scanning for chapter titles, headings, diagrams, and boldface words. Previewing a Web site's home page can also give readers a sense of the structure and intended connections among concepts linked within the site. However, Web pages contain text conventions that are unfamiliar even to many tech-savvy students (Ciolek, 1996). Readers cannot skim by rapidly paging through large sections of text, as they do with printed pages; they must think more strategically about how to efficiently preview multiple levels of a Web site for their specific reading purposes.

The following strategy lesson invites students to stop, think, and anticipate where important information about a Web site's content might be found.

When readers learn how to evaluate information on a Web page and monitor their pathway within and between Web sites, they are more likely to stay on task. This skill reduces the chance of becoming disoriented amid pathways of irrelevant information and allows deeper engagement with Internet text.

Initially, the teacher should model for students seven steps for previewing a Web site, thinking out loud to show the decision making that accompanies each step:

1. Read the title of the page and the title of the Web site in the margin at the top of the window.
2. Scan menu choices. Hold your mouse over the navigational or topical menus that often appear down the left frame or across the top of the window, but don't click yet. Get a big picture of the information available within the site.
3. Make predictions about where each of the major links may lead and anticipate a link's path through multiple levels of a Web site.
4. Explore interactive features of

dynamic images (animated images, or images that change as a viewer holds the mouse over them), pop-up menus, and scroll bars that may reveal additional levels of information contained within the site.

5. Identify the creator of the Web site and when the site was last updated. You can often find this information by clicking on a button on the home page labeled "About This Site," but sometimes deeper exploration is needed to find the site's creator. Consider what this information indicates about the site.

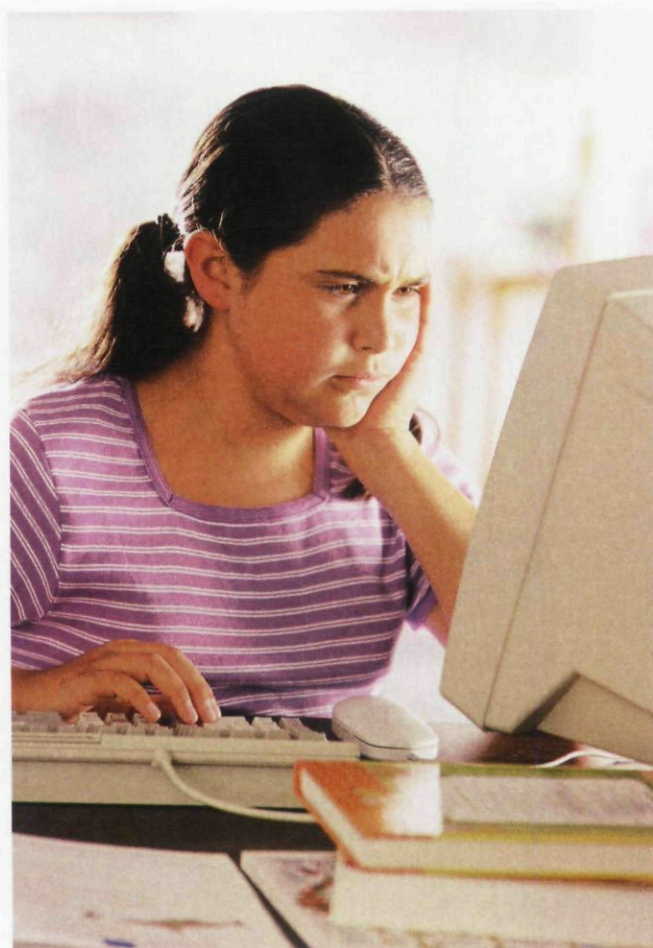
6. Notice and try out any electronic supports the site has, such as an organizational site map or internal search engine.

7. Make a judgment about whether to explore the site further. If the site looks worthwhile, decide which areas of the site to explore first.

Students may particularly benefit from listening in on a skilled reader's decision making for step 7. After several effective demonstrations, students should practice these previewing strategies in their own online reading. This kind of support will help students move away from the shallow, random clicking that often characterizes online reading experiences (Sutherland-Smith, 2002).

How Do I Know This Is True?

Internet technologies raise new issues about our relationship with information. Traditional printed texts used in schools pass through editing, represent



Students require new comprehension skills to effectively read and learn from text on the Internet.

a finite amount of information bound within the covers of a book, and contain images and words designed primarily to provide accurate facts. In contrast, many Internet texts are not carefully edited, link to vast amounts of related information, and are designed

to deceive or persuade young readers (Coiro, 2003b). There are many hoax sites on the Internet. Recently, for example, after clicking on a particularly authentic-looking Web site complete with a skillfully morphed photograph, many students wrote wildlife reports describing the "Pacific Northwest Tree Octopus."

Many readers unknowingly link from the home page of an organization they trust into hyperlinked areas created by other groups, naively thinking that all the information they're reading is endorsed by the group whose home page was their entryway. As students read across Web sites representing multiple perspectives, they must learn to evaluate the credibility of what they find and approach Internet texts with informed skepticism (Leu, Leu, & Coiro, 2004).

Through short evaluation lessons, teachers can model

being informed skeptics. Take, for example, Ken Umbach's online hoax "California's Velcro Crop Under Challenge" (www.umbachconsulting.com/miscellany/velcro.html). An unsuspecting reader might successfully answer multiple levels of comprehension questions related to Velcro crops (such as "What three problems threaten the Velcro crop?") without addressing the issue of whether or not the information in the article is actually true.

The Think and Check activity shown in Figure 2 (p. 34) holds students accountable for considering each question carefully and then checking the validity of the information by recording evidence to support their answers—before they incorporate sources of

factual information into a research project. Teachers might require students to complete several such Think and Checks to validate major sources of information used in a research project.

Here's how a student summarized what he discovered about the validity of Umbach's Velcro crop site:

Does this sound like it makes sense? I asked people I trust if they had ever seen or heard of a Velcro crop, and they all said no.

Where else can I look? I searched for "Velcro crop" and found the site in a list of bogus Web sites.

Who created the Web site and for what purpose? I clicked on the author's biography, which was described as a "totally bogus biography."

Who is the author? He claims to be a self-employed writer and researcher, but another site lists his name and the Velcro crop article in a list of "hoaxes."

Who is linking to this site? By typing in Link:www.umbachconsulting.com/miscellany/velcro.html, I found four other links from Web sites that collect bogus Web sites.

How Do I Synthesize Without Copying?

Generating an original synthesis requires readers to sift through multiple sources of information, interpret them, and elaborate on the ideas that they consider most important. The Internet introduces new complexities to the synthesis process. Sifting through information on Web sites, video clips, collaborative discussion boards, and such emerging technologies as Weblogs compounds the challenges for readers who already struggle with synthesizing multiple sources of paper-based information. Yet digital technology has made it particularly



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FIGURE 2. Think and Check Critical Reading Activity

Think	Check
Does this information make sense?	→ Be skeptical and ask around.
Where else can I look?	→ Search the Internet using keywords in quotation marks, or look in a book.
Who created the Web site and why?	→ Explore the "About Us" link with a critical eye.
Who is the author?	→ Search the Internet using the author's name in quotation marks.
Who is linking to the site?	→ Type "Link:" followed by the URL of the Web site in question into the search box of the Google home page.

easy for students to incorporate portions of other people's writing into their own work.

To move students beyond simply cutting and pasting their notes directly into their final projects, teachers can provide students with a word-processing document (see fig. 3) that serves as a template to help them orga-

nize their research. As they find good information on Web sites, students actually copy and paste relevant text or screen shots into the organizer, accompanied by the address of the site. This way, the actual source text is available for both students and teachers to refer to later on.

In the same document, students

summarize, in their own words, the most salient point they took from each Web site or segment of text. After each summary statement, students compare each new fact with some other information they have acquired and jot down questions and personal reflections on how their thinking has changed about each new idea.

At the bottom of the template, students write an original synthesis of what they have learned that directly addresses their research question. A good synthesis weaves together at least two of their personal impressions with at least two facts learned from their reading.

Toward Savvy Online Readers

Although most online learning tasks require students to move back and forth among all four of these strategies, breaking the online comprehension process into separate steps helps solidify these skills. Adolescent readers will regularly encounter these four reading challenges as they increase their use of the Internet. In an education climate that seeks quality reading instruction and access to technology for all, teachers must pay greater attention to readers struggling with comprehension on the Internet—or risk fostering further inequities in online literacy. **EL**

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FIGURE 3. How to Synthesize Online Sources

Paste into this graphic organizer segments of text relevant to your research question, then record your summary of and reactions to the text.

My research question is:

Source(s): *Copy and paste text or image source here and provide URL for each source.*

a. *Summary:* The most salient points of text are:

b. *Personal connection:* This information connects to other information I have found in the following ways:

This information changes my thinking in the following ways:

My original synthesis, which considers significant points from my sources, is:

My supporting statements, informed by at least two of my summaries and at least two of my personal connection statements, are:

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