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Web Literacy and Critical Thinking: A Teacher's Tool Kit

By Judy Salpeter

This practical guide offers classroom activities and exercises that train your students to be discerning consumers of information on the Internet.

Call it information overload, data smog, infoglut, data dyspepsia—whatever term we use for it, everybody is talking, these days, about the overwhelming proliferation of Web sites, e-mail messages, and other digital information that bombards us on a daily basis. On the positive side, this means our students have access to a huge array of valuable information—primary resources, up-to-the-minute news, and networking opportunities they never would have had before the Internet age. But sending young people out into these uncharted waters without understanding what Alan November refers to as "the grammar of the Internet" can be dangerous indeed.

In recent issues of *Technology & Learning* (See "Net-Wise Teens: Safety, Ethics, and Innovation" by Amy Poftak; "The Educator's Guide to Copyright and Fair Use" by Hall Davidson; and "Teaching Kids to Be Web Literate" by Alan November), we have addressed a number of these dangers—ones related to safety, ethics, and legality. But, as November points out, it is equally unsafe to send students out on the Web without the ability to validate the information they find. The Internet grammar he proposes teaching them includes "a range of critical thinking strategies, from decoding Web addresses to understanding the pattern of links to searching for the owner of a site."

David Warlick of the Landmark Project agrees, explaining that these sorts of skills are key to "preparing kids for a future that we cannot clearly describe. The best thing to teach them, today, is how to teach themselves." He refers to the American Library Association's Nine Information Literacy Standards for Student Learning as "learning literacies"—essential skills that "help people learn in an information-rich, highly networked, and rapidly changing world."

But how do we teach such things? In the next few pages, we look at numerous activities and suggestions that help young people learn how to locate, analyze, synthesize, and critique information.

Searching Skills

HOW TO

You might begin with an agreed-upon search engine and a short list of factual questions (e.g., When was President Bush born? What is the typical number of babies in a litter of leopard cubs? What is the capital of Uganda?). Which key words do the students think will get them to the answer most efficiently? Working in groups, away from the computer, they can write, critique, and revise their search strings.

Online, it's time to test the results. Which team is able to locate the answer with the fewest mouse clicks? Who managed to find a search string that resulted in fewer than ten matches? The Google search engine offers a fun option that can be used for self-testing: the "I'm Feeling Lucky" button takes searchers to a single site that closely matches their search string. If the "I'm Feeling Lucky" hit answers the relevant question, students can feel proud of the keywords they chose.

The ability to search for information online is one of the most basic digital literacy skills. How do you sift through billions of pages of information in order to find the gems?

A search engine is not always where you want to start. Dr. Merle Marsh, director of special projects for Worcester Preparatory School in Berlin, Md., worries that teachers far too often send students off to "search the Internet for . . ." when they would be better off steering them to a preselected list of sites. Her

favorites include Franklin Institute's Educational Hotlists and the links at Kathy Schrock's Guide for Educators.

Providing such prescreened choices is important for younger students—and even for older learners when the goal is to steer them to high-quality content quickly. But, even then, search skills come into play. For example, with Yahoologans, KidsClick, or AOL@SCHOOL, the number of preselected sites is large enough that an understanding of directory structure and the use of keywords to conduct searches becomes important. And when the time does come to send students out onto the wider Web, guidance on the search process becomes essential.

There are lots of tutorials online that focus on the basics—Boolean searching, the use of keywords, and the differences between directories and standard search engines. Increasingly, you can find articles on second-generation search tools such as Vivisimo or Guidebeam and ways of searching the "Deep Web" for data contained within databases not accessed by the standard search engines. We link to some of these tutorials in the online version of this article, and others can be found at the search sites themselves.

How Many Hits?

"When we hear 'Wow, I got 1,000 hits!' we know we have not met our responsibility to our students," says Dr. Marianne Handler, professor at National-Louis University. Experimenting with and discussing Web search techniques helps students discover that the true challenge is to get just a few hits. One can make a game out of this challenge, with a variety of playful races designed to hone fact-finding skills.

As your students work on refining their search skills, take the opportunity to discuss what they have learned. Can they come up with a list of tips for other students trying to narrow in on information quickly? What suggestions—from tutorials, teachers, peers, or elsewhere—were most helpful to them?

Scavenger/Treasure Hunts

HOW TO

You can challenge students to test out some of the search options for themselves, building charts of their own. Assign each student or group of students two search tools to compare, and have the class agree upon some test questions and search approaches to use in their testing. Discuss what criteria they will use to measure the effectiveness of the tools. What, besides the number of search results, might capture the value of the tool and its relevance to them? For example, students might decide that, when using the same search string with different engines, the test for school purposes is how many of the top 10 search results seem relevant to the question at hand.

If your students are having fun with the homegrown search challenges above, they will undoubtedly enjoy some of the scavenger and treasure hunts that abound on the Net. Although these activities offer far less in the problem-solving realm than the popular WebQuests described later, they do offer a motivating way of practicing basic fact-finding skills.

Many of the treasure hunts you will find on the Web actually give you the site or sites to visit; in those cases, the "searching" is within the site—basically, skimming for information. This is helpful for developing reading and research skills and gathering background information for a new unit of study. Even more powerful, if you want students to practice search skills at the same time, is to have them create their own treasure hunts.

Here are some interesting hunts and links to others, along with suggested tools for creating your own.

Which Search Engine?

Most of us have our favorite search tools, and Handler suggests that, if you don't have a single mandated search interface for your district, it is wise to direct students to one or two search tools of your choosing.

On the other hand, the process of comparing search options and narrowing in on their own favorites can be a good learning experience for older students.

You can start off by observing some of the findings at a site such as Search Engine Watch, which offers elaborate lists and charts with information on the popularity, size, speed, and search approach used by a variety of search engines. What are the most popular search tools of the day? What new tools are worth checking out?

Problem Solving and Applying

If our first challenge when facing the vast Internet is locating desired information, an equally big and important set of literacy skills involves using and interpreting that information. Clearly we need to teach students to cite sources and avoid blatant plagiarism, but it goes far beyond that. How do we help our students do more than simply grab and parrot back the information they find electronically?

The "Right Kind" of Assignments

David Warlick is a strong advocate of goals-based projects, in which students "collect, synthesize, process, assemble, and express" information. With such projects, he writes, "students are less likely to simply copy and paste large chunks of text. [Instead, they] will find and copy smaller chunks of information and then carefully assemble them to produce information products that are designed to accomplish something."

David Jakes and his partners at Internet Innovations, Inc. agree. In their e-paper on inquiry-based learning, they suggest that, rather than asking students to address a question like "What is cancer?" we need to be steering them to such essential questions as "What plan can I develop for reducing the chance that I will contract cancer in my lifetime?"

Other examples of essential questions around which to build research projects include:

Should Puerto Rico become the 51st state of the United States?

What invention of the 20th century has had the greatest impact?

Should animals be genetically altered to produce human proteins?

Should the remaining cultures of smallpox be destroyed?

What is the best strategy for reducing the impact of acid rain in the United States?

According to Internet Innovations, foundation questions (the sorts of "what is" or "when did" questions described earlier) play an important supporting role in student inquiries. A number of tools at their site lead students through the inquiry-based research project, beginning with an essential question and a hypothetical scenario in which it would be relevant, then identifying foundation questions that will provide the scaffolding for the final project.

Jakes explains that, when working with a high school class over a period of time, he gradually decreases the amount of guidance he offers. For example, he begins with a complete project page that includes foundation questions, then moves on to projects where students generate their own foundation questions and decide which Web resources to use. Eventually he has them design their own inquiry-based projects from beginning to end.

WebQuests, Anyone?

WebQuests, originated by Bernie Dodge and Tom March, are popular examples of what Warlick and Jakes would call the "right kind" of online assignments. Conduct a search for WebQuests and you will find hundreds and hundreds of examples, some misnamed, but many offering what Dodge refers to as "inquiry-based [activities] designed to use learners' time well, to focus on using information rather than looking for it."

Each WebQuest is built around a task, which provides a context and motivating goal for student work. In his article "A WebQuest Taskonomy", Dodge gives examples of interesting tasks, falling into 12 different categories. These range from mysteries—as in "King Tutankhamun: Was It Murder?" developed at Washington Intermediate School in Pekin, Ill.—to consensus-building Quests such as Tom March's "Searching for China," which has students reading about and debating six different perspectives in order to arrive at a common policy recommendation.

WebQuests offer great ways of enriching the curriculum while teaching students to analyze and synthesize information they find online and elsewhere. If you're looking for exciting WebQuests to try out with your students, you can start with the sites by Bernie Dodge and Tom March, the originators of the WebQuest model. Better yet, you and your students can use some of the examples as inspiration for building relevant WebQuests of your own.

Who's Behind the Curtain?

HOW TO

As you focus in on the question of authorship, it can be interesting to revisit some of the fact-finding races described before. Perhaps your students already discovered that, when racing to find an answer to a supposedly factual question, different groups came up with different answers. You can introduce a new game at this point—we will call it "Says Who?" This time, send the students off with a new series of questions. For example: What is the most popular American sport? How much activity do you need in a day to stay healthy? How old is the earth? Have them return not only with an answer to the question but also with the background information on the "authority" from whom they received this answer.

One of the most important Web literacy skills is an understanding that information does not simply appear online. Somebody had to gather the data and create the page for posting on the Web. Was it an experienced scholar? An advertiser? A fourth-grade student sharing her own research paper? The answer to the above can clearly have a major impact on the value of the information to your students.

"Who Done It?"

A basic but important exercise is to have students look closely at sites they use often. Challenge them to become sleuths and figure out what they can about the creator of the site. Is there an About This Site page or another link that offers them information about the people behind it? Is there copyright information at the bottom of the page? When was the site created or last updated? Is there an e-mail link that lets you write and ask for more information? What else can they find out about its author simply by using the information provided at the site itself?

It is important for students to get used to citing this sort of information as they complete their research. Just as there are standard rules for book citations, we need to develop rules for the Web. At the Landmark Project site, David Warlick shares his suggestions for the types of information to include in a bibliography—complete with a digital index card to guide students through the steps.

Backtracking the URL

In addition to looking at a home page and its links, a lot can be learned from the URL itself. David Warlick suggests teaching students how to apply their digital detective skills to a URL-backtracking from right to left, removing one element at a time and looking for clues at each subpage you reach along the way.

HOW TO

When your students get to the domain name, what does its suffix (.com, .org, or .gov) tell them about the site and its orientation? Warlick recommends paying a visit to www.internic.com and searching for the domain name. Who owns it? What can you find out about that author by conducting a search? You can also find out what other online resources link to the site you are researching—either by typing the command "link: http://" followed by the site name in the search window at Altavista or using the "link" tool at Google. What does that tell you about the nature of the information and the visibility of the site and its author?

Fact or Fabrication?

HOW TO

Fact or Opinion?

There are a number of things that can be done to strengthen students' ability to resist such manipulation. For starters, it is important to help students of all ages learn to distinguish between fact and opinion. You can do this with websites, books, even materials they themselves have created. Marsh suggests, for example, having students generate ideas for a website on a topic relevant to your curriculum. Encourage them to be creative and varied in their approach. Perhaps they will include a "Top 10" list, charts and graphs, illustrations, or advice for other students. As they share their content ideas with classmates, ask them to identify which information is factual, and which opinion. A lively conversation will undoubtedly ensue.

When they are ready, you can begin to take on more controversial issues. You might, for example, have students check out the following sites, which offer radically different perspectives on smoking: smokingsection.com and [Health Hazards of Tobacco](http://HealthHazards.org).

Other examples can be found online in the article, "The Good, The Bad & The Ugly, or Why It's a Good Idea to Evaluate Web Sources" by Susan E. Beck of New Mexico State University Library. Or you could challenge students to do their own research to find point-counterpoint sites on such topics as the effects of television viewing on children or the advantages and disadvantages of a diet high in carbohydrates—or any other controversy that ties in with a current curriculum topic. As each site is located, students can summarize the key points being made and identify which ones directly contradict what they have learned elsewhere.

Then it's time to debate what is the "truth." Which point of view is more popular? Does that make it more believable? Who created each site, and what reasons might that individual or organization have for espousing a particular point of view? Are they simply stating their opinion, or is there evidence that they are distorting or hiding information to make their case?

As your students become increasingly aware that the information they find online was created by real people, the next step is to focus on the question of "Why?" Every site and online article was created for a reason. While these reasons are rarely sinister, information found online—and in other media, as well—is almost inevitably biased in some way.

Find the Hoax

It is important to offer students plenty of practice sleuthing not just for site authorship but for different forms of misinformation. In an online slide presentation at her website, Kathy Schrock lists the following as common causes of misinformation:

- Data changes
- Out-of-date information

- Removing information from context
- Pranks

The last item on her list—the prank or hoax—provides an entertaining and effective tool for helping students hone their "truth detective" skills.

According to Handler, the important thing is to create teachable moments in which the students "accidentally" discover a hoax site. One example is described by Canadian educator Keith Mack at the Media Awareness Network's website.

Mack asks his students to help him do background research for a promotional site for their community. In order to see how other communities promote themselves, he directs them to the following sites: New Hartford, Minn. and Whitemouth, Manitoba.

Only after the students have perused the two sites, taking notes for their own community project, does Mack announce that one of the two sites they have been visiting is a fraud. Not surprisingly, many of his students respond with disbelief and comments such as, "I saw it, Mr. Mack. It was on the Internet—it has to be true!"

Other hoax sites can be used to create such moments of cognitive dissonance. You will want to pair them with similar, non-hoax sites—and a believable scenario—in order to avoid giving away the hoax. The idea is not only to ask students to guess which one is the fake, but to challenge them to prove it. Try it yourself; it's not easy!

Pushing a Point

While hoax sites are mostly there for entertainment or educational purposes, many other websites that purport to tell the truth are questionable because of the biases of their creators. Most disturbing are a small but virulent group of hate sites disguised as scholarship—examples of which Alan November and Scott Granneman point to in their online article on security issues for schools. These are not the sorts of Web pages you want to take students to without careful thought and planning—if at all—but they are sites you should know about in order to anticipate what can happen when students stumble upon misinformation of the malicious type.

What Are They Selling?

The CyberSmart website features an excellent series of activities related to advertising and critical thinking. First-graders start off with activities that have them identifying ads online. Second- and third-graders visit popular commercial sites from Crayola, Mattel, and other toy creators, identifying the star of the product and how the site's creators entertain them and make them want to return. In the older grades, the lessons move on to other commercial sites (Nickelodeon, Discovery Kids, Cartoon Network, and so on), introducing terminology such as "sticky" (users want to "stick" to good sites), and having students compare and contrast different sites. Eventually students are challenged to design their own sticky sites.

Whether you choose to follow the CyberSmart lessons or spin off your own versions, helping students critique and compare commercial sites is an important way of bringing about an understanding of the goals behind them.

Taking the Stage

Sometimes the best way to learn to be a discerning viewer of others' work is to try to do some authoring—and manipulating—yourself. You can find some great suggestions at Yahoo!igans. After sharing information about Stalin and the ways in which he airbrushed photos to remove key people from the scene, the lesson challenges students to try their own photo manipulation. From there, students build to manipulating graphs and creating entirely bogus sites on a fictional topic of their own choosing.

If students end up creating and posting their own hoax sites online, you will want to talk to them about possible repercussions. Remind them that there's a good likelihood that their sites will show up as a search result for some unsuspecting Web surfer at some point in the future. Suggest that they check out the following Web page: web.fvdes.com/teacher_resources/Web_Eval_TL/OKWine/Okawp.html. It is written by teacher John Goldsmith, who—to make a point about Web accuracy to students and fellow educators—created a hoax site on the wonders of the Oklahoma wine industry.

As you can deduce from his retraction page, he found himself in some hot water with a group of people he originally did not believe existed—the real Oklahoma vineyard owners.

Putting It All Together

To reinforce the information literacy skills outlined in this article, and to help guide students to quality sites, it is tempting to create or locate an evaluative checklist for students to follow in locating the "best" sites. There are many such checklists out there—some of them listed in the online version of this article—but David Warlick cautions that the question needs to be rephrased as, "best for what?" Moreover, he believes that most checklists are too cumbersome for any of us to use on a regular basis.

HOW TO

He suggests narrowing down the checklist categories to three basic questions:

Who? Who created this site, and does that lend credibility to or detract from the validity of the information?

When? How current is the site, and does that matter for this particular topic?

Why? What is the reason for this information and the site's format, and how does that affect its value to you?

David Jakes also advocates keeping the number of questions to a minimum. Here is Internet Innovations' three-step process for narrowing a search.

Step 1: Applicability. Students determine if the information at the website is relevant and useful for answering their questions. If so, they continue to step 2. If not, they continue searching.

Step 2: Authority. Students then determine if the information at the website originates from a readily recognizable expert, organization, or qualified person or group. If yes, they use the website to answer their questions. If not, they return to searching.

Step 3: Reliability. The final step in the information evaluation process requires students to cross-reference websites. Each student or team is assigned a site to use for answering a set of questions. They then compare their answers with those obtained from other sources in order to assess the reliability of the information.

Of course, as with most of the other activities described in this article, deferring to the students is often the wisest course. As they become increasingly Web-savvy and information literate, most learners will be more than ready to create checklists, posters, and a variety of other teaching tools to help fellow students learn the grammar of the Internet.

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