

Professional Readings from tc²

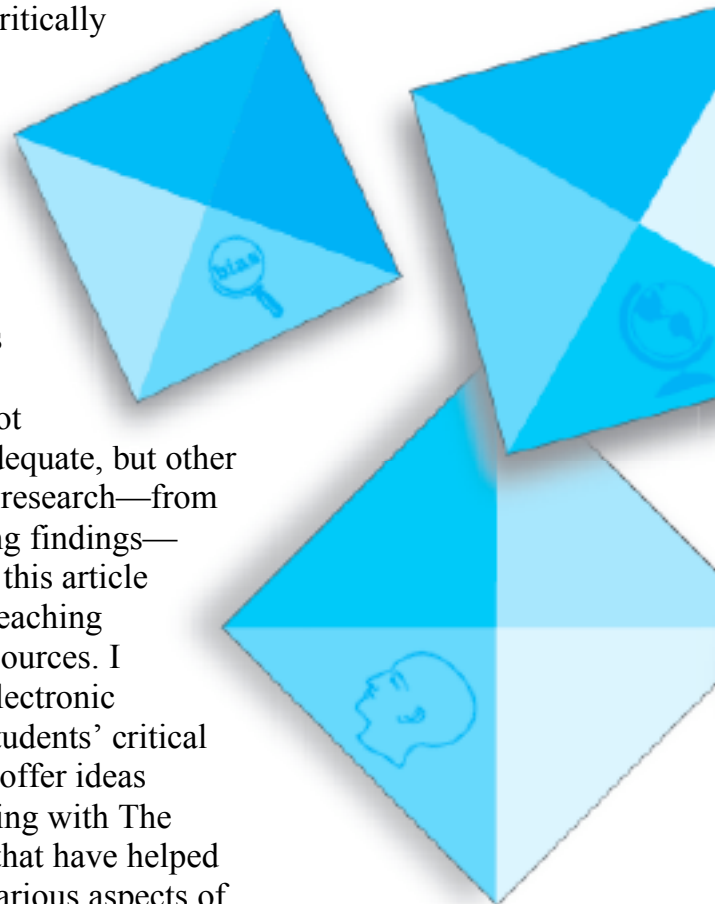
Making Critical Thinking an Integral Part of Electronic Research

By Roland Case

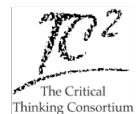
The call to help students think critically about the content and use of electronic information technologies is a common refrain. Regrettably this call has answered adequately. This occurs even in the area of evaluating the credibility of website information—an area that is the focus of most of the work on supporting critical thinking about the Internet. Not only are many efforts in this area inadequate, but other aspects of electronic information and research—from focussing an inquiry to communicating findings—receive even less critical attention. In this article I highlight inadequacies in common teaching evaluating the credibility of Internet sources. I consider in passing other aspects of electronic research that should be the focus of students' critical reflection. On a more positive note, I offer ideas developed by teacher-librarians working with The Critical Thinking Consortium (TC2) that have helped students think more critically about various aspects of electronic research, but especially about the evaluation of information.

Critical evaluation of Internet information

It is not surprising that the predominant efforts to support students in thinking critically about electronic research have focused on evaluating the credibility of



The Critical Thinking Consortium
Education Building
University of British Columbia
6365 Biological Sciences Road
Vancouver, BC V6T 1Z4
604.822.9297 (p) 604.822.6603 (f)
tc2@interchange.ubc.ca www.tc2.ca



© Canadian Association for School Libraries 2003. ISSN 1710
8535 School Libraries in Canada Online, Vol 22 (4) Reprinted
with permission. If you would like to make additional copies of
this resource, please contact *School Libraries in Canada* journal.

Internet information. The dubious reliability of this source has been widely documented and only heightens the importance of adequately preparing students to make sound judgments about the information they obtain. The tendency has been to provide evaluation checklists for student use in judging the credibility of information. Although this is a potentially useful strategy, many of the checklists, developed initially for university audiences, are inappropriate for elementary and secondary students. For example, checklists often invite students to judge the accuracy, currency and comprehensiveness of information found on a site. Unquestionably these are important considerations. Yet, the application of these criteria presupposes student knowledge—and in some cases considerable knowledge—of the research topic. Unfortunately, students typically lack even modest background knowledge about the focus of their research and thus are incapable of making informed judgments in light of these criteria. Even an assessment of ‘currency’ presupposes that students know about developments in the field since the work was published. In the absence of this background knowledge, student typically base their assessment of currency on the publication date. This is a highly unreliable indicator—a 50-year-old article on DNA or gravitational physics may be far less dated than a one-year-old article on Iraqi governance or contagious diseases in Toronto. In the language of the TC2 model of critical thinking, students lack the requisite background knowledge—one of five types of intellectual “tools” involved in thinking critically.

The absence of relevant critical thinking vocabulary—another of the tools that many students lack—further undermines their ability to effectively apply evaluation checklists. For example, students are often asked to detect whether or not a website is biased without being helped to develop an adequate understanding of the concept. Many students incorrectly believe that any expression of an opinion is evidence of a bias and, conversely, that any site which contains only factual statements is necessarily without bias. Clearly students need to understand the concepts that are central to thinking critically about Internet credibility, before they can make informed judgments.

Students’ acquisition of yet another requisite tool is inadequate because website evaluations typically occur as isolated assignments and not as matters of routine. In fact, it is becoming increasingly common to pre-screen sources (as is done with WebQuest) to avoid having students assess sites for themselves. This well-intended practice may actually lull students into a false sense of trust, the effect of which is to undermine what we regard as another important tool of a good critical thinker, namely the possession of a questioning attitude or “habit of mind.” Rather than screening sites, we will have greater success in nurturing a habit of critical scrutiny in our students if we consistently insert dubious Internet sites into our reference lists. Only if students know to expect erroneous sources will they develop vigilance in searching them out. Another popular but potentially counterproductive practice is to invite

students to offer “yes or no” assessments to questions, such as “Is the information complete?” or “Are sources for factual information clearly listed?” In our experience this “all or nothing” approach encourages simplistic, one-sided conclusions. Instead, we should nurture “tolerance for ambiguity,” defined as a willingness to work with nuanced, not black-or-white answers.

Teaching the tools

As the above discussion illustrates, we are concerned that many of the essential tools needed to prepare students to think critically about Internet use are not adequately taught. As illustrated in the chart of sample tools, students’ ability to think critically about every aspect of electronic research, not simply evaluation of information sources, requires the possession of different types of tools: criteria for judgment, background knowledge, critical thinking vocabulary, habits of mind and thinking strategies.

Sample tools for thinking critically about electronic research

Background Knowledge - the information about a topic required for thoughtful reflection

Students cannot think deeply about a topic or technology if they know little about it. Two questions to ask in developing this tool:

- What background knowledge do students need for them to make a well-

informed judgment on the matter before them?

- How can students be assisted in acquiring this information in a meaningful manner?

Criteria for Judgment - the criteria or grounds for deciding which of the options is the most sensible or appropriate

Critical thinking is essentially a matter of judging which alternative is sensible or reasonable. All judgments are based on criteria of some sort or another.

Although students will not always agree on identical criteria, they need help in thinking more carefully about the criteria to use when judging various alternatives.

- Are my research questions focussed and relevant?
- Are the search parameters restrictive and sufficiently inclusive?
- Are our sources reliable?
- Is my interpretation plausible?
- Is the website appealing and functional?

Critical Thinking Vocabulary - the range of concepts and distinctions that are helpful when thinking critically

Students require the vocabulary or set of concepts that permit them to make important distinctions among the different issues and tasks facing them. These include conceptual distinctions such as:

- bias and point of view;
- various informal fallacies (e.g., false appeal to authority);

- primary and secondary source;
- evidence and implication

Thinking Strategies - the repertoire of procedures, models, organizing devices, and hints that may be useful when thinking through a critical thinking problem

Although critical thinking is never simply a matter of following certain procedures or steps, there are strategies that are useful for guiding performance of when thinking critically:

- Research models: Are there steps or procedures to follow that would guide students through the factors they should consider?
- Search strategies: What techniques and hints might help students conduct more effective searches?
- Information organization: Would a graphic organizer (e.g., webbing diagrams, Venn diagrams, "pro and con" charts) be useful in representing student knowledge?

Habits of Mind - the values and attitudes of a careful and conscientious thinker.

Being able to apply criteria and use strategies is of little value unless students also have habits of mind of a thoughtful person. These include:

- Open-minded: Are students willing to withhold judgment when warranted? Are they willing to consider evidence against their view and to revise their view should the evidence warrant it?
- Tolerance for ambiguity: Are students accepting of answers that are not black-or-white?
- Inquiring or "critical" attitude: Are students inclined to question the clarity of and support for claims, and to hold justified beliefs and values?
- Intellectual work ethic: Are students willing to expend the effort required to complete the thinking tasks competently?

In our approach, we consider the range of tools that students will need for the task and assist students in acquiring them. For example, we do not presume that students will understand all the criteria and vocabulary for evaluating information and so would teach these tools through a practice activity, such as the one found in the chart "How reliable and why?" Notice also in this example our use of a rating scale. In moving students away from a forced dichotomy, we hope to encourage a more nuanced assessment and thereby reinforce tolerance for ambiguity.

How reliable and why?

We would use several approaches to ensure that students have the requisite background knowledge to competently apply the criteria for evaluating information sources. The most obvious although not necessarily the easiest method is to provide students with pre-reading containing the contextual information they will require. Another strategy is to invite students to make relative assessments of the credibility of two or three sites (students would judge whether each site is more/less current or comprehensive than the others). This kind of comparative assessment requires less background knowledge than is needed to judge the currency or comprehensiveness of a site on absolute terms. Another strategy is to teach students to assess the credibility of sites using “non-substantive” criteria—that is, criteria that do not require knowledge of the subject matter. In the chart reproduced on the next page, students consider a set of four “circumstantial” criteria (credentials of the author, care in preparation, type of site sponsorship, trail of evidence) that can be competently applied even if students know very little about the specific topic. Other notable features of this evaluation chart are the expectation that students provide reasons for and against their assessment on each criterion and the use of two critical thinking concepts—evidence and implications. Students are aided in probing more deeply into the credibility of each site by inviting them to distinguish “evidence” found on a site (e.g., the author has a Ph.D. from Harvard) from the possible and potentially competing “implications” that the evidence may have for the site’s

credibility (e.g., a Harvard Ph.D. may mean the author knows a lot about the topic; it may also suggest that the site has an American perspective).

As the term implies, nurturing “habits” of mind requires ongoing and persistent opportunities for students to engage in critical scrutiny. Because of the demands on teachers to “cover” the curriculum, Internet use must be embedded into the teaching of subject matter and should not be tied exclusively to large-scale (and therefore time consuming) independent research projects. We try to offer instruction on evaluation of Internet sources or for that matter on other steps in the research process as mini-lessons integrated into content instruction. For example, in an upcoming resource, students add to their knowledge of the Canadian North as they learn the tools for framing thoughtful questions of an e-mail pal. So too, students learn to think critically about information needs as they undertake a mini-project on space exploration.

Two primary teachers using our model helped their grade two and three classes think critically about web design while integrating curriculum outcomes from four subjects (see bibliography for a further description of this project). Prior to creating a class website to publish their own written work, the teachers invited students to develop criteria for a good website by analyzing three toy manufacturers’ sites—Beanie Baby (www.ty.com), Barbie (www.barbie.com) and Tonka (www.tonka.com) and two educational sites for young children — “yucky” facts about the human body

(www.yucky.com) and the “kid’s” corner of the National Geographic (www.nationalgeographic.com/kids). After much thoughtful discussion, the upshot of their comparative analysis was a list of student-developed criteria: has an interesting subject, can be enjoyed by girls and boys, is full of colour, is informative, is not slowed down by too many pictures and graphics. Using these criteria as the foundation for decision making, each class negotiated the design and development of its site. (The primary students’ website containing their illustrated writing samples can be accessed at www.deltasd.bc.ca/cd).

Because of factors such as limited access to equipment, time constraints and unpredictable results, it is often impractical to expect students to evaluate multiple sources of information gathered from open-ended searches. As the above primary example suggests, it is often more efficient for the teacher to select a handful of websites for comparative assessment. For the reasons suggested earlier, we regularly include flawed sites so that students develop the habit of critical scrutiny. Although flawed sites are available on the Internet, it is

unrealistic to expect age-appropriate sites on a wide range of curricular topics. (Amusing but effective examples of flawed website on cloning that we have used with our students can be found at “Clones-R-Us” <http://www.d-b.net/dti/> and “How to Clone a Human” <http://www.biofact.com/cloning/human.html>). A more reliable approach is to accumulate sets of key sites on various curricular topics and deliberately doctor (or invite students to doctor) one site in each set so that it is no longer reliable. Initially, make the flaws very obvious, but with older students the flaws can be increasingly subtle. In our experiences, students enjoy finding the “fraud” and typically examine the documents more closely than they would otherwise.

Although there is much more to be said on the issue, I have endeavoured to illustrate the important need for a more systematic and integrated approach to preparing students to think critically about electronic information and research. Our group believes that the key to greater progress towards this goal is the careful identification and deliberate instruction in the requisite tools for each task in the research process.

Bibliography

Thinking Critically About the Internet: Surfing the Net in the Primary Grades
Rempel, K. & Brunner, S. (Spring 2001). *Primary Leadership* 4(1), 56-59 (special
“Critical Thinking” issue)

© Making critical thinking an integral part of electronic research. Published in *School Libraries in Canada*, 22(4), 13-16. (2003).