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# Evaluating Information on the Internet

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*The Internet as a source of information is vast, disorganized, and continually in a state of flux between updating and stagnating. Students must develop strategies to cope with these problems. The Internet itself provides many opportunities for students to be taught the skills of evaluation: appraisal, criticism, discrimination, comparison, ranking, and verification. It can provide the modeling of strategies for using search engines, how to distinguish between good and poor sites, and detecting misinformation.*

## *Introduction*

This is an exciting time for teacher-librarians and classroom teachers. The Internet offers an important opportunity to teach evaluation skills where they will be instantly recognized by students as necessary and relevant. As teachers struggle to cope with the information explosion themselves, it is an opportune time to model the skills needed to evaluate what is found and to reduce the information overload. Technology has made the mechanics of searching easier than ever before, but has increased dramatically the need for critical thinking in the development of search strategies to enhance the validity of search outcomes and sift through the plethora of information available.

The need for evaluation skills is obvious. The increasing amount of literature available on the subject attests to this fact. This need has always existed, but the Internet has demonstrated such skills to be paramount. Children show signs of blossoming evaluation skills with questions some parents dread: *Why? How? When?* But as their schooling progresses, students seem to become more accepting and passive absorbers of data. We need to teach them to question what they are reading, hearing, and seeing—that what is presented is not always truthful, without bias or manipulation. Evaluation criteria provide a systematic approach for searchers to assess the quality of the information they encounter. A checklist of criteria can clearly indicate potential problem areas and raise awareness of such problems as bias, authority, and currency.

The advent of the Internet as an information source has essentially not changed the problems students previously encountered with print and electronic resources such as CD-ROMs and databases. However, these materials have generally undergone scrutiny by editors and publishing companies before being made available. Anyone can author anything on the Internet, and so now there must be even more awareness of the need to examine this material critically. With digital alteration of images possible,

selective editing of news items, and manipulative advertising, information seekers need to be more discerning of the validity of the information available. An evaluation checklist may not cover all possibilities of information "massage," but it can provide an awareness of the need for healthy skepticism. There is also scope for evaluation of the search engines used to access Internet sites and Web page information. E-mail, listservs, news groups, and bulletin boards as communication tools should also be subject to scrutiny in terms of evaluation criteria.

Many students perceive the Internet as the only useful resource, providing the most current, most prolific amount of information on every conceivable topic, and the fastest means of obtaining that information. However, in practice, research has shown that students found their Internet searching frustrating and time-consuming for little productive result, due to lack of appropriate searching strategies and poor search technique (McNicholas & Todd, 1996). They have not comprehended that the Internet is riddled with misinformation, and that more than ever evaluation skills are necessary to decipher the good from the bad and indifferent. Skepticism is a useful filter to be applied (Safford, 1996).

The importance of evaluation has emerged as a major concern of information professionals, educators, and Internet users, and bibliographies of articles and Internet sites are appearing on the World Wide Web (Kotlas, 1997; Auer, 1998; *Evaluating the Quality*, 1997; Smith 1998). There is also a useful AskERIC Infoguide: *Evaluating Internet Resources for Use in Higher Education* available from the ERIC database online at http://ericir.syr.edu/ and search infoguides.

## *Students' Searching Problems*

Neuman (1995a, 1995b) found that students had problems generating search terms, designing effective search strategies, and overcoming mismatches between personal ideas of how information is organized and how information is actually organized in electronic databases. Although Neuman's research was based on CD-ROMs, her conclusions can be related to similar problems found in Internet searching, and indeed to print resources. McNicholas and Todd (1996) commented that student Internet searchers experienced frustration due to lack of selection skills. Library materials preselected for their relevance to the curriculum provided a short cut to useful information. When faced with the information overload of the Internet, students did not have the discriminatory or evaluative skills to reduce their information retrieval to a manageable result.

Students lack strategies to deal with the information they find. Library instruction tends to concentrate on where to look, but not on what to do with the information found (Wesley, 1991).

> By refocusing our time to concentrate on decision making and evaluation, students can be taught to identify the main issue and understand the relationships

among related concerns. They can gain experience in determining the appropriate types of information sources—expert, general; primary, secondary; narrative, graphic. They can become familiar with the many factors that determine the quantity of information required. They can understand that every piece of information comes from a specific frame of reference and represents truth only in that frame of reference. They can begin to feel comfortable questioning all sources of information they encounter. (p. 24)

## *Characteristics of Search Engines*

The tools to unlock information from the Internet are the search engines, subject directories, and meta-indexes, which provide access via keywords or search strings (see Appendix for a list of search tools on the Internet).

Students lack knowledge of search engine characteristics, and this will affect the results they obtain when using such tools (Walster, 1997; Abilock, 1997). Strategies such as determining what sources are actually searched by the search engine, analyzing the quality of the information found, and understanding the rules and idiosyncrasies of each search engine are essential for successfully locating desired material (Walster, 1997). For example, Alta Vista searches Web pages and Usenet news groups. It allows Boolean searching using *and, not, or;* phrases in quotation marks; proximity searches using *near;* truncation (cat* will include cat, cats, catalogue, catering, etc.); language searching; and the facility to limit searches to parts of documents such as titles or URLs. Tillman (1997) advocates the need for a systematic approach to the use of search engines. Abilock's (1997) diagnosis questions may provide such a systematic approach that is useful for the novice searcher.

Todd (1997) makes the interesting observation that the library catalogue, "the contents page of a book, the menu of a multimedia CD-ROM, the classroom teacher, the teacher-librarian, and the journal index are all search engines as well and all work differently to retrieve relevant information" (p. 28). Understanding how search tools operate leads to more intelligent searching, but there are still information problems to be confronted.

The literature abounds with articles on the characteristics of different search tools. Although some are dated in Internet terms, useful advice for searching via these tools is offered. In particular, Notess (1997) warns that browsers such as Netscape and Internet Explorer search engine buttons do not lead to the actual site, but to an abridged version of the selected search engine.

The advice from the literature regarding search engine use is not to rely on searching from one database alone, as understanding the strengths and weakness of each determines the success of locating the information required (Feldman, 1997). Abilock (1997) provides a matching of information need (such as requiring a broad overview of a topic) to a search engine suitable for that purpose (Yahoo as a subject directory). This diagnostic form of selecting search engines is particularly useful in aiding students to become independent information users (see Table 1).

Table 1
Matching Information Need with Search Tools

| *Information Need* | *Suggested Search Tool* |
|---|---|
| Broad need<br>Overview of topic<br>Narrowing topic | Yahoo (subject directory) |
| Small but relevant result list | Excite (query by example or more like this) |
| Availability of resources | MetaCrawler, Savvy Search, Inference Find |
| Reviewed or ranked sites | Magellan, Point, WebCrawler |
| Unusual or rare keyword, e.g., species name<br>Narrow or very specific term search | Alta Vista |
| Common search term, e.g., computer, Internet | HotBot |
| Scientific information | Alta Vista |
| Natural language (full sentence query) | Infoseek |
| Proper names (people, places, cities) | HotBot |
| Internet domains (com., edu.) | MetaCrawler, HotBot |
| Images, sounds | Ultraseek, Imageseek, Lycos Media, HotBot |
| Quotations | Open Text |
| Answer to a specific question | Ask Jeeves, AskERIC (education query) |

(Abilock, 1997; Feldman, 1998).

## *Web Site Evaluation Criteria*

In evaluating Web sites, two aspects need to be considered—the site design and the information presented on the site. Wilkinson, Bennett, and Oliver (1997) have drawn up a list of 11 criteria with matching indicators of quality that were ranked according to their importance by a review panel of experienced Internet users. These criteria are:

1. Site access and usability;
2. resource identification and documentation;
3. author identification;
4. authority of author;
5. information structure and design;
6. relevance and scope of content;
7. validity of content;
8. accuracy and balance of content;
9. navigation within the document;
10. quality of links;
11. aesthetic and affective aspects.

There is much literature available on evaluation criteria for the Internet, all with varying emphases and depth. Many of the criteria can be applied to different types of electronic sources or slightly adjusted to enhance

relevance. Schrock (1996a, 1996b) has produced critical evaluation surveys for three school levels. Simple yes-no answers for questions in categories such as site presentation and content are pitched at the elementary level, whereas more probing questions are contained in the middle school and secondary levels. Each survey requires the Web browser, URL, and site name to be recorded, a useful habit to develop. The surveys also require a written analysis of the student's opinion of the site. McLachlan (1999) has devised a checklist for teachers in determining site suitability for classroom use. Speed of loading, first impressions of the site, ease of navigation, use of multimedia, and content criteria are examined on a 5-point scale with score ranges allocating a suitability rating. A most impressive site for classroom use in developing Web skills is the Widener University/Wolfgram Memorial Library module approach (Alexander, Powell, & Tate, 1997a). Eight self-contained modules, including one on evaluation of Web resources, are available for self-paced instruction.

Sites and pages on the Internet should be evaluated in terms of their authority, balance, and objectivity, currency, accuracy, coverage, purpose, and site organization and design. Sample questions for each aspect are listed in Table 2, compiled from criteria described in the following references: Alexander and Tate (1997); Beck (1997); Caywood (1998); Grassian (1997); Kotlas (1997); Jacobson and Cohen (1996).

## *Identifying Misinformation*

Students need to be aware that information on the Internet may be false or misleading. Misinformation includes incomplete information, pranks, contradictions, out-of-date information, data improperly translated across different machines or systems, software incompatibility that sometimes leads to fragmentation, unauthorized revisions, factual errors, biased information and scholarly misconduct (Fitzgerald, 1997).

According to Fitzgerald (1997), the following triggers may indicate misinformation:

- payment demands
- contradictions and inconsistencies within the article
- author credentials not matching the subject matter
- appeals to the emotions—flattery, fear messages, language stirring guilt or sympathy
- opinion markers— words such as *could, might, would, believe, "I think," assume,* etc.
- misleading or unsound arguments that sound plausible
- oversimplification
- unstated assumptions
- "pass" messages—instructions to pass a communication on to other people, similar to chain letters
- lack of evidence to support claims. (p. 11)

Table 2
Evaluation Criteria for Internet Sites/Pages

| | |
|---|---|
| *Authority* | Who is the author/producer?<br>What are the author's credentials in the subject covered?<br>Is there a sponsor?<br>Was the site developed by an educational institution? .edu?<br>Was the site developed by a business or corporation? .com or .org?<br>What is the reputation of the sponsor or developer?<br>Is there a link to information about the author or sponsor?<br>Is there an e-mail and postal address for the author?<br>If there is no responsibility indicated, is there any other way to determine the site's origin? |
| *Balance and Objectivity* | Does the information show any bias?<br>Is the page designed to sway opinion?<br>Is the information presented in an objective, balanced manner?<br>Does the site function as a soapbox?<br>Is there advertising on the page? |
| *Currency* | Is the information current?<br>Is the page dated?<br>If so, when was the last update?<br>Is the resource archived?<br>When was the site first written, placed on the Web, and last revised? |
| *Accuracy* | Is the information on the site accurate?<br>Is the information reliable and error-free?<br>Is the information well organized and well written?<br>Is there an editor or someone who verifies the information? |
| *Coverage* | Is the material covered adequately?<br>What topics are included?<br>Are they explored in depth?<br>What does this page offer that is not found elsewhere?<br>Can the information be more easily obtained from another source? |
| *Purpose* | Is the site appropriate for the intended audience?<br>Is the purpose to inform or persuade?<br>Is the information promotional?<br>Is the information copyrighted?<br>Is there a cost for the service? |
| *Site Organization and Design* | Is the site easy to use?<br>Are the formats and speed of loading acceptable?<br>Is the site searchable?<br>Is there an index or table of contents?<br>Is the site reliable in connection?<br>How well is the site maintained?<br>If there are links, do they work?<br>Does the site require additional software or hardware?<br>Do illustrations, video, or audio add value to the site?<br>Do the icons represent what is intended?<br>Is there a text-only option?<br>Is it easy to navigate within the site? |

One of the most effective means of teaching students how to recognize misinformation is through direct contact with examples and ensuing discussion. Alexander and Tate (1998) have compiled an excellent list of links to Web pages that provide stimuli for evaluating accuracy, authenticity, objectivity, depth, and additional challenges such as advertising blended with infotainment. A sample page is "The true but little known facts about women with AIDs, with documentation," which purports to be a scholarly mini-treatise with authority credited to Dr. Juatta Lyon Fueul (!) and includes facts such as a Pittsburgh study proving porridge twice daily protects women from contracting AIDs through using unprotected spoons (Duper, H., & Idjet, S., 1993). Examples such as this clearly point out to students the tricks used to pass off nonsense as truth and how important it is to question all information on the Net. Users should also be aware of the possibility of encountering offensive material on the Internet.

## *Conclusion*

Evaluation is a vital component of the search process, keeping the process on course, preventing sidetracks and distractions from diverting the attention away from the task at hand. Together with analysis and synthesis, evaluation is a higher-order skill necessary to construct personal meaning and understanding from gathered information.

If higher-order thinking styles are required, information problems must be worded to require those levels of thinking. Assessment must include the steps taken to accomplish the final product if the importance of the information search process is to be recognized. This will necessitate more effective planning and collaboration between the teacher-librarian and the classroom teacher to use many of the strategies outlined in this literature review. There are lessons available on the Web that can be tailored to the needs of school communities, which include teachers as well as students. In many cases, teachers have more fear of the unknown with electronic media, and they need the reassurance that support is available to them.

Teaching and learning are the responsibility of the entire school staff, but there is a leadership role for the teacher-librarian to lobby and promote the need for a whole-school commitment to information literacy and information skills across the curriculum. There is an opportunity now for teacher-librarians to be proactive, to take the initiative for teaching evaluation skills in context, in the development of the information literate student.

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## *Appendix: Search Tools on the Internet*

This list contains the site name and URL of some commonly used search tools on the Internet, arranged in groups with similar searching functions.

Search Engine Watch (http://www.searchenginewatch.com) is a useful site for information about everything you need to know about search engines.

### *Search Engines*

| | |
|---|---|
| Alta Vista | (http://altavista.com) |
| Australian mirror site | (http://www.goeureka.com.au) |
| Ask Jeeves | (http://www.askjeeves.com) |
| Excite | (http://www.excite.com) |
| HotBot | (http://www.hotbot.lycos.com) |
| Infoseek | (http://www.go.com) |
| Northern Light | (http://www.northernlight.com) |
| Lycos | (http://www.lycos.com) |
| OpenText (now BusinessWeb) | (http://pinstripe.opentext.com) |

### *Subject Guides/Trees/Catalogues*

| | |
|---|---|
| Galaxy | (http://www3.galaxy.com) |
| LookSmart | (http://www.looksmart.com) |
| Yahoo | (http://www.yahoo.com) |
| Internet Sleuth | (http://www.isleuth.com) |
| BUBL LINK | (http://bubl.ac.uk/link/) |
| GoTo | (http://www.goto.com/) |

### *Forms-Based Interface Search Engines*

| | |
|---|---|
| All in One Search page | (http://www.allinonesearch.com/) |
| CUI's W3 Search engine page | (http://www.telecom.or.jp/search/searchi/index/) |

### *Miltithreaded Search Engines*

| | |
|---|---|
| Dogpile | (http://www.dogpile.com) |
| Inference Find (now Infind) | (http://www.infind.com) |
| MetaCrawler | (http://www.metacrawler.com) |
| Profusion (now Intelliseek) | (http://www.profusion.com) |
| Savvy Search | (http://www.savvysearch.com) |
| WebCrawler | (http://webcrawler.com) |

*Clearinghouses*

| | |
|---|---|
| Argus Clearinghouse | (http://www.clearinghouse.net) |

*Specialty Search Engines*

| | |
|---|---|
| Deja News | (http://www.dejanews.com/) |
| Filez | (http://www.filez.com/) |
| Amnesi | (http:www.amnesi.com/) |

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