Training the Health Information Seeker: Quality Issues in Health Information Web Sites

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ABSTRACT

This article explores evaluation issues in online consumer health information within the context of librarians as educators and intermediaries. Literature on Internet and health information seekers reveals that health information returned by search engines is generally accepted without critical appraisal. Reported and observational studies of users show a disconnect between what users say they know and their actions in finding and assessing the appropriateness of health information. A growing body of literature assessing the accuracy, comprehensiveness, and attribution reporting of health information finds these areas lacking and contributing to the poor assessment of quality. Several quality initiatives representative of available criteria sets, accreditation bodies, and teaching aids are discussed. A rationale for providing some type of evaluative or critical appraisal component is offered.

INTRODUCTION

The number of Internet or online health information seekers continues to grow. The common methods new and experienced users employ in finding health information has remained constant. Health information seekers continue to use search engines to search and browse for usable health information resources. Search engines may be one of the most important tools developed for any information seeker. The unorganized and vast resources of the Internet are, as users suspect, readily and instantly organized. It is assumed that the most relevant and necessary links are displayed on the first page of results.

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Librarians know that as much as search engines may be important tools, it is also important to help users develop a critical approach to assessing the information resources that are so readily available. Librarians have had key roles in bringing the Internet to newer audiences. As libraries become access points to the previously unconnected, librarians become intermediaries not just to the information users see but also to the analytical process users are not currently employing.

Consumer health information brings a different dimension to user education of online information seekers. The need for privacy, the ordeal of a new and heuristic experience, and the often fragile emotional states medical conditions can place users in are issues that affect the uninitiated health information seeker. Medical librarians are familiar with this type of patron. The growing number of new Internet searchers has meant that public librarians have also been acquainted with this type of user. The convergence of the new and perhaps unsavvy user, a health information need, the promise of instant information from the Internet, and the reality of hard-to-discern information resources has made the need for teaching evaluation skills apparent.

This article will explore issues related to the need for teaching users analytical evaluation skills in the context of online consumer health information. The studies discussed will reinforce the notions alluded to above. Studies examining Internet health information seekers will be discussed, specifically, articles that shed light on the number and behaviors of health information seekers. Several studies attempting to measure the quality of Internet content will be reviewed in order to examine whether there is a "quality problem" on the Internet. The literature examining quality initiatives and their use of criteria sets will also be reviewed. Studies of consumer health information–seeking behavior support the need for continued educational reinforcement of critical analysis of health information Web sites.

Health Information Seeking: Prevalence and Behavior

The studies mentioned in this section are drawn from surveys of users of Internet health information. Most searches for health information are reported by users as taking place at home. Nevertheless it is important to consider the library user's predisposition to the same behaviors uncovered in the research. Findings reveal the need for libraries to consider appropriate interventions for preparing the online health information user.

Several studies attempt to gauge the popularity and use of online health information throughout the United States. In the larger context of information seeking on the Internet, users turn to online resources to gather information on new or unfamiliar topics. The abundance of information sources makes the Internet helpful in researching topics when the ability to compare information is most important. (Fox & Rainie, 2002).

Licciardone, Smith-Barbaro, and Coleridge (2001) attempted to measure the use of online health information against other media. The study found that print media (newspapers and magazines) and television are the two major sources of health information. Thirty-two percent of the respondents in the study indicated using the Internet as their primary source for health information. There was no distinction made as to whether the information gleaned from these sources was the result of the user's active research into a particular topic or came across through casual or recreational reading and viewing. In the Licciardone et al. (2001) study, 50 percent of the respondents indicated they "felt comfortable using the Internet as a health information resource." The study's methodology did not establish any criteria for self-assessment of the user's comfort level.

The findings in Licciardone et al. are largely consistent with Fox, Rainie, and Horrigan et al. (2000). The Fox study estimates that, of 104 million American adults that are Internet users, 55 percent use the Internet to acquire health information. The Fox study did not attempt to measure the user's comfort or skill level for finding online health information, but it did provide findings on how users search for health information. Users are likely to search for information related to a physical or mental illness (91 percent and 26 percent respectively) but are less likely to take part in online transactions like getting advice from an online doctor (10 percent) or purchasing medications and supplements (10 percent).

Users surveyed in Fox, Raine, and Horrigan et al. (2000) reported a reliance on search engines to conduct their health information searches. Users are likely to save or bookmark a Web site deemed useful. In discerning the quality of health information, 58 percent of the users reported looking for the organization or company providing the information. This percentage of users is more likely to have some college education. Users with a high school education or lower are less likely to view a Web site's source information.

A much larger percentage of health information seekers was reported in the Harris Poll's "Cyberchondriacs Update" of 2001 (Taylor 2001). The Harris Poll study suggests that 75 percent of adult Internet users have searched for health information. The study queried its respondents regarding the type of Web sites visited for health information. Sixty-eight percent of respondents indicate using a search engine, directory, or general site focusing on many topics. Only 24 percent of the survey's respondents indicated using a Web site whose focus is on health information (Taylor, 2001).

THE HEALTH INFORMATION SEEKER: CRITICAL SKILLS

The studies mentioned above used brief interviews of randomly sampled respondents to gather data. There are few studies involving extended interviews or user observations. Observational studies are more useful in

terms of what is learned about user behavior in the online environment. Observations reveal a more instinctive approach to finding health information online. In interviews conducted with observed searchers, users' assessment of information quality is based on the look and organization of a Web site.

In a study by Eysenbach and Köhler (2002) seventeen participants were observed as they conducted online searches to answer 136 health-related queries. The study paired results of these observations with statements from a separate cohort of focus group participants. The intent of the focus group discussions was to identify expectations and problems consumers encounter in searching for appropriate health information online. Users were asked to identify the merits of a trusted online resource. Web sites from official authorities and an understandable and "professional" layout were mentioned as features that instill trust. A controlling authority or third party endorsements were seen by participants as desirable. In discussing the advantages of the Internet as a health information resource, participants noted the ability to verify information by checking a number of sources (Eysenbach & Köhler, 2002, p. 574).

Observations by Eysenbach and Köhler revealed that users act quickly to find answers to health-related queries and typically do not employ any measure of fact checking or source verification. Participants relied on search engines (Google, AltaVista, Yahoo, and Lycos, among a total of eight search engines used) to begin finding the requested information. None of the participants used a health information portal from a library or medical association. Sixty-five percent of the 280 search queries consisted of single word searches. Boolean operators and phrase searching with quotations were used a total of eleven times. Participants spent an average of almost six minutes in answering a given question. For 71 percent of the searches observed, participants limited themselves to the first five search results. Only five participants clicked on a link appearing on the second page of search results. Despite the almost uniform searching techniques employed across eight search engines, participants visited a total of 271 unique sites and conducted 280 search queries.

The study did not aim to evaluate the quality of the participants' search results. Participants did not review or look for information relevant to ownership of the Web site or authorship of the information. Participants could recall the Web site from which they indicated finding an answer only 20 percent of the time and could recall the category of ownership (government agency, commercial institution, association) only 23 percent of the time (Eysenbach & Köhler, 2002, p. 576). The Eysenbach and Köhler study is unique among the body of studies attempting to document user behavior. It is one of few observational studies documenting the actions of the health information seeker.

Consumer WebWatch has commissioned several studies (such as Fogg,

Soohoo, & Danielson et al., 2002) that point to how users evaluate information. Findings in "How do People Evaluate a Web Site's Credibility" (Fogg, Soohoo, & Danielson et al., 2002), like those of Eysenbach and Köhler (2002), reveal a disconnect between what online users claim to be looking for in a trusted information resource and the evaluation that actually takes place by the user at a Web site. The study's large sampling of observations across many disciplines allowed for comparisons between how users assess a Web site for health information and how they assess non–health Web sites.

For Consumer WebWatch, credibility is the principal criterion from which proper evaluations of a Web site can be made. When evaluating health sites the greatest factor in credibility pointed to information usefulness. A substantial number of comments indicated that health Web sites were deemed credible if they provided information that people found to be useful and to have a "good focus." Subjects reviewing health information Web sites had both positive and negative comments regarding credibility and the presence of advertising. In assessing quality or credibility for the total sample of Web sites evaluated in the study, visual appearance, design, and organization were primary factors. Secondary factors were those attributed to credibility in the health information Web sites: what the authors call "information focus" (comprehensiveness, clarity, potential bias). It is perhaps somewhat heartening that, for health information, information usefulness has a greater role in assessing credibility than visual appearance and organization.

A more recent comprehensive study of online health information seekers is a follow-up study by Fox and Rainie under the Pew Internet and American Life Project (Fox & Rainie, 2002). The study employed the same methodologies of telephone surveys and focus groups to assess the state of what it calls "health seekers." Based on their projections, the number of adults using the Internet to find health information has grown from 52 million to 73 million. Three categories were used to describe the range of critical skills employed in assessing health information. One quarter follows a recommended protocol in reviewing the information for source and currency and takes some measures to verify the information. Another quarter of the health information seeking population reports employing some measures to assess information "most of the time." The remaining half of all health seekers checks the source or date of the information at occurrences ranging from "only sometimes" to "never."

During extended callback surveys participants recalled their searches for online health information. Although these results are self-reported they resemble the findings of Eysenbach and Köhler's (2002) observations. Eighty-six percent of users visited a range of two to five sites by starting with a search engine. Only 12 percent of users surveyed reported visiting a site because of name or sponsor recognition. Only 29 percent of users

have bookmarked a site, and 14 percent indicated they have a preferred health information Web site. Participants reported rejecting information from health Web sites because sites are too commercial (reported by 47 percent of participants) or because the source or authorship could not be determined (reported by 37 percent of participants).

As in the previous study by Fox, Rainie, and Horrigan et al. (2000), data were gathered on the types of information most commonly sought by online health information seekers. Most users look for information on specific illnesses or conditions (93 percent reported). Drug information and information related to wellness and weight control were sought equally (65 percent). Forty percent of users reported looking for information on mental health conditions, and 50 percent of users surveyed have searched for information on complementary therapies or alternative medicine. Thirty-two percent of users have looked for specific information related to health care providers and hospitals in online directories.

The literature on online health information seekers shows a disconnect between how users report evaluating health information and their actual behaviors. Searching methods by health information searchers are primarily geared toward rapidly finding an information resource while overlooking evaluative content. Users evaluate health information in terms of the information's appropriateness in a given situation. While the Internet's usefulness in finding multiple documents with one search is a key advantage for users, research shows that few users consult multiple information resources. The growing number of online users and the ease with which inaccurate or misleading information can be readily retrieved is a concern for many medical librarians and health care providers. While the likelihood of finding inaccurate or incomplete information is greater, users are also concerned about finding health information that is based on quackery rather than sound medicine.

User studies do not point to the absence of a critical process in evaluating online health information but rather to a misapplication of a critical process that generally overlooks a thorough assessment of information. This assessment is often limited to the reliance on one or two health information Web pages reviewed in a short period of time and deemed appropriate for meeting the user's needs. Another aspect that limits the control of the online user is the randomness with which Internet search engines function. Relevance and ranking algorithms used by search engines recall a large variety of Web sites. These large recall sets give a false impression of comprehensiveness and lead users to believe that search engines ensure a replication of results throughout many searches across different search engines. What makes using the search engine to find health information an attractive approach is also what makes the search process potentially daunting.

ONLINE HEALTH INFORMATION QUALITY

A substantial body of literature exists that seeks to assess the quality of online health information. These studies attempt to establish indicators of quality under categories familiar to librarians: authorship, disclosure (statements relative to the Web site's sponsorship or purpose), currency, accuracy, comprehensiveness, and scope. These categories operate in the online environment as they do in the print environment. Categories related to the online environment are design, layout, interface functionality, and usability. For many quality indicators, assessments can be made without a high level of expertise in the subject area. Assessments are easy to make for those indicators geared to appearances and functionality. Indicators like currency, disclosure statements, and authorship can require some knowledge, however cursory, of the information. Indicators like comprehensiveness and accuracy require more knowledge in the subject area in order to validate the given information.

Berland, Elliott, and Morales et al. (2001) utilized three measurements to assess quality, accessibility, and readability of online health information in four subject areas. The quality measure was based on the accuracy and completeness of the health information sampled in the study. The accessibility measure replicated previous studies with search engines and their effectiveness in finding relevant information. Reading levels for online health information were assessed for English and Spanish language resources. This study stands out from many other studies that aim to assess the quality of online health information for several reasons. The study is rare in its attempt to assess three measures across four chronic conditions: breast cancer, depression, obesity, and childhood asthma. Most quality assessment studies of online health information focus on one condition.

In order to gauge quality, the study utilized two sets of expert panels for the four conditions. One panel assembled consumer-related questions and "clinical elements" or specific items that a representative health information resource should address. Online health information content was stripped of its identifying features and compiled under the appropriate consumer-related questions and clinical elements. Another expert panel reviewed the online health information content using standardized rating forms. Levels of coverage (not addressed, minimally addressed, and more than minimally addressed) and accuracy (mostly incorrect, mostly correct, and completely correct) were scored. Results for coverage and accuracy measures were reported as a percentage of all clinical elements addressed for a chronic condition. Combined scores for clinical elements in English language Web sites receiving more than minimal coverage that were completely accurate were tabulated for breast cancer (63 percent), childhood asthma (36 percent), depression (44 percent), and obesity (37 percent). Incorrect information was in the 3 percent to 4 percent range

for English language information with the highest area of inaccuracy being for depression (18 percent) (Berland, Elliott, & Morales et al., 2001, p. 2617). Conflicting information was most prevalent in the area of treatment information (35 percent) and diagnosis (13 percent). Levels of conflicts for other subcategories (definition, etiology, risk factors, and incidence and prevalence) ranged between 7 percent and 4 percent. Berland, Elliott, and Morales et al. assert that their data support the contention that "substantial gaps in the availability of key information" (2001, p. 2619) exist and that, within the four conditions examined, half of the topics considered to be important by experts were covered more than minimally. The study's findings suggest that "consumers using the Internet may have difficulty in finding complete and accurate information on a health problem" (Berland, Elliott, & Morales et al., 2001, p. 2619).

The study also called attention to the reading level of online health information, underscoring the disconnect between the reading level of health information on the Internet (generally in the range of tenth to twelfth grade) and the lower reading skills of 48 percent of the U.S. population (Berland, Elliott, & Morales et al., 2001, p. 2619). Appearing in a widely read medical journal, the study's results in measuring quality and readability drew the attention of medical librarians and health professionals. The study was published at a time when public libraries were becoming a widely used resource for the previously unconnected and the population of online health information seekers was growing. The study helped underscore the disconnect between the Internet's potential to reach many audiences and the uniformity of its Web site sponsors and producers in aiming its content at a highly sophisticated and largely middle- and upper-middle-class audience. The study also helped call attention to the need for multilanguage resources.

Eysenbach, Powell, Kuss, and Eun-Ryoung (2002) conducted a systematic review of studies in which Web sites and Web pages were evaluated. As with any systematic review, results of studies seeking to evaluate online health information quality were examined to identify common findings, compare methodologies, and determine to what extent findings can depend on the methodology employed in the study. The studies included in the systematic review have a date range from 1997 through 2001. Because varying methodologies and criteria are used to assess quality, no resounding conclusion on quality could be attained.

Most studies examined by Eysenbach et al. (2002) concluded that quality is a problem on the Internet; in particular, the authors found significant problems in terms of lack of completeness and lack of accuracy. In examining accuracy as an indicator of quality, studies that rate online health information against clinical guidelines and expert consensus documents tended to find higher rates of inaccuracy than those studies rating accuracy

against a single expert's opinion. Only 9 percent of the studies found positive conclusions for their evaluations of accuracy; none of these rated the health information sample against a clinical guideline.

The authors did not intend to perform a meta-analysis and find quantifiable measures of quality. The authors found many of the methodologies used in the quality assessment literature to be problematic. Many of these studies exclude features of a Web site that could be considered important in examining quality. As an example Eysenbach et al. (2002) found that measures used to examine readability as a quality indicator removed factors like defining medical jargon, writing style, and overall tone. The authors urge caution in gathering conclusions from studies that strip the health information content from the context in which it was originally found. These studies tend to overlook the stated purpose of a Web site and assume that any health information Web site should cover all prescribed areas of information. While not wanting to pull the online health information content from its context, the authors also urge bringing the assessment of online health information into the larger context of health information in other media. The authors found comparable rates of disclosure for revision dates of online health information and for disclosure of revision dates for printed patient leaflets. The authors point out that, as with online health information, alarming rates of inaccuracy have also been found in studies on other health information media.

Online Evaluation Criteria

Criteria sets have been used in many ways to evaluate Internet health information. Most criteria sets are designed for consumers to use in assessing the usefulness of a particular Web site. For librarians these criteria sets are familiar tools often applied to other types and formats of information. Librarians involved in collection development would be primary developers and users of evaluation criteria. Such criteria are often crafted as part of a library's collection development policy. These policies reflect the mission of the library and the library's parent organization.

Criteria sets or guidelines have been criticized as duplicative, poorly tested, and lacking in overall usefulness. The Health Improvement Institute (2003) conducted analyses of 22 guidelines for Consumer WebWatch. These 22 guidelines contained 466 criteria elements or subcriteria under 9 larger criteria categories developed as metacriteria. The categories with the most elements are

- Validity: The Web site's differentiating between statements of facts and opinions and attribution of stated facts and opinions.
- Accessibility, presentation, design: The Web site's presentation of information; the authors combine issues related to the site's interface and the content's readability and comprehensibility.

- Web site transparency/credibility/currency: The Web site's disclosure of purpose, sponsorship, and dates pages are created and revised (Health Improvement Institute, 2003).

The authors found these sets to be unusable by consumers because of their lack of consumer friendliness and the criteria's inability to produce a quantifiable measure of a health Web site. Although the authors did describe key categories necessary in any criteria set, no discussion was made as to how to make any criteria set approachable and usable to consumers.

Eysenbach et al. (2002) suggest studies measuring the quality of online health information have varied results because of their inability to define quality criteria with "standardized operational definitions." Likewise, researchers of evaluation criteria and other evaluation methods question their usefulness because the criteria cannot be quantifiably applied to and tested against actual content.

Librarians involved in educating online information consumers have probably utilized some form of evaluative criteria to relate the importance of quality assessment. Librarians are familiar with evaluative criteria as these are utilized throughout the library's resource selection process. Five of the twenty criteria sets examined in the Health Improvement Institute (2003) study were developed by libraries or library-related organizations. As researchers have called for searching examinations of criteria sets and advocated for their being field-tested, librarians have worked soundly and quite successfully with similar selection criteria throughout library collection development policies. Librarians have applied operational definitions and practical applications to evaluative criteria and can attest to the robustness of these criteria as evidenced by library collections.

Online Health Information: Quality Initiatives

Another important set of resources for educating the online health information seeker are the numerous quality initiatives that have been established. Many of these initiatives have been in existence almost since the emergence of online consumer health information. These initiatives vary in complexity, approach, and sponsorship. Described below are four representative initiatives that illustrate the various methods employed to foster quality in health information Web sites and educate users in employing online analytical skills.

Health on the Net (HON) began in 1996 and is one of the oldest initiatives. Librarians and educators have probably used the HON Web site in teaching evaluation skills and demonstrating the "seal of approval" approach to fostering and regulating health information quality. Health on the Net is based on the principle of self-regulation. A health information Web site carries the HON image as a way of pledging to abide by the standards established by the Health on the Net Foundation. A review process

and reporting mechanism are in place where users can report a Web site's violation of the HON principles. HON's seven key principles are authority, complementarity, confidentiality, attribution, justifiability, authorship/sponsorship, and advertising truth (Health on the Net Foundation, 1997).

The American Accreditation Healthcare Commission (also known as URAC) created a Web site accreditation process where a Web site producer pays a fee for a review process by URAC. URAC has developed a set of over fifty standards that must be met by the applicant Web site. These standards are organized under concepts like disclosure and linking, health content and service delivery, privacy and security, and quality and oversight (URAC, n.d.). Like HON, URAC is a not-for-profit organization. URAC has long been an accrediting body for areas of health care like claims processing, utility management, and workers' compensation. URAC assembles consultation teams that meet with Web site producers to review and assess the online information resources. Health information knowledge base producers, vendors, and health insurance companies are examples of entities that have sought and received Web site accreditation.

Mitretek Systems, Inc. convened the Health Summit Working Group (HSWG) in 1997 with funding from the U.S. Agency for Health Care Policy and Research. The group developed a standard criteria set for evaluating health information. Mitretek Systems also developed a Web-based scoring mechanism known as IQ-Tool. The tool was designed to assist users in deriving a quality score for a health information Web site. The IQ-Tool is no longer supported.

The Working Group's Criteria for Evaluating Internet Health Information has survived the IQ-Tool and is probably the definitive criteria set for health information evaluation. The criteria were developed as part of a white paper that provided extensive elaborations of the seven major criteria. The white paper is used by health science librarians in developing training modules for evaluating online health information. The seven criteria and their related subcriteria are

> *Credibility:* includes the source, currency, relevance/utility, and editorial review process for the information
>
> *Content:* must be accurate and complete, and an appropriate disclaimer must be provided
>
> *Disclosure:* includes information for the user on the purpose of the site, as well as any profiling or collection of information associated with using the site
>
> *Links:* evaluated according to selection, architecture, content, and back linkages
>
> *Interactivity:* includes feedback mechanisms and means for exchange of information among users

Caveats: clarification of whether site function is to market products and services or is a primary information content provider (Health Summit Working Group, 1999)

The Centre for Health Information Quality (CHIQ) is an initiative based in the United Kingdom. Like the Health Summit Working Group, CHIQ has developed criteria, referred to as guidelines, that can be used to appraise the effectiveness of a health information resource. CHIQ has as its principal categories accuracy, clarity, and relevance, under which there are ten subcategories: consistency, continuity, currency, reliability, appearance, presentation, content, accessibility, appropriateness, and patient involvement (Centre for Health Information Quality, 2002). CHIQ also has developed criteria or guidelines on producing health information.

In addition, the Centre for Health Information Quality has produced educational resources that can be used as part of an online training session. Sample Web pages reflecting appropriate and inappropriate information resources on smoking are used in conjunction with an evaluation instruction curriculum called QUICK. The Quality Information Checklist module includes eight sections developed out of a question-based evaluation. The module is written in plain language and incorporates many graphics and examples. In describing a "purpose" criterion, the site asks under section 2, "Are the aims of the site clear?" and begins, "A good website will tell you who it is for, what it is about and what it is trying to do. These are the site's aims" (Centre for Health Information Quality, 2000).

Risk and Dzenowagis (2001) reviewed thirteen English-language quality initiatives in order to compare their mechanisms, sponsoring organizations, and reach. All of the initiatives had as their basis a criteria set. All of the criteria sets were similar in terms of organizing subcriteria under major headings. Quality initiatives were found to operate under one of three mechanisms: (1) a code of conduct or statement of ethics under which Web site producers self-certify and self-regulate; (2) third-party certification (accreditation) where payment from the Web site producer is required; and (3) a tool-based evaluation where an evaluation instrument is developed for use by users assessing a particular health Web site.

Risk and Dzenowagis contend that there are three essential elements to a quality initiative: a set of criteria, an educated and interested user, and some type of enforcement. None of the initiatives reviewed by the authors fulfilled all three of the elements. Among the most difficult problems to address are the "burdens placed on the citizen (user)" (Risk & Dzenowagis, 2001) and the cost of implementing an initiative that provides accreditation as well as enforcement. A high level of understanding of the Internet and health information is required of active users of evaluation initiatives. Users must want to have interest in either a site's ethics

statement or a seal of approval or accreditation. As previous studies have suggested, the health information seeker's level of involvement is quite low.

The use of criteria sets for evaluating health information is an important part of teaching users important online information seeking skills. Online searchers are predisposed to thinking that their simple search utilizing an often broad search term, and their selection of a top ranking link on a search engine, will have a high degree of relevance. The user is also predisposed to assimilate the information without critically appraising the information. The just in time approach to information access applies as easily to the just in time information assimilation.

In the online health information realm, criteria sets and other evaluation mechanisms have become regarded as necessary features of the health information landscape. Whether they are designed and composed by a health information content producer or a third party organization, these criteria sets should be promoted as a public service and offered as a regular feature of any health information Web site. Like traffic signs, they can often be overlooked. Their ubiquity should be encouraged because their message may be as slow to assimilate as the online user can rapidly assimilate online health information.

Educating the Health Information Seeker

When the World Wide Web emerged as an information medium in academic health sciences libraries, evaluation and critical thinking components were quickly incorporated into instruction. Medical librarians added Internet basics courses, introducing students, faculty, and health care providers to a new and dynamic medium. The health care workforce adapted rapidly to using the Internet as an information resource. The need for introductory courses on Internet utilities and their functions in acquiring health information diminished over a relatively short period of time. It is still necessary to provide health information users at all levels with a framework or contextual environment of health information resources. This framework should include the distinctions between information resources that are freely available as a health information Web site and those resources that libraries choose to purchase and make available via the World Wide Web.

In educating the consumer health information seeker on the types of information available, it is important to describe the information environment in the same manner. Consumers should be aware of the valuable information resources purchased and provided by the library. Consumers also should be oriented to the context or environment in which health information Web sites make information freely available. This includes a review of a broad classification of information providers, as in the following:

- Health information directories of filtered or preselected lists of health information Web sites
- Producers of a health knowledge base that license the resource to other Web sites
- Presenters or licensees who make available health information content from a leased knowledge base

Such a review or discussion may invoke some inquiry into quality issues and the necessary evaluations or critical thinking approaches that need to take place in the search for online health information. The inverse can also be true where discussion about evaluation and quality may lead to a discussion of health information providers.

Librarians and health care providers call attention to "pseudo-health" Web sites and other quackery accessible through the Internet as a rationale for consumer health information education. The potential harm that can be inflicted by pseudo-health Web sites may be considerable; for example, the time spent investigating and pursuing these treatments may delay the receipt of appropriate care. This alone is a good reason for educating users. But it is also important to help users develop a critical thinking approach that questions the motivations and content of any health information Web site. Educating users in the health information environment is an important component in helping users recognize Web sites for what they are.

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