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Information Literacy and the Internet: Transforming the Practice of Teaching and Corresponding Ethical Consequences

Gerald D. Bailey and David Pownell

Technology pioneers have witnessed an interesting evolution of the computer over the last thirty years. In the 1970s, educators saw computers as a way of “crunching numbers.” In the 1980s, a second wave, educators saw personal computers being used for word processing, spreadsheets, databases, and presentation devices. In the 1990s, computers and other technologies combined to create opportunities for electronic communication, electronic creation (Websites), and electronic collaboration (e-mail, chat groups, listservs, etc.). In the 2000s, educators will undoubtedly see more sophisticated techniques of electronic strategies for communication, creation, and collaboration. As technology leaders transform teaching and learning with the emerging technologies, ethical use of identifying, accessing, and applying technology will become one of the hotly debated issues among educators, parents, and publics.

During the last decade, teachers have used emerging technologies (computer, modem, CD-ROM, etc.) in three primary ways: (1) technology-as-aid (i.e., sometimes called “teacher talk & technology” or “electronic chalk”). Teachers who use technology applications (e.g., HyperCard®, PowerPoint®, Persuasion®, or HyperStudio®) to support direct instruction fall into the category of technology-as-aid, or (2) technology-as-subject Tech Ed programs or Tech Prep programs are where the curriculum is focused on the tools and subject of technology. It is common to see Tech Ed programs include courses of communication, transportation, and production. Tech Prep programs usually include vocational programs that combine secondary and post-secondary courses that lead to an associate degree or two-year certificate, and (3) technology as-empowerment-tool. In this instance, technology is seen as the core or foundation for the learning. Teachers are most interested in putting the technology hardware and software in the hands of students where students discover meaning for themselves (i.e., constructivism).

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Recent Developments Which are Forcing Related Ethical Issues

As a backdrop to the computer evolution, futurists have provided the following information about recent changes in society:

- The amount of information is doubling every two to three years.
- Everyday 7,000 scientific and technical articles are published.
- Satellites orbiting the globe send enough data to fill 19 million volumes in the Library of Congress— every two weeks.
- High school graduates are exposed to more information than their grandparents were in a lifetime.
- Only 15 percent of jobs will require a college education, but nearly all jobs will require the equivalent knowledge of a college education.
- There will be as much change in the next three decades as there was in the last three centuries.
- Technology development is doubling every eighteen months.
- Ninety percent of the technology that people will be using in next ten years has not been invented yet, or people don't have access to it (Bailey, Lumley, and Dunbar, 1995 and Bailey and Lumley, 1997).

Taken together, these facts show a trend about the breadth and depth of change and “this new style of change” is changing our private and public lives— forcing us to deal with ethical uses of technology that most of us would have never contemplated. Specifically, access to the Internet has made teachers overwhelmingly aware of the information explosion because both teachers and students are drowning in a sea of information. Too often, teachers and students “begin fishing on the Internet” and catch hundreds of Websites. In the midst of this endless harvest of fish, there are snags, distractions, junk disguised as quality, and an incredible amount of debris. In short, it is common to see students who don't know how information is organized, how to find useful information, how to create new information, and how to use information in such a way that others can learn from them (Websites). Even more troublesome is the lack of knowledge concerning ethical use of this information by both teachers and students.

The Response

In their search for answers to these Information-age challenges, many teachers have become more interested in the concept of Information Literacy. Information literacy can be defined as identifying, accessing, applying, and creating information. Information Literacy is an information-age problem solving process and addresses many of the challenges and problems of life-long learning in the electronic age. In 1989, the American Library Association Presidential Committee on Information Literacy outlined the basic underpinnings of Information Literacy. Additional information about the concept of Information Literacy can be found at the American Library Association's site: <http://www.ala.org/aasl/positions/PS_infolit.html>. According to the American Library Association, many groups have helped to define Information Literacy. Information Literacy is one of five essential competencies for solid job performance according to the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS). Many educational associations including the

Association for Supervision and Curriculum Development (ASCD) have supported the concept of Information Literacy. In addition, authors such as Eisenberg and Berkowitz (See: <<http://www.big6.com>>) have helped refine our ideas about Information Literacy.

Whatever authority you associate with Information Literacy, they generally agree that there are steps or stages found in this process of “learning how to learn.” Each step must be explained, understood, and followed if students are to become a life-long learners– making sense out of information for themselves. Likewise, each step requires thought about the ethical issues associated with information literacy.

To further clarify Information Literacy, the authors have field tested a model called Bailey-Lumley Information Literacy Model (See Figure 1) over the last five years. The Bailey-Lumley Information Literacy Model provides ideas and suggestions for putting Information Literacy into action for teachers who are creating a learning-based environment for students by focusing on the Internet as well as identifying ethical issues that teachers will encounter.

Step 1: Identifying the Right Question(s)

In the first step of Information literacy, teachers must facilitate students as they begin to ask the right question(s). To solve a problem, there must be something significant to study. There must be a problem which needs a solution. The question(s) must be relevant and worthwhile to both the teacher and student. The student must be able to apply what they have learned. Identifying the right question takes considerable practice. Here are a few of the questions that the teacher needs to get students to consider:

- What is real, authentic issue (problem), or question?
- Is there more than one question that needs to be addressed?
- What is important to consider when addressing the questions?
- Is there an opportunity for creating new information in this information search?
- Is this an integrated issue? (i.e., crosses several disciplines or one discipline)
- What do I need to know to ask the right question(s)?
- What are the related issues to the question (i.e., system’s perspective)?
- Can I formulate a hypothesis about this question?

In short, “learning how to learn” requires thinking about what answers you are seeking– the learner returns to the original question to determine if the answers (which were found as a result of the search) are appropriate.

As the teacher guides students in asking the right question, ethical issues arise for both the teacher and students:

- Who owns this information?
- Does the location of this information have any legal implications for the user?
- What ethical-related questions must be identified prior to any activity in information literacy?
- How do the questions and possible answers relate to the community, society?
- Is the question worth allocating time to– is it worthy of study?
- Are the questions appropriate learning tools?

- Are there any risks or dangers to students involved (i.e., exposure to sensitive topics)?
- Are the questions age appropriate?
- Do the questions support the values of the school, community?

Step 2: Organizing Your Search

The prerequisite to Step 2 include having a basic understanding of the Internet and World Wide Web. Obviously, students need to be connected to the WWW and have an Internet browser. In addition, students must have an understanding of the basics of bookmarks, folders, and search engines. Students must have some fundamental understanding of how things work to begin getting ready to organize their search. In Step 2, questions relating to the search process include the following:

- What bookmarks are available from the web?
- What traditional print and media resources are available? Do they complement or provide different material than found in the Website sources?
- How can I organize this information quickly and efficiently? What folders do I create to house these bookmarks?
- Are there some Websites (“jumpsites”) that can help in the search for information?

As the teacher guides students in getting organized (thinking about searching), ethical issues must be considered. The following questions guide the teacher and students in that process:

- Legally, what is the difference between storing and using print and nonprint materials?
- Can I use any materials without fear of copyright violation?
- What are the copyright laws?
- Who are the authorities on copyright and ethical issues?
- What are the “fair use” policies for digital materials?

Step 3: Selecting the Appropriate Search Tools (search trees and search engines)

In Step 3, the learner must know how to identify search engines which enable users to search Web documents using key words.

Web search engines attempt to create a detailed record of the Web using automated software agents– nicknamed spiders– that crawl from URL to URL, visiting every site in the public areas of the Web and recording the address. All search engines handle these initial steps in essentially the same way.

Few people give much thought to the search engines they use. They find what’s handy or what they’ve heard about, often using what’s on their browser or a favorite Website. The various search sites do seem different, but it’s difficult to determine differences. As a result, a clear path of problem solving does not emerge for the learner.

Students need to understand what the various search engines do. Often, students will stay with only one search engine– the first one used rather than explore others. Search engines make significant differences in the quality and quantity of search results. Some send robot software to every site and record the full text of every page. Others first analyze the addresses in the database to determine which sites seem most popular (typically by determining the number of links pointing to the sites in question). They then send out software to

record information at these sites only— anything from the bare HTML title and header to an algorithmically constructed summary of contents to the full text of the entire site. Whatever the scope of the database, it must be rebuilt, refreshed, or updated regularly to keep the system current.

The search logic used to extract information from the database is another crucial component of these tools. Engines should be able to find the Web sites that match the search criteria and rank the results according to a degree of relevancy.

The essential questions that learners need to address:

- Are there search trees which lead to information before selecting a particular search engine?
- Which search engines will best help me conduct the search?
- Do I know the strengths and weaknesses of each search engine?
- Who else has researched this area?
- Who are the authorities?
- Have credible researchers researched this area?

As the teacher guides students in selecting the appropriate search tools, ethical issues must be considered. The following questions can guide the teacher and students in that process:

- How much information can any one search engine gather (In other words, how much depth of information do I need)?
- How long can I store this information?
- Can teachers/board of education censor some search engines and respective materials?
- What board of education policies should be in place which deal with ethical-related questions and electronic learning?
- What search engines are “kid friendly” and which incorporate more mature topics?
- Which engines retrieve more reliable information and sites?
- Which engines have less advertising, chat, or email enticements?

Step 4: Analyzing the Resources (sites)

One of the biggest problems that teachers and students encounter is determining whether the Website is credible. A prerequisite to determining credibility is knowing the intended purpose. Is the purpose (a) commercial, (b) advocating a position, (c) informational, or (d) educational? (For more information, see Marsha Tate and Jan Alexander, “Teaching Critical Evaluation Skills for World Wide Web Resources,” *Computers in Libraries*, November/December 1996.)

Once the sites are categorized for their intent, the following questions can be posed:

- Are these sites authoritative? Who are the authors? What can I find out about the authors?
- What are the credentials of these authors?
- Is the site “good” or does it just “look good?” (flash vs. substance?)
- If credibility is unknown, do others with “determined credibility” say the same thing?
- After credibility is determined, what information should be used in the product (Website)?

As the teacher guides the student in scrutinizing sites for credibility, ethical issues abound. The following questions guide the teacher and students in that process:

- Is it ethical for people to publish information that is incorrect or false? What is my responsibility if I believe the information to be?
- How do I deal with information which is questionable?
- Am I contributing to unethical behavior if I publish materials which are questionable?
- What role does the teacher have in identifying false or unethical information?
- How can students be taught to identify and understand hidden agendas and biases?

Step 5: Analyzing, Synthesizing, Sorting, and Sifting Information

Once credibility is determined, an equally tough task is determining what the information says and does not say. In essence, the learner is holding up the question posed in Step 1 to determine what information answers that question. Questions which need to be answered in Step 5 include the following:

- What are the major issues? What sources reflect these issues?
- Who has presented the strongest evidence? What is the supporting evidence?
- Which sources are of lesser importance? Why are they of lesser importance?
- Which of the authors are saying the same thing? How many are saying it?
- What new issues are being raised in this information (identified in the original search questions)?

As the teacher guides the student in analyzing, synthesizing information, ethical questions must be considered. The following questions guide the teacher in that process:

- What type of material resources are ethical or unethical to use? Some? All?
- What kind of ethical obligation do I have in providing balanced coverage of the issue?
- What is the role of the teacher in helping students identify untrue or false information?
- When should this occur?

Step 6: Generating a Product or Creating New Information (Website)

First, students and teachers must learn to frame their Website in the context of information literacy. That is, the creation of a Website is the highest form of information literacy, and without the foundational steps of information literacy, the Website is merely a product which may or may not be tied to learning.

Second, Information literacy (IL) involves more than text. IL is comprised of text, audio, video, and graphics. When combined, they become new forms of information to be learned and mastered for communication purposes. Conveying meaning from a wider spectrum of communication mechanisms rather than using one medium (text) is a new opportunity for teachers and learners. It is an opportunity to make Websites more than text with enticing “eye candy” made up of flashy graphics, blurbs of video, and sound bites.

Many of the current education (learning or instructional) Websites appear to be built around “electronic activities” (e.g., electronic pen pals, telecomputing, games, competition). The process of creating Websites needs to be undertaken in the spirit of “exploration,” “experimentation,” and “entrepreneurialship” with the goal of fostering Information Literacy. Creating activity-oriented Websites which are not tied to information literacy (even though, they are very sophisticated technology-based learning when compared to teacher-based instruction) will not lead to information literate learners needed in the 21st century.

The fundamental questions that need to be answered in Step 6 are:

- How do I determine audiences and their needs?
- What do I want to say to my audience(s)?
- What is the best way to structure my information to meet those needs?
- How do I show my credentials, biases, etc. to potential audiences?

As the teacher guides the student as they develop a product, ethical issues must be considered. The following questions guide the teacher in that process:

- What is the difference between legal use of print, video, audio, and graphic materials?
- How can permissions for materials be obtained?
- What ethical responsibilities do students have in identifying their own biases (authorship, purpose of Website, etc.)?
- What are the issues of privacy when making a web site?

Step 7: Testing Ideas for Feedback

Testing ideas may be one of most difficult tasks for the learner. The essential question is: what do other people think? What can I learn from the material that I put into Cyberspace? These questions have everything to do with “push/pull” concept of getting people to visit your Website on a regular basis. That is, if I “push” this information out to people, what can I do to “pull” information back (i.e., getting the observer to return and provide feedback about your Website’s content and design). The essence of life-long learning is that few ideas remain stagnant and unchanged. If new information becomes available, how does that information impact the information that you have created in the format of a Website.

Essential questions that need answers include the following:

- How do I determine my audience? Motivate my audience?
- How do I get feedback from others about my new knowledge?
- How have I extended my previous knowledge?
- How, when, where, and why do I refocus on related questions or different questions?

As the teacher guides the student in getting feedback and refocusing on the next tasks, ethical issues must be considered. The following questions can guide the teacher and students in that process:

- What is the responsibility of the student(s) who finds information that was incorrect or false? Should retractions be published? Where should they be published?
- What is the responsibility of student(s) who find new information that adds new insight or revelations to the the topic?

Conclusion

Information Literacy in the context of the Internet and supporting teaching and learning strategies has great potential to transform the face of education. At the same time, ethical issues abound that were not present in nontechnology-infused teaching and learning. We can not teach information literacy without equal emphasis on ethical use of information. These ethical-related questions and materials must find their way into an already “crowded curriculum.” At the present time, the role of the teacher has never been more critical in helping teachers help students become intelligent consumers and well as intelligent producers- this means dealing with ethical issues in a forthright and substantive manner. Undoubtedly, the 21st century will bring many challenges of intelligent and ethical use of information. The task is not knowing all of the answers to these ethical concerns, but knowing the right questions to ask about them.

Resources

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Figure 1
Bailey-Lumley Information Literacy Model©

