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John J. Doherty
Northern Arizona University

Mary Anna Hansen
Montana State University

Kathryn K. Kaya
Montana State University

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Teaching Information Skills in the Information Age: the Need for Critical Thinking

John J. Doherty
Undergraduate Reference Services Librarian
Cline Library
Northern Arizona University
Flagstaff, AZ
Mary Anne Hansen
Reference Coordinator
Kathryn K. Kaya
Reference Librarian
MSU Bozeman Libraries
Montana State University
Bozeman, MT

Introduction: The Boyer Commission and the Information Age

A recent report by the Boyer Commission on undergraduate education concluded that universities have too often failed, and continue to fail, their undergraduate populations [1]. Students are graduating without some of the basic skills they need to function in the professional world, such as knowing how to think logically, write clearly, or speak coherently. Thousands of students, they note, graduate without having tasted the basics of research [2]. The report challenges universities to rethink their traditional instructional models, to move to a model of inquiry-based learning wherein the student is involved in research from the beginning. Everyone (faculty and student) involved in the teaching-learning experience should recognize that they are both discoverers of knowledge and learners:

The skills of analysis, evaluation, and synthesis will become the hallmarks of a good education, just as absorption of knowledge once was. [3]

In the current educational climate such a model is highly attractive in meeting the faculty's need for research and the student's need for good teaching and learning. As librarians know well, however, research is a much more difficult process due to the proliferation of information. In discussing his vision of the future, Daniel Bell noted that:

In the coming century, the emergence of a new social framework of telecommunications may be decisive for the way in which economic and social exchanges are conducted, the way knowledge is created and retrieved. [4]

When Bell first promulgated this vision of the post-industrial society, or the information age as we now call it, ARPANET, the progenitor of the Internet, was still in the secretive hands of the military. He notes that his vision would be a total break with the past, as there would be "a changeover from a goods-producing society to an information or knowledge society" [5]. The key to this emerging new era, he adds, is the combination of computer and telecommunications technology, which is something we now see with the Information Superhighway of the Internet.

The Boyer Commission recognized this problem, noting that the more information a person can obtain, the more important it becomes to judge how to use it [6]. The report notes that obtaining information on the Internet is easy, but, as McFadden and Hostetler believe, too much is expected of the Internet and other such electronic resources. These expectations are transferred to our students "without due regard for the problems and road hazards" [7]. As well, many students come to university with these expectations already in place. Today, students of all ages and traditions are faced with a college career in which basic computer skills are an essential beginning to research; in an increasingly electronic world, libraries are at the forefront of offering such elementary research tools as the library catalog on computer instead of cards. Many of these catalogs are now available on the World Wide Web (Web) complete with a Web interface, and those that are not are offering a text-only telnet link. This, of course, has started a war in scholarly circles that has echoes of the Luddite riots of the early Industrial Revolution [8].

In this "Information Revolution," librarians and teachers are noticing that students are coming to the computer with one of two general attitudes: "How am I going to work with this monster?" or, "This is the hotline to the great god of information." Both attitudes serve to make life more difficult for the student and the teacher alike, and raise concerns and issues that the academy is only just beginning to address. Librarians have jumped on the Internet bandwagon, in part because we, too, see it as a solution to a great many ills, and in part because we do not want to be "left behind" in the information age [9]. It is true to say that librarians see themselves as information professionals moving forward into the information age as active participants [10].

Role of Libraries

As active participants in this new world, however, we still have certain duties to our consumers. The Boyer Commission suggests that the student can become a more intelligent information consumer through exposure to scholars, "experienced, focused guides who have spent their lives gathering and sorting information to advance knowledge" [1]. Yet, as Ragains notes, while scholars do see to it that their students are made aware of relevant information sources "this may occur only infrequently because teaching faculty themselves often have specialized information seeking habits" [12]. The librarian's expertise, however, lies in the area of information; that is, its organization, acquisition, and retrieval. In the information age, knowledge is a basic social need. The library user needs to be aware that information is more than just a periodical citation for

the next paper-it is an essential commodity for survival. Inexperienced users come to the library with the preconceived notion that information is discrete facts and ideas, and that these pieces constitute gospel. Librarians, on the other hand, know that information is a much more burgeoning and dynamic construct. Librarians must educate our users that a holistic approach is essential to basic research methodology:

All graduates of baccalaureate programs must be able to recognize when they need information, what kind of information they need, and where to look for it to complete a task successfully. They must also be able to do this effectively regardless of the information's format, source, or location. They must understand how information is structured and organized and how the structure, organization, availability, and retrievability of information are influenced by the structure and organization of the dominant society. [3]

We teach the students to place their questions in contexts that provide approaches to the information they require. In the academic library, for example, we should meet the information needs of our constituents, be it through traditional resources or the Web. At Montana State University-Bozeman (MSU) Libraries, we have developed an instruction program that incorporates all aspects of information resources in an effort to address the varied needs of a diverse student body. Also, as Montana and other states begin to use emerging technologies to develop initiatives to serve students through distance education, the MSU Libraries has begun to adapt its instruction program to continue to provide library services to our off-site users.

Library Instruction at MSU

The MSU-Libraries initiated a revision of its instruction program in 1994. At the time it was thought that "basic" level instruction sessions were not worth the time and effort it took to prepare and teach them. Librarians thought that the students lacked "context" in which to apply the skills being taught. Also, past offerings of such sessions were woefully undersubscribed. It was therefore concluded that, to better serve our users, we should concentrate our efforts in three areas: discipline specific instruction; course-specific instruction; and, credit classes offered under a library rubric. In discipline-specific instruction, the librarians approach various departments in order to cooperatively design library instruction sessions and exercises, especially for the lower level, introductory courses in the context of a given discipline. For example, a team of our librarians is currently working with the English department to develop basic sessions for the college writing classes. By concentrating on these students we believe we are reaching consumers at the beginning of their college career, when they most need library instruction.

Course-specific instruction, on the other hand, offers both faculty and students more advanced sessions that deal intensively with the subject at hand. For example, we offer the Nursing Research students a session on searching databases such as Medline

and setting up a profile in Uncover Reveal. We use these sessions to introduce the user to higher-level research concepts such as controlled vocabulary and citation technique. One of the most important factors in the success of discipline-specific and course-specific instruction is a collaborative effort between the librarian and the instructor. The best instruction sessions, and consequently the best student learning, happens when the librarian and the instructor get together well in advance of the session to discuss the course content, to plan what to cover in the session, and even to design an assignment that integrates library resources into the context of the class.

Both of these types of instruction involve some general use of the Internet, and the Web in particular. For more basic library sessions, however, we try to under emphasize the Internet, or burst the bubble of hype most of our incoming students bring with them. Thus, evaluation of the information source is always stressed, and we can note that currently it is difficult to apply strict criteria to electronic information and still get comparable results to traditional resources. Generally, libraries tend to note the transitory nature of current knowledge in such sessions. At MSU, we draw attention to this and also to the need to continue to educate oneself on the continuing development of new information resources. For example, the Internet, and the Web in particular, is still developing, but we are noticing that Internet information is becoming more reliable as academics begin to realize its potential. Academic culture, however, is still very much rooted in print resources, and until that culture changes significantly the Internet will always remain a secondary resource.

Having said this, in the more advanced, course-specific sessions we can take the Internet a step further. Besides drawing attention to the specific tools and resources that each discipline has, we can take the student on a tour of the Internet, to look for and to apply critical thinking skills to resources specific to each field. One of the ways we do this is to prepare and offer the class a virtual handout "home page" for the instruction session, complete with links to various sites that the librarian (and perhaps the instructor) find useful. Such materials do exist on the Internet, but must be evaluated in the same way as traditional resources. As a "jumping off" point, these pages provide the student with a practical resource, especially when we can add text to remind the student of the various benefits and pitfalls of using the Internet. As Oberman notes, the world of information is becoming much more complicated, but the "cognitive skills necessary to successfully operate within it" remain the same. [4] Librarians need to recognize that an aim of library instruction is to enable "students to be active and critical in the encounter with other minds . . . [that the] focus is on the process of scholarly dialogue, not on the organization of the library or the production of term papers." [5]

Information Literacy Seminar

The seminar, the third of our areas of library instruction concentration, developed initially as a response to the frustrations imposed by the constraints of on-demand library instruction, which generally allows only 50-75 minutes to cover both the mechanics of using the library and finding information and the thinking processes involved in research.

The seminar was created in an attempt to move beyond the vagaries of teaching students how to use an academic library and the basics of research, that is, how to find what you need in the library. The emphasis of the course was based on critical thinking and developing skills to determine information need; finding information appropriate to need, regardless of format; and, evaluating the usefulness of the information for a given situation. [6]

Over time it was noticed that the students enrolling in the class fell into four broad categories: those who saw it as an "easy credit"; those who were comfortable with the library, but wanted advanced skills; those who had no idea how to begin; and those who were terrified of what libraries have become. This, coupled with the increased profile of the Internet demanded a revision of the syllabus. The class that we now offer has been upgraded to a three-credit (from two) 200-level seminar (from 100-level). In addition to learning the competencies previously discussed, students are also forced to think about the types of information they consume, not just in academic life but in everyday life as well. They are asked to apply critical thinking skills to information by assessing such factors as authority and bias; skepticism (sometimes cynicism) is very prevalent, and highly encouraged, in the class. The students are thus using, and recognizing, essential elements in the critical thinking process: a readiness to question all assumptions, the ability to recognize when it is necessary to question, and the ability to carry out evaluations and analyze in a rational manner. [7] Through this seminar we demonstrate and engage our students in using critical thinking skills, while avoiding the trap that some educators and librarians fall into of "teaching and collecting facts rather than valuing explanations, arguments, and critical attitudes towards facts." [8] One of our goals is to create students with an attitude - a critical attitude toward every piece of information they encounter.

This focus on and incorporation of critical thinking into the seminar is essential for achieving our major goal of the course: to make students information literate. In addition to conditioning students to question everything they hear and read, in this course we encourage them to explore both sides of an issue. One strategy we employ to accomplish this is to have them debate controversial topics in class, often having them take and research the opposing point of view from their own. We emphasize that in order to argue any viewpoint comprehensively, the students must have some knowledge of the opposing points. Some students were even surprised to find that their perspectives change as they have to research and think critically about all sides of the issue.

One of our assumptions in teaching this course is that in order for it to be successful, i.e., in order for us to achieve our goal of teaching students to be critical thinkers, the students have to feel some ownership of the class. That is, the students have to buy into what we are teaching so they will internalize it and practice it. One means for achieving this objective is to involve students from the very beginning in evaluation. Spring semester we decided to do formative evaluation with our students: we determined their expectations for the class from the first day - we had them write a paragraph or more about what they expected to get out of the class; then periodically throughout the

semester, about every five or six classes, we asked them to fill out a brief survey that asked them three questions:

1. What has been the most useful thing you have learned in the last few classes?
2. What do you feel you have missed during the last few classes?
3. Any other comments?

By determining student expectations for the course at the beginning, and by emphasizing that they can help decide what we cover in the course, and then by periodically having them think and reflect upon what we have covered and what they might like to cover, we are giving them a vested interest in the class; we are giving them the opportunity to have some control, some ownership, of the class.

At the end of the class, we did a final evaluation where we asked the students to think back over the semester about all the brief evaluations that they had done periodically. We asked them to respond to these questions:

4. What are your thoughts about these evaluations?
5. Do you think these evaluations were helpful to you?
6. Why or why not?

Finally, also on the last day of class, we asked them to revisit their expectations for the course: we handed out the paragraphs they had written on the first day of class, asked them to read back over them, and answer these questions:

7. Do you think we have met your expectations for the class?
8. If you were asked to write a similar essay today, knowing what you do about the class, would it be any different?
9. If so, how?

An important piece of teaching our students to be critical thinkers is to get them to be reflective learners, i.e., to reflect upon what they have learned, what gaps there are, i.e., what else they would like to cover in the class - we ask them reflect upon the class as a whole so they can see how all the content areas of the syllabus fit together to make this whole concept we call information literacy.

We have designed an Internet portion of the class that is a very intensive and detailed examination of the information available on the Internet, and the Web in particular. In preparation for this, we have the students subscribe to a class listserv and encourage discussion of class issues through this forum. In part, this allows the "computer-phobic" student time to become acquainted with the keyboard in a non-threatening situation. We also use the listserv to build on classroom discussion by posing questions and letting the students generate the ensuing discussions themselves. Also, as an added incentive, the students are encouraged to make use of computer facilities to design and mount their own Web homepage as a class project.

This project is intended as an exercise in creating and maintaining an Internet information resource. Building one's own web page reinforces some of the basic tenets of authority and bias that are the essentials to retrieving good information. Around 33 percent of the students in the Spring 1997 seminar chose to create a homepage, and most chose controversial topics. [19] One, a retiree, detailed both sides of the marijuana controversy from the 1996 elections; another, a Russian exchange student, provided a useful guide to his country's Internet presence; and others examined some of the current hot issues in Montana, in some cases complete with the requisite vitriol. The lesson learned is that the information on the Internet is only as trustworthy as the person presenting it; the researcher is ultimately responsible for examining and deciding on what to trust.

The Web is viewed with a certain skepticism in some academic circles. An analogy could be that the Web is to information what a supermarket tabloid is to news. The seminar tackles this analogy head-on, for the Web can be a good source of information when critical thinking techniques are applied to it. We have the students examine tabloid culture, especially in how it relates to broadsheet news resources. In a way, this debunks a part of the elitist attitude prevalent in the academy that true information can only come from the professionals: "Pedagogically, it is a wrong lesson to give the impression that professors have the truth and students must swallow it." [20] We remove ourselves as the "sage on the stage," thus de-emphasizing the role of the instructor as yet another infallible source of information, becoming instead "the guide on the side." The impression we provoke is that information can come from many sources, even the tabloids, and that any information is subject to evaluation, even information provided by "mainstream" sources. The students conclude that information of value may be found in the tabloids and that the opposite may be true of the mainstream press; that "all knowledge of human society-of the present as well as the past-is imperfect and mediated by documents and other people." [21] Friere notes that we are enveloped in "facts," that "we need to be, not more compliant, but more critical of the news, media, television, what we see, what we hear. This means to assume a critical way of thinking toward life." [22] Friere continues: "we cannot say that [students] know nothing, because they have a certain level of knowledge that comes from their own practice." [23]

While there are negatives to this approach, we believe that they can be overcome with reciprocal effort on the part of the instructor and the student. Teachers of all levels have a responsibility to teach in a way that develops critical thinking, and the best method is that in which all things are subject to scrutiny by the student. [24] It is the student's responsibility to participate in this scrutiny. Incorporation of technology into education has been attacked as dehumanizing, but O'Donnell encourages the academy to be more honest, noting that "much of what transpires in higher education is already dehumanizing and distancing." The lecture, he continues, should only be used when it is the best pedagogical tool rather than as the default. [25] By adopting this methodology, our users will be effectively and, we suggest, innovatively taught.

Conclusion

It is a mistake to believe, as one recent library commentator does, that librarians are in the business of spoon-feeding information to customers. [26] While we are still heavily dependent on local resources to answer our users' information needs, technology will make it easier for them to find it elsewhere from the comfort of home. In fact, the Internet has become a local resource, as evidenced by the location of computer terminals at the reference desk to be used in working with users. It is our intention to teach our users to be independent and informed information consumers on their way to becoming lifelong learners. Our course makes use of the majority of "tactical recommendations" of Richard Paul, such as: not spoon-feeding information to the student; analyzing what we teach and learn; speaking less, thus forcing the students to think more; and requiring regular writing for the class, including that on the discussion list. [27] As librarians and educators who are members of the academic enterprise, we foresee our continuing role in contributing to the development of thinking, informed citizens, and incorporating and utilizing new technologies that enhance our endeavors.

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26. Goodson, C. (1997). Putting the 'Service' Back in Library Service." *C&RL News*, 58 (3), 186-187. The author notes, mistakenly in our view, that in the "modern service economy in which we all must now operate, the profession of librarianship will simply not survive unless we wake up and recognize that the era in which we could get away with insisting that customers come to our building in order to get a product is over" (p. 186). She suggests that librarians ought to do the research and present the user with a final product. We, however, believe that the information age requires that we take the harder path of educating our users to take advantage of new and emerging technologies.
27. For a more detailed version of these suggestions, see: Paul, R. (1992, Spring). "Critical Thinking: What, Why, and How." *New Directions for Community Colleges*, 77, 18-2