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Teaching and Assessing Information Skills in the Twenty-first Century: A Global Perspective

Hannelore B. Rader

Issue Editor
Library Trends, a quarterly thematic journal, focuses on current trends in all areas of library practice. Each issue addresses a single theme in depth, exploring topics of interest primarily to practicing librarians and information scientists and secondarily to educators and students.

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Introduction

HANNELORE B. RADER

Information literacy can be defined in terms of information skills needed by all citizens to be successful in the information environment of the twenty-first century. Information literacy standards indicating levels of proficiency for K-12 students, published by the American Association of School Librarians and the Association for Educational Communications and Technology, have been available and in use since 1989. Education departments in many states have mandated the inclusion of information skills teaching throughout the K-12 curricula.

Outcome measurements for information skills developed by the Association of College and Research Libraries in 2000 (http://www.ala.org/acrl/ilstandardlo.html) can be addressed in terms of what type of information skills students in higher education need to acquire to become successful students, professionals and researchers and ultimately productive workers in the society of the twenty-first century.

Information literacy includes the following competencies:

- The ability to determine the nature and extent of the information needed;
- The ability to assess needed information effectively and efficiently;
- The ability to evaluate information and its sources critically and to incorporate selected information into one's knowledge base;
- The ability to use information effectively to accomplish a specific purpose;
- The ability to understand many of the economic, legal, and social issues surrounding the use of information;
- The ability to access and use information ethically and legally.

Integrating information literacy instruction throughout the curricula in the K-12 school environment as well as throughout higher education
needs to become a major goal for librarians, faculty, and teachers. Methodology to accomplish this and related case studies describing actual learning environments in which information skills are taught are described in this issue. The need for information literacy instruction is a global issue and included in this publication are examples from the United States as well as China, the Netherlands, and South Africa.

Assessment strategies and evaluation criteria used to measure the outcomes of information literacy instruction are discussed in some of the articles.

Lori E. Buchanan, DeAnne L. Luck, and Ted C. Jones describe a model course of integrating information literacy into the virtual university environment using Austin Peay State University in Tennessee as an example. A team-teaching process is utilized to teach a core course in the liberal arts online. The ACRL (Association of College and Research Libraries) Information Literacy Competency Standards for Higher Education have been integrated into this course. This graduate course utilizes problem-solving techniques and discussions related to copyright, intellectual property, and Web page design and construction. Students are assessed regarding their acquired information skills through a variety of measures. As a result of the described course, future collaborative partnerships between librarians and faculty will be formed to teach students information literacy competencies.

Karin de Jager and Mary Nassimbeni provide a detailed description of information literacy in higher education in South Africa. They provide an overview of the development of current practices related to information skills teaching and the policy framework surrounding such teaching. Included is a literature survey used to compile a small survey instrument, which helped to establish the current practices. Significant factors affecting information literacy instruction include institutional policies, locating appropriate teaching strategies, diversity in students' backgrounds and abilities, and performance assessments.

Ilene F. Rockman discusses how academic librarians' long tradition of collaboration with faculty has advanced the mission and goals of libraries, particularly in the area of information literacy instruction. The rise of the general education reform movement in academia during the last decade has enabled librarians to move into a more formal planning role for general education programs. She shows the value of cooperation to ensuring that information literacy becomes the foundation for student learning and that assessment is a key component of outcome-based information skills instruction.

Jacqueline de Ruiter addresses the needs of older researchers in terms of using the Internet. She discusses how mature information users often have excellent information skills related to print materials but are unable to translate these skills into digital information use. Instruction needs to be provided to mature information users to help them acquire hardware dexterity and navigation skills. Several innovative instructional methods are suggested.
Ping Sun discusses the latest information literacy initiatives in Chinese higher education. Educators and librarians are reviewing traditional information education to prepare for appropriate changes so they can teach information skills in the twenty-first century. The new information and education environment in China is described as well as how faculty and librarians are beginning to collaborate in changing the teaching of information skills by incorporating their own standards and outcome measurements.

Gary Thompson describes how regional accreditation agencies have established mandates for universities to ensure information literacy instruction and appropriate assessment of such learning outcomes. This requirement is forcing higher education institutions to address information skills instruction in terms of forming librarian-faculty partnerships for teaching these skills. Syllabi and curricula need to be systematically updated to incorporate information literacy instruction in a meaningful way. New instructional methods and materials need to be developed to ensure successful collaborations.
Integrating Information Literacy into the Virtual University: A Course Model

Lori E. Buchanan, DeAnne L. Luck, and Ted C. Jones

ABSTRACT

The virtual university environment provides librarians with new opportunities to contribute to the educational process. Building on the success of team-teaching a traditional liberal arts core course with composition and communications faculty, librarians and a communications professor worked together to integrate the Association of College & Research Libraries (ACRL) Information Literacy Competency Standards for Higher Education (2000) into the online environment. The resulting graduate-level course in multimedia literacy assembled faculty and curriculum resources normally untapped in traditional classrooms. All five information literacy standards covering need, access, evaluation, use and the social, economic, legal, and ethical issues surrounding information use were addressed. Readings and threaded discussions about intellectual property, fair use of copyrighted materials, the evaluation of free and fee-based Web information and Web page design and construction prepared students to work in groups to design and construct Web sites. Students also completed a capstone project in the form of individual Web portfolios, which demonstrated the information and multimedia principles they learned in the class. Assessment of information literacy skills occurred through the analysis of student discussion, evaluative annotations, Web site assignments, perception surveys, and a master's level comprehensive exam question. What was learned in this course will serve as a model for future collaborative partnerships in which faculty and librarians work together to ensure that students who learn from a distance truly master information literacy competencies.
INTRODUCTION

Increased access to technology has altered the way that students study, while the variety of electronic information resources has widened the potential resource base for all students. These developments have reduced face-to-face teaching in the library and the need to visit the library building for help. It has also meant that librarians need to alter the way they plan and deliver information literacy instruction. (Orr, Appleton, & Wallin, 2001, p. 457)

User expectations regarding electronic access to information are increasing. Academic library collections are evolving from primarily print-based collections to growing electronic collections. Universities are offering more and more distance education courses. As a result, library services, including user education, must evolve to meet new user expectations in the virtual university environment.

According to Saunders (1999), “partnerships with teachers are more necessary in the virtual library than ever before to design learning experiences that require multiple formats and critical thinking” (Users’ Expectations section, para. 4). Although librarians have a long history of collaboration with faculty, the successful integration of the new Association of College & Research Libraries (ACRL) Information Literacy Competency Standards for Higher Education (2000) into college and university curricula depends on forming even closer partnerships with faculty. A newer type of partnership, which is likely to increase in the years to come, is the development and team-teaching of online courses by librarian-faculty teams. Integrating information literacy (IL) into online courses will help students become more aware of the issues surrounding information and its use. This article describes the development, teaching and assessment of an online course in which IL learning outcomes are integrated with course content.

During Fall 2001, two Austin Peay State University (APSU) librarians teamed with a communications professor to develop and teach an online graduate course in communications topics entitled Multimedia Literacy. In order to place this course into context, this paper will first discuss the role of librarians in the virtual university environment. Next, it will consider the importance of instructional design and librarian-faculty collaboration to the integration of IL learning outcomes into the virtual university. Within this broader context are descriptions of APSU librarian-faculty collaboration and the APSU Library User Education Program. The paper then discusses how this particular graduate multimedia literacy course was conceived, developed, and taught. It addresses the integration and assessment of IL student learning outcomes with course content. The final sections of the paper include student feedback, as well as the instructors’ observations and recommendations concerning the integration of IL into online courses.
The Virtual University Environment: Background

The College and University Systems Exchange (CAUSE) Current Issues Committee (1997) defines a virtual university as “an institution, or a set of institutions, engaged in a delivery of degree granting programs in higher education, using technology and methodology outside a traditional classroom” (Virtual Universities section, para. 1). Over 2 million college students will be engaged in distance learning by 2002, according to a January 1999 International Data Corporation report titled *Online distance learning in higher education, 1998–2002* (as cited in Distance Learning in Higher Education, 1999, Expanding Universe section, para. 1). The report concludes that 84 percent of four-year colleges and universities and 85 percent of two-year colleges will offer distance education courses in 2002. Given these numbers, it is imperative that librarians seek additional ways to meet the needs of distance learners. As Hricko (2001) points out, “students that have a greater intellectual framework for using information will most likely be the individuals that have the greatest success in completing distributing [sic] learning courses” (para. 2).

Librarians and the Virtual University

Library gate counts are decreasing (Carlson, 2001), which comes as no surprise to librarians. More and more students are visiting library Web sites, or simply bypassing the library altogether. When students do use the library in addition to the general Internet, they expect Internet-based services such as online public access catalogs, full-text database articles accessed via the Web, and e-reserves. Libraries try to meet these expectations by providing growing numbers of materials electronically, document delivery via Ariel and other services, such as Ingenta, for faster access to materials not held locally. More databases, more full-text articles, and more electronic books are making research possible anytime, anywhere. Remote patron authentication, which enables users to access library services from anywhere in the world, is now in place. Martell (2000) suggests that, in the future, “librarians will deal with users almost exclusively in a virtual environment and face-to-face interchanges will become atypical” (p. 104). Librarians are hard at work constructing well-designed Web sites and answering live chat and e-mail reference questions. However, providing access to needed resources and answering reference questions is only part of the equation. Librarians also need to instruct users about the variety of resources available to them both on the World Wide Web and through library Web sites, as well as about the differences among the various types of resources that they need. Delrin and Erazo (1997) state that “teaching patrons how to effectively apply the increasingly sophisticated search methods available online will be an important function in the digital library” (p. 105). Because users are accessing library Web sites rather than visiting library buildings, librarians need to consider new ways to design instruction for distance learners. In order
to capitalize on the unique opportunities and challenges present when teaching IL in the online environment, librarians need to absorb and apply current instructional design principles.

**Instructional Design in an Online Environment**

Good pedagogical elements, such as clear educational objectives, assignment-specific instruction, and active learning, have served librarians well through the years. These elements continue to provide the basis for effective instruction in the online environment (Dewald, 1999a). However, additional design considerations emerge as IL instruction for distance learners evolves. Although an in-depth discussion of design principles is beyond the scope of this article, a few questions to consider when planning online instruction are:

- How much do instructors and students know about the technology they will need to use in the online environment?
- What are the limits imposed by the technology that students and instructors are using?
- How do instructors ensure that sound teaching relationships with students are built in the online environment?
- What is the most effective delivery method to convey information and create a learning opportunity in any given situation, given the different ways to interact with students online?
- How can the distinctiveness of the online environment be maximized to motivate students to learn?
- What ways can the online environment be used to capitalize on the unique strengths of the independent adult learner?
- What methods can be used to assess students in the online environment?

Consideration of these issues will enable librarians to plan effective IL instruction in the online environment (Dewald, Scholz-Crane, Booth & Levine, 2000; Dewald, 1999b).

**Meeting Student Information Literacy Learning Outcomes**

Grassian and Kaplowitz (2001) state that "synchronous remote learning and particularly Web-based asynchronous learning allow us to reach out to a larger variety of user groups by offering various forms of ILI [information literacy instruction] in learner-centered approaches" (p. 408). "Information literacy in a distance learning environment can be provided through credit courses taught by a librarian, as an integrated component of a discipline-based distance education course, or as stand-alone Web tutorials" (Dewald et al., 2000, p. 37). Librarians have experimented with stand-alone IL courses and tutorials for several years now (e.g., Fowler & Dupuis, 2000; Hansen & Lombardo, 1997; Manuel, 2001; Parise, 1998; also see Contours of Cyberspace, 1999; Go for the Gold, n.d.; and Information Literacy & You, 1999). Most recently, O'Hanlon (2001) reports the development of a four-
week online freshmen IL course, “the first credit course in research skills offered by the libraries…” (p. 9) at Ohio State University. The award-winning Texas Information Literacy Tutorial (TILT) is now available for use by other libraries through an Open Publication License (Dupuis, 2001). Such examples demonstrate growing experiences among librarians who use technology to teach IL concepts asynchronously. Iannuzzi (1998) believes librarians can capitalize on such experiences to form new partnerships with faculty. Additional ways to deliver IL instruction, including the integration of IL within distance education courses, must be developed. Fully integrating IL learning outcomes into distance courses will require librarians to build even stronger collaborative relationships with faculty in the future.

Collaboration between Librarians and Faculty

Partnerships have always been an important means of informing users about the information resources and services available to them (Raspa & Ward, 2000). However, the evolving nature of higher education demands new types of collaboration, especially in the areas of distance learning and technology. Rader (1998) states “librarians are emerging within the university as leaders in the electronic information environment where new formats of information and knowledge are beginning to have an impact on learning, teaching and to some extent research” (Academic Libraries at the Cross-Roads section, para. 2). She believes (1996) that “[librarians] must forge partnerships… to bring about curricular restructuring and dynamic learning environments for students in the information age” (Librarian-Teacher Partnerships section, para. 1). Iannuzzi (1998) advocates involvement in key campus initiatives, such as technology in the classroom and distance learning.

“Distance education also presents a host of unique collaboration opportunities and challenges” (Caspers & Lenn, 2000, p. 150). The virtual university allows librarians to be “present” and involved in online courses on a scale not always possible in a traditional classroom. However, distance learners may not have the advantage of an informal peer network to familiarize them with library resources. Therefore, to be effective, librarians must “reach distance learners… through cooperation (at least) and collaboration (at best) with teaching faculty” (Caspers & Lenn, 2000, p. 150). Examples of cooperative activities are:

- Creating distance education resources and services Web pages;
- Advocating links to Library Web sites within online courses; and
- Developing course-specific resource Web pages.

Hricko (2001) believes that “in order for remote access students to develop information skills, librarians should collaborate with distance educators to develop Web-based assignments that lead students to master the basic competencies of information literacy” (para. 4). This collaboration
will extend further, in some cases, to librarians and faculty working together to create course-integrated units and modules, as well as to develop and team-teach online courses. Collaborating more directly with faculty will ensure that IL is integrated to the greatest degree possible with course content. As Hodson-Carlton and Dorner (1999) observe, “a collaborative redesign [italics added] of the instructional module for Internet delivery could increase the relevance of the exercises to the student’s clinical practice areas and promote more student interaction with the material” (p. 22), an idea they later pursued with success (Dorner, Taylor, & Hodson-Carlton, 2001).

Referring to online course-integrated IL instruction, Dewald et al. (2000) point out that “although such activities may be labor-intensive for librarians, collaboration with faculty can be rewarding, and there will probably be more such examples in the future” (p. 38). If librarians and faculty collaborate to include IL concepts with course content, it is more likely that students will achieve IL learning outcomes.

The remainder of this article will discuss the collaboration between librarians and faculty to develop and teach an online course at Austin Peay State University (APSU). First, background information about APSU, ongoing collaborations between librarians and faculty, and the APSU Library User Education Program will place the course in perspective.

Austin Peay State University: Overview

Austin Peay State University (APSU), Tennessee’s designated public comprehensive liberal arts university, is located in urban Clarksville (pop. 103,000), forty-five miles northwest of the state capital, Nashville. Its educational emphases are liberal arts and professional programs such as education and nursing. Librarians team-teach with faculty as part of APSU’s Heritage Program, an alternative core of interdisciplinary freshman English and humanities courses. Two interdisciplinary courses in writing, speaking, and researching have been offered to freshman students for the past fourteen years at APSU.

APSU’s 7,500 students include many part-time (38 percent), nontraditional (52 percent), and distance education (36 percent) students. It is also largely a commuter campus, with only 1,000 residential students (E. Ivey, director of institutional research, personal communication, November 10, 1999; T. Moseley, distance education coordinator, personal communication, March 5, 2002). Given such characteristics, offering online courses is a logical delivery mode. Online courses began at APSU in Fall 2000 with three courses and thirty-eight students. With support from a new administration, online course offerings have grown to forty-nine courses, enrolling 1140 students, in Spring 2002.

APSU is a Tennessee Board of Regents (TBR) institution and also supports the Regents’ Online Degree Program (RODP), a completely online degree program in which courses are provided through all the TBR uni-
Relationships between APSU Librarians and Faculty

Through the years, APSU librarians have consistently provided leadership in bringing technology to campus and integrating it into the teaching and learning processes. Librarians, in cooperation with faculty and staff, have taught Internet courses, and have led and served on technology committees. As individuals they have served in key campus roles such as academic advisors; the university’s first Webmaster was a librarian. In many ways, these efforts have laid the foundation for instructional collaboration with APSU faculty, a very high priority for APSU librarians.

Along with the partnerships linked directly to the library user education program described below, librarians are currently working with distance education staff and faculty experienced with technology to establish a multimedia development suite. This facility is housed in the library and coordinated by a librarian who is also involved in the library user education program. The suite will provide a place where faculty can learn about instructional design in an online environment and how to integrate multimedia into the courses they teach. It will also provide additional opportunities for librarians to work with faculty to integrate appropriate IL concepts into the curriculum.

The Library User Education Program

In 1986, the APSU Woodward Library User Education Program was formalized with the hiring of a user education librarian. The program provides course-related instruction (85 percent), course-integrated instruction (12 percent), and orientations (3 percent). Between 1986–87 and 2000–01, the number of instruction sessions grew from 57 to 131, representing a 130 percent increase. A new surge is presently occurring, with Fall 2001 sessions (100) outpacing Fall 2000 sessions (76) by 32 percent. The number of students reached has increased by 153 percent in the past fifteen years.

During the 1990s, the user education program evolved as the library integrated additional electronic resources and technologies. An instructional facility in which students engage in active learning experiences was built in 1994. Instruction was established as an integral goal within the library’s strategic plan; all librarians are now encouraged to become involved in instruction. The library’s distance education services, “Ask A Librarian” (email/live chat reference), and Web site all reinforce the library’s instructional mission.

The APSU library Web site, http://library.apsu.edu, provides a means to reach students anytime, anywhere. Librarians post instructional materials directly to the Web site so that distance learners have access to help at their points of need. Research guides, search tips and information about how to use specific resources and services are examples of instructional
materials that have been developed by librarians, who do so in anticipation of learners' needs and in response to their requests.

The potential for IL instruction within the more formal online learning environment is great. APSU librarians have already been asked to create course-specific resource Web pages and Web-based instructional units. Faculty can then link to these Web pages from within their departmental or personal Web pages, or from within their online courses developed in the more controlled Blackboard and WebCT environments. They have also worked closely with the director of distance education and the Blackboard administrator to make sure clear links to the library's Web site are visible within the online environment. In order to fully integrate IL concepts within course content, however, APSU librarians need to work more directly with the faculty who are teaching the courses. Fortunately, librarians have already established relationships with a number of faculty members. One such relationship continues to open doors.

During the last fourteen years, librarians have worked closely with composition and communications faculty first to develop two Heritage Program courses (HUM 1010 and 1020) on "Writing, Speaking, and Researching across the Curriculum," and second, to team-teach the courses. Through the years, experiences with Heritage course-integrated library instruction have heavily influenced the instruction provided in course-related sessions requested by faculty teaching other courses. Overall, relationships between faculty and librarians are stronger as a result.

During April-May 2001, selected APSU faculty, including one of the Heritage communications professors, met with librarians in information literacy initiative meetings which grew out of an action plan the user education librarian developed during an ACRL Institute for Information Literacy Immersion Program. In Summer 2001, HUM 1010 was revamped to focus on specific IL learning outcomes, which were being assessed as part of the national IMLS/ACRL "Assessing Student Learning Outcomes in Information Literacy: Training Academic Librarians" project. As a result of all these activities, both the librarians and the communications professor possess a greater understanding of IL learning outcomes, as well as having the experience of working together. The timing was right for collaboration on a new venture, namely an online multimedia literacy course.

**Multimedia Literacy Online Course: Background**

The APSU communication and theatre department offers the master's in communication arts degree with a corporate communication specialization. One elective available within this degree program is "Topics in Communication" (COMM 5900), in which "research, discussion, and papers focus on a variety of communication topics related to media and organizations" (The Master's in Communication Arts, n.d.). "Multimedia Literacy" was selected as the COMM 5900 course topic scheduled to be
taught online during fall semester 2001. The original topic area, outlined by a faculty member who has since left the university, included "defining multimedia, exploring its use, and discussing the impact its growth has on society. . . . [to] provide a multimedia toolbox, demonstrate how to create and publish multimedia applications, and introduce the World Wide Web and how to create Web pages. . . . [encouraging] discussion of multimedia frontiers, emerging technology, and societal issues including human impact, regulation copyright, fair use, equity, cost, and universal access" (On-Line Courses, n.d.).

At the end of spring semester 2001, the chair of the department of communication and theatre asked the communications professor who would eventually serve as chief instructor for the course to investigate options for developing and teaching the course. Based on previous work in Heritage and the newly organized information literacy initiative, the professor saw connections between multimedia literacy and IL. He believed that this course might be a vehicle through which to integrate IL into the graduate communication program. He approached library faculty for assistance, and they readily agreed to collaborate on the course.

All three instructors brought valuable experiences to the development table.

The communications professor (chief instructor) had worked in distance education while completing his doctorate and had coauthored an article on the virtual university environment (Turner & Jones, 1994). The librarian guiding the integration of IL into the course serves as user education librarian and designs Heritage 1010 IL instruction and assessment. The librarian overseeing the Web design and construction portion of the course serves as the library’s Webmaster and teaches in the Heritage Program. All three instructors received training from the APSU Blackboard administrator and were somewhat familiar with the Blackboard environment.

The chief instructor envisioned a course that would give students access, evaluation, and application skills for using the World Wide Web. Students would build their own Web sites using what they had learned about finding and evaluating content. The Web sites were to be driven by the individuals' areas of academic interest and focus. Students would learn about Web authoring tools, Web page design strategies, organization, and whatever else would help them to place materials in the Web environment.

The user education librarian was interested in focusing on more advanced IL competencies, such as the "IL Standard Five," which cover the legal, economic, ethical, and social issues surrounding the access and use of information (Association of College and Research Libraries, 2000). Helping students examine ethical issues and information technology in libraries, as Bodi (1998) suggests librarians can and should do whenever possible, was very appealing. In addition, tying evaluation and use of Web sites as information sources to Web site design and construction was an
interesting prospect. Much would depend on how information-literate the graduate students already were.

The library's Webmaster viewed the Web as the most pervasive multi-
media environment in today's society. However, librarians' skills, such as organizing information, are very important and somewhat lacking on the Web. Web design could potentially be used to teach some underlying information skills. The Webmaster drew parallels between potential course content and the library Web site redesign process that APSU librarians had just completed. This process included setting goals, brainstorming about content, and experimenting with organization. Students could learn to concentrate on the important issues of content and organization by:

- Comparing easy-to-use and hard-to-use sites and identifying the aspects that made the sites that way;
- Creating a target audience and goals for a Web site;
- Listing the content to be included in the Web site;
- Organizing the content;
- Developing a navigation scheme; and
- Creating homepages and a few linked pages.

Instructors spent summer 2001 separately considering content, discus-
sion questions, and assignments that would allow students to interact with and learn the material. A rough outline of the course was drafted follow-
ing a face-to-face meeting of instructors at the end of July 2001. Shortly after this meeting, an English professor working for a nearby university offered his manuscript of a basic Web portfolio textbook for students to use (beta-
test) as a guide in their work. While initial development of the twelve-week course occurred during August 2001, the instructors found it necessary to remain flexible and open to needed changes throughout the course, which ran from September through November 2001.

Course Development and Implementation

The challenge of developing this course for delivery in an online envi-
ronment soon became apparent to those involved. Questions concerning appropriate course materials, student experience, and the online environ-
ment had to be considered:

- What course documents would be used? Would a separate print text be most appropriate? Would Web-based readings be available?
- Had all enrolled students already completed at least one online course? Had they completed at least one graduate course? Did they hold a bachelor's communications degree?
- Could this course's learning objectives be accomplished in Blackboard?

The chief instructor realized that a new conceptualization of multimedia literacy was necessary and began with a definition. The following defini-
tion is based on a synthesis of the definitions of literacy, visual literacy, and multimedia (Lexico LLC, 2002). Multimedia literacy is "having the knowledge or competence needed to recognize and understand ideas conveyed through various media" (Jones, Luck & Buchanan, 2002, Collaborating Online to Teach section, para. 10). This new definition freed the instructors to focus on multimedia concepts and ideas rather than software tutorials and labs. Enabling students to acquire a broad knowledge of what works and what does not work in multimedia environments was deemed the most appropriate course objective. Instructional strategies that would ground students in information and multimedia concepts and ideas, as well as provide them with some practical experiences in which to apply the concepts, emerged.

Given the fact that the course was being delivered online via the World Wide Web, students could use the Web to explore concepts of information and multimedia literacy. In place of a single text, instructors identified course content readings freely available on the Web, via the library’s Web-based databases or through electronic reserves, and provided links to them within the Blackboard environment. Instructors created weekly course overviews that guided students in completing course readings, answering threaded discussion questions, and writing essays. Students also were required to design and construct group Web sites and compile individual Web portfolios in which they collected written and multimedia examples of their own work and supporting materials. Throughout all of their work, students gained in IL competencies, which enhanced their ability to complete the assigned work.

Information Literacy Outcomes Addressed

Selected student learning outcomes associated with the ACRL Information Literacy Competency Standards for Higher Education (2000) were addressed throughout the multimedia literacy course. The ACRL Instruction Section’s (IS) Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians (2001) was used in conjunction with the ACRL Standards to pinpoint specific objectives related to the IL student learning outcomes. Although later units reinforced IL outcomes as well, two initial IL units offered during the second and third weeks of the course focused specifically on information literacy content.

The course overview for the first IL unit (week two) began by emphasizing the students’ need to develop topics to cover in their Web sites and Web portfolios. This first unit then covered nearly all of the student learning outcomes (and the specific IS Objectives) associated with IL Standard Five: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

During that week, students were required to read Web-based sources about the issues surrounding information access and use, as well as review
plagiarism and the ethical use of information. The selected legal, economic, and social issues included:

- Intellectual property and fair use of copyrighted materials;
- Free access to information, libraries and censorship; and
- Free vs. fee-based access to information.

Students reacted to the readings through threaded discussions. The discussion questions (see examples below) prompted students to critically think about issues.

- Do you think the author is correct in her premise that the value of information will shift from the creation of content to the services associated with that content?
- How do you think creators of information content should approach their work in the future?
- As you research your multimedia topics, how much information do you think you will find in the free area of the World Wide Web?

The second IL unit (week three) guided students through the process of accessing and evaluating information. Students were assigned readings covering the standard evaluative criteria (authority, accuracy, currency, coverage, and objectivity); they reacted to these readings by participating in threaded discussions in response to posted questions. In some cases, student discussion indicated that they already employed standard criteria. However, it was also clear that the readings and discussion with their classmates added to their knowledge base and experiences. For example, students responded to the question, “What has been your experience with the quality of Web-based information compared to print information sources such as journal articles and books?”, by stating that they believed Web-based information was more accessible, more understandable, and the quality comparable in some cases. At the same time, they also pointed out that the Web held too much information, the accuracy was questionable, and the library’s Web-based databases were better than the free Web information.

Instructor feedback was a synthesis of student discussion, but also included additional points that needed to be made. For example, in response to student comments about fee-based and free Web information sources, the IL instructor pointed out that libraries must shift from ownership of sources to providing access to sources because information volume and cost are increasing while library funding is decreasing.

Students put into practice what they learned about accessing and evaluating information by identifying three information sources pertaining to their upcoming Web site group project. They then critically examined the sources and wrote source annotations utilizing the standard evaluative criteria (critical thinking skills). [Note: Selected taxonomies (skills) are highlighted throughout this section. They receive additional consideration in
The second unit addressed selected outcomes relating to IL Standards One (*information need*), Two (*access*), and Three (*evaluation*). The main IS objectives associated with the IL outcomes addressed covered:

- Focusing on a project topic;
- Using technology to organize information;
- Understanding the differences between free and fee-based sources;
- Modifying the search according to information found;
- Conducting the search in different retrieval systems;
- Using the Library’s Web site to identify information about services; and
- Evaluating information based on standard criteria.

In an effort to prepare students for the next course segment, two final threaded discussion questions regarding evaluation of Web sites included:

- How well do you think these Web pages (required readings) conveyed the information about evaluating information sources?
- How will you use what you learned this week in designing your portfolio?—In other words, what might you do differently to ensure others will evaluate your site favorably?

Objectives reached in the second and third weeks were further exercised during the next five weeks as students searched for information while they learned how to present multimedia in the Web environment. Outcomes associated with IL Standard Four (*The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose*) received the most attention during this segment of the course as students focused on using information in an electronic environment rather than in a research paper. Students learned about Web site design and construction, which involved:

- Understanding basic design principles;
- Defining the project;
- Planning organization and navigation;
- Creating a Web site blueprint; and
- Developing Web page content.

Throughout this segment, they learned how to gather, evaluate, and organize information from outside sources, as well as to draw upon their own knowledge and experiences.

Web design readings and threaded discussion questions made the students consciously think about how they themselves use the Web. Some of their responses to the discussion questions posted during the course’s middle weeks demonstrated that they had achieved the objectives that were the focus of weeks two and three. For example, one student’s response to a question about Web design mistakes was, “I like to know where my information is coming
from so I can determine if it is reliable." Yet another student responded, "I also strongly agree that [having] no... [biographies] is a big problem and I hate when it is not recorded when the information was updated."

Using their own experiences and the evaluation criteria previously learned as a starting point, the students looked at the flip side: which design and management principles create a good user experience and good evaluation. Students were asked to evaluate "good" and "bad" Web sites. In the case of the "bad" Web sites, they identified solutions to the Web sites' problems (problem-solving skills). They viewed the Web sites using the Lynx text-based browser, which not only allowed them to experience the frustration of visually impaired users dealing with bad HTML, but also reinforced the value, or lack thereof, of multimedia elements. Viewing a Web site through the Lynx text-based browser introduced disequilibrium, an active learning method that Oberman (1991) advocates because, "the mental discomfort of disequilibrium challenges students to think actively and constructively... remembering what they discovered and transferring the principle to a new problem" (pp. 198-199).

Visualizing the organization of Web sites helped students become more efficient at accessing information through the Web. Engaging in the process of creating a Web site helped students better understand the medium. Overall, students gained skills in "synthesizing course content with their own prior knowledge and skills" (Dewald et al., 2000, p. 40) during the Web design segment of this course (synthesis skills).

During the last four weeks of the course, students created group Web sites, critically reviewed their peers' Web sites and developed individual Web portfolios. Targeted IL competencies were visible within student work; for example, use of evaluative criteria came through in their peer reviews. Students also had the chance to reflect upon what they learned about information within their Web portfolios. The process of creating group Web sites and individual Web portfolios helped reinforce what students learned concerning evaluation and the issues surrounding information use. Oberman (1991) believes "the application stage ensures that the discovery of a concept or skill through group activity can be generalized to a new problem" (p. 200). Creating the Web sites and Web portfolios provided students with the opportunity to apply what they had learned about Web site design and construction (application skills). By the end of this segment, students had learned to:

- Work together;
- Share technical knowledge;
- Brainstorm and negotiate content and design; and
- Debate various points of view.

They presented information in a unique environment with its own rules, applied evaluative criteria to their own work, learned how to critical-
ly review their peers’ work and responded to and revised their work based upon outside reviews.

The multimedia literacy course as a whole shows evidence of the process of building the important cognitive skills of analysis, synthesis, and evaluation (Oberman, 1991). Active learning elements within the context of the APSU course’s activities are listed below in italics:

- Students engaged in group activity as they constructed Web sites.
- Instructor reinforcement and feedback occurred through discussion threads, via e-mail and within the Blackboard Course Material area.
- Application of IL competencies and Web site design and construction principles took place through the annotated bibliography, Web site, and Web portfolio assignments.
- Equilibration occurred as a result of the disequilibrium present within the course (e.g., the use of the Lynx text-based browser to view Web sites to determine their usability).

According to Oberman (1991), “Active teaching, which results in active learning [employing the four elements listed above], offers an opportunity for students to discover the concepts which they will need to operate in an information rich environment” (pp. 198–200). Technologies associated with distance education enabled instructors and students involved in this course to engage in active teaching and learning, and supported the processes needed to develop students’ cognitive skills. The graduate students, who were all older, responded well to these active learning techniques as suggested by Dewald et al. (2000). As a result, student learning experiences were much richer.

Selected taxonomies, which Dewald et al. (2000) believe “may prove useful in selecting skills to assess” (p. 40), appear italicized below, as well as in previous sections. Students demonstrated their learning through:

- Critical thinking skills: Students developed evaluative skills by reading and discussing evaluative criteria, then applying them to information sources identified for their annotated bibliographies. They also used evaluative criteria to break down Web sites and assess the information they contained. Students also employed evaluative skills in their peer reviews; instructors gave feedback through discussion and comments on graded assignments.
- Problem-solving skills: Students used evaluative criteria to analyze “bad” Web sites and learned how to solve the problems they identified. They then took what they learned and applied it to their own Web site projects; instructors gave feedback through discussion and comments on graded assignments.
- Synthesis skills: Students synthesized course content about intellectual property and fair use of copyrighted materials with their own prior
knowledge. They incorporated this knowledge in their Web site and Web portfolio projects; instructors gave feedback through discussion and comments on graded assignments.

- **Application skills:** Students applied what they learned about information to creation of a Web portfolio that represented their academic, professional, or business work; instructors gave feedback through discussion and comments on graded assignments.

The assessment methods outlined above reflect the best characteristics Dewald et al. (2000) advocate and believe to be “crucial to the success of distance learning endeavors . . .” (p. 39). They include:

- Connecting to learning outcomes;
- Centering on the student;
- Assisting both teachers and learners; and
- Gauging progress throughout course, as well as at the end of the course.

Final assessment of student learning will occur after more students complete a master’s-level comprehensive exam question related to course content. A student perception survey provided immediate assessment information.

**Student Perceptions**

Students were given the opportunity to evaluate the course by means of an anonymous online survey. The sixteen survey items covered student demographic information (three items), grading (two items), materials (two items), course design (four items), and content (five items). Thirteen of fourteen students answered the survey, and ten students posted additional comments. Percentages quoted combine the “strongly agree” and “agree” responses. Remaining options were “neither agree nor disagree,” “disagree,” and “strongly disagree.”

Resulting feedback covering demographics, grading, and materials indicated:

- Most students had taken communications classes before (85 percent).
- Most students had taken a graduate course (62 percent).
- Over half were taking their first online class (54 percent).
- Nearly all found the assignments reasonable for a graduate-level course and the grading policy fair (92 percent).
- All students found the online readings appropriate and liked having materials provided online rather than through bought textbooks.

A large majority of students indicated they felt the class as a whole was appropriately designed for an online format (85 percent) and that the IL, Web site design and construction, and Web portfolio modules built well upon each other (69 percent). Most felt that having several instructors made
the course a richer experience than having only one instructor (77 percent). Although a few students found having three instructors "confusing" at times, others noted that "the different experiences and backgrounds of the instructors broadened the interpretation and . . . [delivery] of the material."

In considering course content, nearly two-thirds of the class (61 percent) noted that the IL topics integrated well with what they had studied in other communications classes, although one noted that while "interesting and well thought out . . . [information literacy] could have been related better to the topic and not just library issues." When asked if the approach to multimedia maximized what could be learned in an online class, students more readily agreed (77 percent). Most students felt that Web site group work provided interaction that might otherwise be missed in an online course; however, some raised logistical and task assignment concerns. Some students felt that it was difficult to get everyone in the group together. Another student felt that most of the work fell to the "expert" in the group. Students found the Web portfolio component a logical extension to what had been learned in the first two units on IL and multimedia design and organization (77 percent): "The coursework for this class led nicely to the final project. It made the final project easier to do, knowing all the material we had covered previously." However, several students made appeals to "[b]egin reading the Web Portfolio book [online text manuscript] at the beginning of the semester. It would have been helpful in choosing our topics . . . [and] building . . . [the] group Web sites." Most students felt that the assignments built on each other (61 percent), but all agreed that the information in the class was practical (100 percent). Course instructors plan to use the information obtained from students to improve this course.

_Instructor Observations and Recommendations_

Team-teaching a course with classroom faculty provides librarians with an exciting opportunity to truly integrate IL into the students' education. The goal is for librarians and teaching faculty to "contribute to these skills in a mutually reinforcing manner" (Dewald et al., 2000, p.33). The APSU multimedia literacy course successfully integrated some IL standards; however it also revealed the following challenges which need to be addressed further:

- Librarians, in collaboration with faculty, need to develop workable, mature methods for integrating IL concepts into traditional coursework and assignments instead of teaching them in a related but isolated fashion.
- Librarians need to continue to seek collaborative projects and develop the connections necessary to work closely with faculty and to dedicate the time to engage in true collaboration.
Librarians must continue to better educate themselves and teaching faculty on IL concepts, standards, learning outcomes and objectives.

**Mature integration methods.** The concept of IL instruction, as opposed to training in library use or research methods, is still foreign to most faculty and to many librarians as well. Librarians lay the foundation for the integration of IL instruction by educating themselves and their faculty colleagues about IL student learning outcomes. True integration of IL into courses will also require a paradigm shift on the part of faculty and perhaps even more on the part of librarians. The difficulty of "thinking outside the box" was evident in the design of this course. The "Information Literacy" block was still presented as a separate unit at the beginning of the course, even though librarians were teaching both content and IL and had control over much of the course structure. Although the IL concepts presented in that unit were referred to and built upon throughout the course, the students still saw it as the "library" part of the course, instead of an integral part of their newly acquired knowledge. Dewald et al. (2000) state several times the necessity of faculty and librarians closely working together to integrate IL within the course framework so that students fully understand the librarians' objectives. This must be the case if IL instruction is to be effective.

In planning to offer the multimedia literacy course a second time, the librarians intend to introduce and teach IL concepts in tandem with the Web site project. For example, IL evaluation criteria will be introduced at the same time as Web design issues; students will then address both criteria and issues in their "good site/bad site" reviews. Legal and ethical issues such as copyright and plagiarism will be integrated into the section concerning development of project content. These issues will be related to the media law and ethical issues to which students are exposed in other graduate courses. Students will be required to include information from (or at least a bibliography of) Web- and print-based materials in order to integrate the development of information access skills into their assignment.

Another course activity subject to revision is the use of student groups to construct Web sites. The benefits of working in groups include many advantages important in this course, namely:

- Assistance of less technologically sophisticated students by those more advanced;
- Generating more student discussion and new ideas; and
- Reducing individual frustration with unfamiliar concepts (Oberman, 1991).

Although some benefits resulted, it was apparent from the student surveys that group activity actually increased the level of frustration. The frustration was due to unresponsive group members and the problems associated with students hindered by very different schedules. Moreover, it is
possible that, for a project this large, the distance-learning environment does not support the level of teacher supervision needed to guide group work. Oberman (1991) points out that "active learning requires the teacher, or leader, to assume the roles of manager, expert, consultant, and interpreter, [and to provide] appropriate reinforcement and feedback to students at critical junctures in the active learning sequence" (p.199). In the future, the Web site will be an individual project coupled with a shorter group assignment that provides some peer-to-peer interaction.

Web portfolios created in the course met with varied levels of success. The potential of portfolio assignments for developing and assessing IL skills is described in detail by Dewald, et al. (2000). Because instructors were unfamiliar with the concept of Web portfolios when the class started, they did not start the project early enough in the semester, or devote enough time to it at the end, to take advantage of these possibilities. However, future sections of the course may include an ongoing portfolio assignment, which will help the students integrate IL concepts into their knowledge base by encouraging them to draw connections between their communications education and the new multimedia/IL concepts they are learning. Such an assignment will also allow for continuous assessment and feedback regarding information access skills as well as comprehension of higher-level IL issues like copyright.

Connections and collaboration. Successful integration of IL into courses requires ongoing collaboration between librarians and faculty. Developing initial connections with faculty is the necessary foundation upon which to build collaborations. For librarians, being active in campus activities and committees, building individual relationships as part of academic departmental liaison duties, and heavy involvement in freshman experience or other core courses are all ways to connect with faculty. Librarians must take advantage of every available opportunity to educate faculty about the many contributions that librarians can make to student learning, especially educating students about information and the issues surrounding its proper use.

The collaboration among the communications professor, the user education librarian and the library Webmaster worked extremely well. Team-teaching the Heritage courses had built trust in each other's expertise and experience, which paved the way for smooth coordination of duties. The librarians relied upon the communications professor for subject expertise (e.g., what information the students should already know from other classes in the degree program) and guidance in handling the classroom management duties with which librarians were unfamiliar. Coordination among the three was accomplished by phone, through e-mail or brief chats on campus and the occasional lunch meeting in the cafeteria.

Time to collaborate. The only major obstacle to offering the course again is lack of time. The librarians involved in this course can attest to Winner's (1998) statement that "teaching users to understand the structure and role
of information and to use critical thinking in the evaluation and selection of material they receive is labor-intensive” (p. 26). Libraries can handle this issue of time in one of two ways: by reassigning librarian time to team-teaching, or by paying librarians on an overload basis for teaching, as Winner suggests (1998). The time involved is significant enough that the responsibility should never just be added to regular duties, any more than classroom faculty should teach an overload class without some compensation, in either time or money.

**Educating faculty and themselves.** Collaborating to teach IL provides many benefits to librarians as well as to faculty and students. In addition to increased knowledge of IL and how to integrate it into courses, librarians improve their relationships with teaching faculty and students. The ongoing interaction between students and librarians in this course allowed a true relationship to develop. Students in the class took advantage of other opportunities to interact with the librarians, such as visiting the library reference desk to meet the course instructors and using APSU’s live online reference service.

The whole experience of teaching a course also improves the effectiveness of librarians’ curriculum development. Instructional design and active learning activities studied for the purpose of this course carry over into the development of other forms of instruction. Related to this are the additional insights into student behavior beyond that seen in one-time or short-term instruction, which can then be applied into those types of instruction. Finally, the very fact that librarians have taught a “regular” class and have real-world experiences with integrating IL, increases librarians’ credibility with other faculty. This credibility is vital in all librarian/faculty interaction, but is doubly so when, in promoting the integration of IL, librarians step into the teaching arena. Both librarians and teaching faculty will grow in their knowledge of IL because of shared academic experiences. They will continue to collaborate on the integration of IL into the curriculum; and they will develop workable, mature methods for integrating IL concepts into traditional coursework and assignments.

**Conclusion**

The role of the librarian is changing in the virtual environment. The ability to adapt to changing roles lies in librarians’ willingness to experiment with new ways to accomplish their libraries’ missions. Librarians whose organizations must serve distance learners are faced with the challenge of integrating IL student learning outcomes into online courses. Becoming more knowledgeable about instructional design in the online environment is necessary. Boldly experimenting with new modes of instructional delivery can invigorate librarians and the services they offer.

Beyond instructional design, the successful integration of IL outcomes in online courses depends upon the connections librarians form with their
faculty colleagues. Connections evolve into collaborations in which librarians must take the lead to further educate themselves and faculty about the IL learning outcomes. Only when librarians and faculty work in tandem to achieve the common goal (information-literate students) can IL instruction seamlessly merge with, not merely flow beside, course content.

Many lessons were learned as a result of implementing this graduate multimedia course. Changes in content, assignments, and delivery modes, which will be implemented the next time this course is offered, are being considered. Many of these changes appear in this article. Overall, however, the three instructors believe the course was successful based on their observations of the student learning which took place, as well as on feedback from the students. Much was learned about collaboration, instructional design in the online environment, and the ACRL Information Literacy Competency Standards for Higher Education.

This knowledge and experience will be put to good use, both in more traditional settings as well as in the online environment. It is hoped that what was shared here will serve as a model for future collaborative partnerships between faculty and librarians. Working together in such partnerships will ensure that students who learn from a distance truly master information literacy competencies.

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Institutionalizing Information Literacy in Tertiary Education: Lessons Learned from South African Programs

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ABSTRACT
This paper presents an overview of the development of current practice in information literacy education in tertiary institutions in South Africa. The policy framework affecting information literacy is examined from multiple perspectives. An examination of the literature identifies key concerns that are used in the compilation of a small survey instrument to establish current practice. The impact of institutional policies, finding educational strategies that meet the identified objectives of information literacy, diversity in students' backgrounds and abilities, and ultimately the assessment of performance all emerged as significant. The concept of multiliteracies is suggested as a useful approach to conceptualizing information literacy as central to student learning. Future directions are suggested.

INTRODUCTION
The concept of "information literacy," which first appeared in the literature during the 1970s and which was comprehensively discussed in a major review paper (Behrens, 1994), developed in response to the growing recognition that finding, selecting, and using information was becoming increasingly complex (p. 311). During the 1980s this term gradually started to replace the concepts of user education and library skills, which essentially emphasized library as opposed to information usage (Behrens, 1993, p. 124).

In the 1990s, at least partly as a result of the increasing importance of information literacy in response to rapid technological developments, the Association of College and Research Libraries (ACRL) published a set of five "Information Literacy Competency Standards" for the U.S. (2000).
Similarly, the Society of College, National, and University Libraries (SCONUL) in the UK published a Seven Pillars Model of Information Literacy, which details the seven major information skills required by all students (1999). Essentially, there seems to be agreement that the information literate person is one who can:

- Recognize the need for information;
- Access information efficiently and effectively;
- Evaluate information and its sources critically;
- Incorporate selected information into one’s knowledge base;
- Use information effectively to accomplish a specific purpose;
- Understand the economic, legal, and social issues surrounding the use of information;
- Access and use information ethically and legally.

Implicit in such an understanding of the concept of information literacy is the recognition that a logical progression is implied and that certain skills have to be mastered before a person can perform all the functions as outlined above. Recognizing a need for information has to precede the process of access, which in turn requires a number of different skills such as familiarity with information resources, with the library and with various means of accessing resources in different media. Evaluating and using information are “higher order” cognitive skills (Sayed, 1998, p. 13), which may be employed to develop new ideas and knowledge. Charles McClure (1994) expressed this in an early model of information literacy which relates information literacy to other literacies:

At one level, an individual must be able to read and write—the traditional notion of literacy. At another level, the person must be technically literate, e.g., be able to operate computer, telecommunication, and related information technologies. At a third level, people need media literacy, and at yet another level they need network literacy. All of these types of literacies can be cast in the context of information problem-solving skills. (p. 118)

McClure therefore places information literacy at the center of the overlapping literacies as outlined; in his view it is the skill in which the others are subsumed.

**INFORMATION LITERACY IN SOUTH AFRICA: POLICY ISSUES**

The interest in information literacy has been spurred by systemic transformation of education at all levels, and the increasing adoption of ICTs in South African society. The policy framework for information literacy in tertiary institutions is derived from three policy domains:

- Education policies;
- Information communication technology (ICT) policies;
- Library and information services policies.
**Government Approaches**

The responses of the different sectors to information literacy issues vary according to their primary concerns. For example, departments such as that of communications and trade and industry stress economic participation, citizenship, and the broad aims of government’s agenda for the information society. While there is no single document setting out the government’s policy on the information society, it is possible to discern the importance attached to it by the government and its belief that ICTs can be used to facilitate and accelerate economic, educational, and social development. The documents and statements resonate with government’s keen awareness of the knowledge-based economy and its desire to raise awareness of the benefits for citizens of becoming an information society.

The government has placed much emphasis on the link between development and ICTs and is engaged in a number of national and global projects to promote the rollout of ICTs and their use. Explicit commitment to various conceptions of information literacy is apparent in many of the associated policy statements and documents. So, for example, South Africa participated in the Okinawa IT Charter adopted at the G8 Kyushu Summit of 2000. This represented collaboration between the world’s richest countries and a number of developing countries to help bridge the digital divide. One of the clauses reads:

> The policies for the advancement of the Information Society must be underpinned by the development of human resources capable of responding to the demands of the information age. We are committed to provide all our citizens with an opportunity to nurture IT literacy and skills through education, lifelong learning and training. We will continue to work toward this ambitious goal by getting schools, classrooms and libraries online. (Okinawa Charter on Global Information Society, 2000, No. 11)

Announcing the imminent publication of the government’s policy position on electronic commerce, Department of Communications Director-General Andile Ngcaba added that, in addition to creating a regulatory environment for electronic commerce, “Government also has to promote education to increase information literacy among all citizens in order to allow operators and consumers to reap the full benefits of electronic commerce” (“Discussion paper,” 1999, para. 2).

One of the paragraphs in the *Green Paper on Electronic Commerce* reflecting on the theme of digital literacy refers to the problems of basic literacy and its impact on people’s ability to develop the skills necessary for the information society:

> In a country where literacy remains a huge and seemingly intractable problem, what resources and programs are required to develop an awareness of the potential benefits of the information age; related technologies and e-commerce in particular? Adult and life-long learning
programs, tertiary and higher education schools, and in some countries even early learning centers are the focus of review and attention. Policy makers should institutionalize ICT awareness and skills development within the labor market and prepare school leavers for an increasingly knowledge-based society (Department of Trade and Industry, 2000, Digital Skills section, para. 1).

The South African government has recently launched “Info.com 2025,” the National and Government Information and Communication Technology Strategy, which serves as a collective program of ICT projects designed to establish a networked information community and make South Africa globally competitive. Info.com 2025 addresses issues of policy, infrastructure, human capacity, and local content within ICT industries. One of its objectives is to facilitate and promote education and training through the use of telecommunications technologies. The plan is to install public information terminals at main post offices and to set up community information centers (“telecenters”) in towns and villages (Ngcaba, 1999).

Information Literacy in the Educational Domain

The education domain also has an interest in the rollout of ICTs and the development of skills to use them effectively. The Department of Education is engaged with a Technology Enhanced Learning Initiative (TELI). “[The] Strategic Planning Committee has identified six ‘lead’ projects [to] create a technology-enhanced learning network” (South Africa. Department of Education, 1997, p. 1) to take forward the department’s strategy for the use of technology in education and training. One of the projects is to develop “a generic information literacy course for use in schools, community centres, industry-based training sites, and other appropriate sites of teaching and learning” (South Africa. Department of Education, 1997, p. 1). In elaborating the concept of competence in this paper, it is clear that the view adopted is a narrow one focusing on computer skills. The broader, more inclusive conception of information literacy for schools features in the general curriculum, where one of the generic outcomes indicates that the learner is expected to be able to “collect, analyze, organize and critically evaluate information” (Zinn, 2000). However, learners at schools have very limited exposure to either school libraries or computers. The School Register of Needs, a national survey, found that fewer than 30 percent of schools had libraries (Department of Education, 1997, p. 8). A survey of computers in schools showed that only 13.5 percent of schools had a computer or computers (Computers in schools, 2000). So, while the intent is clear that there should be inculcation of information and computer literacies in schools, the reality is that by the time students reach higher education institutions, the vast majority have had little or no exposure to library and information resources and do not possess the skills to use them.

Thus, the burden for information literacy education is greater at the tertiary level than one would normally expect. University and technikon
libraries operate in the higher education sector and therefore align their policies with those of their sector. In the education domain, reference to information skills and information literacy is made in a wide range of policy documents. A recent policy document, issued by the Council on Higher Education, dealing with the national qualifications framework, does enter the debate about the nature of generic skills and their supposed transferability. The report cautions that generic skills, such as information competence, cannot be taught in isolation from the context of the discipline in an add-on module (South Africa, Council on Higher Education, 2001, p. 109). The Council on Higher Education has specified information competence in all levels of qualifications granted by universities and technikons. For example, at Exit Level 7, completion of a general degree, the formulation for this competence is specified as “well-developed information retrieval skills. . . using IT skills effectively” (2001, p. 60). The National Research Foundation (the major research-funding agency in South Africa) has adopted ICTs and the information society as one of its focus areas to support. They point to the reality of low levels of information literacy and the need to give people previously excluded the opportunity to move into the information society (National Research Foundation, 2001).

The National Commission on Higher Education’s Working Group on Library and Information Technology highlighted the role of information literacy in their report to government. The report notes that as “information literacy is an integral part of the profile of a lifelong learner” and given the diversity of the student population, information literacy programs are necessary (1996, p. 48).

Library and Information Services (LIS) Policies

While different entities in the government use varying terms to express the skills associated with the goal of information literacy (e.g., information technology literacy, computer literacy and digital literacy), the LIS sector tends to stress academic achievement, with tacit or explicit references to life-long learning and the presumed requirements of employers, and uses the terms “information literacy” or “user education.” The report of the Interministerial Working Group on the Library and Information Services (LIS) Function pointed out that one of the values of the South African LIS system is to contribute to socioeconomic development of all South African people through information literacy (Department of Arts, Culture, Science and Technology, and Department of Education, 1997). Information literacy also features in two recent acts of Parliament. One of the functions of the newly established National Council for Library and Information Services, established by an act of Parliament in 2001, is to promote information literacy defined as, “the ability of learners to access, use and evaluate information from different sources, in order to enhance learning, solve problems and generate new knowledge” (South Africa, 2001, Definitions section,
The act of Parliament that brought into being the National Library of South Africa by amalgamating the State Library in Pretoria and the South African Library in Cape Town, refers explicitly to the promotion of information awareness and information literacy as being one of the functions of the National Library (South Africa, 1998).

The inclusion of information literacy in two important pieces of legislation governing LIS is a measure of the ascent to prominence of this concept in contemporary South African LIS thought and practice, as reflected in two very important LIS institutions. The National Council is a new and long-sought institution whose major task will be to advise the minister on matters relating to LIS in order to “support and stimulate the socio-economic, educational, cultural, recreational, scientific research, technological and information development of all communities in the country, and [to] provide optimal access to relevant information to every person in an economic and cost-effective manner” (South Africa, 2001, p. 2). In addition to its traditional functions, the National Library of South Africa provides leadership to the LIS community in South Africa.

The Coalition of South African Library Consortia (Cosalc), whose members are drawn almost exclusively from higher education libraries, has adopted user education as a strategic direction for the consortia (1999). Some of the consortia, notably the consortium in the Western Cape, were among pioneers of the movement. As yet, the community of higher education libraries has not produced a set of information literacy standards such as those developed by the Council of Australian University Librarians (2001), ACRL, or SCONUL. It is significant that the Department of Education/European Union Higher Education Libraries Programme, whose purpose is “to help redress the resource imbalances of the past in the Higher Education Sector. . . [in] historically disadvantaged institutions” (Department of Education/European Union, 1997, About the Program section), has highlighted the importance of information literacy in the development program. Each of the seventeen participating institutions has hired an information literacy librarian and information literacy education has been an important aspect in the education and training component.

Convergence of Government and LIS Policy Perspectives

A reading of policy texts in the government domain and in the LIS sector shows that, while the paths are not divergent, the trajectories have not yet converged. The government’s primary focus is information technology literacy, while libraries have a much broader view of information literacy. LIS theorists frequently express exasperation that government documents stop short of making explicit the links between a desired outcome (such as lifelong learning) and the identification of LIS as one of the agencies tasked with implementation. So, for example, in her analysis of lifelong learning in the new transformed educational system, Behrens is critical of
the narrow conceptualization in a range of government policy documents. Commenting on the foundational *White Paper on Education and Training* (South Africa, 1995), Behrens concludes: “In view of the *White Paper*’s integral use of the concept of lifelong learning, the lack of outright reference to the importance of information skills (and the concomitant resource based learning) in the learning process is a serious omission” (1995, p. 261).

While the government policy documents are frequently vague about implementation and agency, the strategy adopted by LIS policy documents is to identify key government policies and to draw links of relevance for action in libraries. So, policies tend to assert claims that libraries should have a unique and favored status in giving programmatic content to the government’s goals of an information society.

**Information Literacy Training in Tertiary Education Since 1997**

The South African library literature on the whole area that encompasses user education, library skills, bibliographic instruction, and information literacy has been fairly scant until recently and was comprehensively surveyed and discussed by Behrens in 1993 (pp. 124–130). In this review she acknowledges that, while most South African academic libraries were probably paying attention to teaching information skills in various guises from the 1980s, details of such courses were not often reported in the literature (p. 125), so that they were not available for discussion or close scrutiny. A further problem was that these training programs were “neither compulsory nor credit-bearing” (Mpendulo, Adams, Pienaar, & Rawlins, 1999, p. 37) making it very difficult to assess their efficacy or lasting value.

A search through the literature since Behrens’s review of 1993 revealed some increase of published material on information literacy interventions and activities in South Africa. A major impetus in the awareness of the importance of information literacy was provided by the visit of Patricia Senn Breivik to the five tertiary academic institutions in the Western Cape and the subsequent production of what became known as the “Senn Breivik report” in which information literacy was identified as a key factor in “co-operative academic planning . . . in order to achieve transformation with limited economic resources” (Underwood, 2000, pp. 15–16). The resulting “INFOLIT Project,” with substantial external funding, was specifically designed to promote information literacy, to conduct a needs assessment and an audit of current programs, to promote information literacy projects in the five institutions and to investigate both local and international models which could be applicable to the local situation (Underwood, 2000, p. 16).

Partly as the result of the INFOLIT initiative above, a new and credit-bearing course, “Information tools and skills” was launched at the University of Cape Town (UCT) in 1996 (De Jager & Nassimbeni, 1998) and has continued ever since. In addition, information literacy training courses were
initiated and reported by the Universities of South Africa (Thompson, 1998, pp. 125–129); of Pretoria (Thompson, 1999, pp. 36–37); of Natal (Leach, 1999, pp. 58–60; Prozesky, 1999, pp. 56–57) and at the Natal Technikon library (Rawlins, Pienaar, Mpendulo, & Adams, 1999, pp. 54–55). The problems of designing a curriculum and offering a course within the constraints of distance education were specifically addressed by Machet and Behrens (2000, pp. 8–14).

Makhubela reported on a joint information literacy project between the University of the Western Cape (UWC) and UCT, which was attempted in 1997 (2000b, pp. 141–143). Another joint project, between the Universities of Pretoria and Potchefstroom, was briefly reported by Thompson (2000). The journal Innovation has published several papers on aspects of information literacy and at the end of 2000 dedicated an entire issue (no. 21) to the topic. The title of this issue, “Literacies and Learning: Reflections on Information Literacy in Southern Africa,” foreshadows the position to be taken in this paper: that information literacy comprises a number of interrelated “literacies.”

The reported courses noted above were primarily directed at undergraduate students; they were aimed at teaching information skills and not simply library skills (Leach, 1999, p. 58) and were “generic” in the sense that they were designed for students from different disciplines and therefore did not deal with curriculum-specific material at any great depth (Thompson, 1999, p. 36). Walker comments on the still prevailing reluctance of academic staff to recognize that information literacy is “fundamental to the modern acquisition of knowledge” and has to be integrated into all taught courses (2001, p. 62). In this regard, Makhubela notes that there has not been much assessment of whether such courses “make a difference to students’ learning” (2000b, p. 142) and expresses doubt whether the information skills learned in generic courses and that have not been embedded in curricula, will really prove to be transferable (p. 143).

One exception to this general trend of directing generic courses at first years or undergraduates was found at the University of South Africa, where in 1997 a course in research information skills was specifically designed for master’s degree students in chemistry (Thompson, 1998, p. 125). In this course, active involvement of lecturers in chemistry was sought and obtained (p. 126) so that the course was fully integrated into the curriculum. Designed at a distance education institution, this course made use of a workshop component to provide students with practical, hands-on training in information skills (Ten Krooden, 1999, pp. 82–92) and used an innovative method of portfolio evaluation with which to measure student performance (Fourie & Van Niekerk, 1999, 2001).

At UCT a course directed at honors degree (postgraduate) students was introduced in the Faculty of Humanities at the beginning of 2001. This
course was still "generic" to a certain extent, as students from a range of different departments on the faculty were enrolled (De Jager & Nassimbeni, 2001), although informal attempts were made by the faculty to take into consideration the requirements of students.

One further example of embedding information literacy skills into the curriculum may be found in another course that had developed from the original INFOLIT Project. In the Botany Department at UWC, an experimental multimedia course delivered on the World Wide Web emphasizes the student-centered approach together with resource-based learning and states as an explicit educational goal the promotion and development of information literacy among participating students (Keats, 2001). This course may be regarded as an example of how faculty members who have been made sufficiently aware of the importance of information literacy, will act independently to make it an integral part of their courses.

During the 1990s, South African teachers and librarians generally began to understand that, while the body of literature on information literacy from the Anglo-American world is relevant to local circumstances, it was also important to understand that learners in South Africa come to the world of information with specific and often severe handicaps that might not be so evident in the rest of the world.

The INFOLIT needs assessment study was published as a monograph in 1998 (Sayed). Walker described this work as a product "from South Africa's leading information literacy project" (2001, p. 61). It consisted of a major overview of the state of information literacy on five tertiary education campuses and revealed the large discrepancies between students from "historically disadvantaged" (i.e., black) and white universities. Sayed (1998, pp. 6-7) emphasized that information literacy teaching in the South African context should additionally recognize the fact that all students have not had equal prior access and exposure to educational resources. The same opportunities in which to develop skills that might be taken for granted in western school leavers, have not been available to the majority of entrants into South African tertiary institutions. Students bring to higher education a set of previous experiences, convictions, and disciplinary traditions that may either hinder or enhance their learning and these should be taken into consideration in activities aimed at developing information literacy in students.

In the same context, it was also increasingly recognized that the skills required for information literacy might not necessarily be generic, but rather "highly dependent on context" and that, as the tools and ways of handling information are in a constant state of change and development (Sayed & De Jager, 1997, p. 9), teaching information skills should be firmly embedded in subject knowledge. It might therefore follow that so-called "generic" courses that are not firmly integrated into the curricula of specific courses might be less appropriate for inculcating information skills of lasting value.
Investigating Current Practice

At the LIASA (Library and Information Association of Southern Africa) Conference in September 2001, it was agreed that user education and information literacy would be a focus area of the Research, Education and Training Interest Group (RETIG). A number of different institutions were represented at this meeting and identified themselves as either interested in providing information literacy training or already were active practitioners. An e-mail questionnaire was therefore designed to assess the extent of institutional support for information literacy at twenty-six identified institutions of tertiary education in South Africa, as well as to investigate the nature and extent of information literacy activities that could be identified. Responses were obtained from twelve tertiary institutions in South Africa. Seven universities and five technikons were represented. While this overview therefore does not claim to exemplify all information literacy initiatives in South Africa, it may be regarded as indicative of the process and development of interventions by identified enthusiastic participants at South African tertiary education institutions and may reinforce or expand some of the findings in the recently published literature.

The importance that the central government has placed upon issues related to information literacy, such as the inculcation of generic skills and recognition of prior learning, has been discussed above. The first question that was explored in the questionnaire, therefore, was whether the respondents’ institutions had shown any strategic awareness (as expressed in strategic plans or policy statements) of the importance of information literacy.

Responses indicated that only one institution placed primary emphasis on “educating for life” and providing “a foundation of skills, knowledge and versatility that will last a lifetime, despite a changing environment” in its mission statement. Otherwise, there was not much explicit evidence of institutional strategic plans or policy statements that specifically acknowledge a responsibility for inculcating information literacy in students. It was noted that one institutional strategic goal recognized the importance of student development. A further two institutions were of the opinion that making an information literacy module compulsory for all first-year students, or employing a librarian responsible for information literacy, implied institutional support.

In response to this question, four institutions referred to library rather than institutional mission statements. One stated that an information literacy task team from the library defined its own mission statement to enhance teaching, learning and research by providing information skills training to staff and students in support of the university’s own mission statement. Another’s library mission statement read that the library would “be sensitive to its users’ different information needs and varying levels of information literacy skills, and contribute to the development of the users’ abilities to retrieve, analyze, evaluate and organize information.” One in-
stitution noted the importance of independent and lifelong learning and sensitivity to differing information needs; another stated that user education was mentioned in the library strategic plan.

The respondents were asked where in their institutions the responsibility for the teaching of information literacy skills and competencies resided and whether responsibility for teaching resided in the library, in academic development divisions, in a department of communication or information studies, or in academic departments. Responses made it obvious that there was some evidence of cooperation between the various libraries and academic departments. At institutions that had departments of communication or information studies (or science), four in all, the departments were jointly responsible for courses with the libraries or themselves offered dedicated courses.

A number of queries related to existing courses directed at inculcating information skills: whether the courses were offered as stand-alone modules or integrated into subject curricula and whether they were differentiated according to years of study. Issues of assessment and credit, as well as methods of course delivery, were also explored.

Reports were received of stand-alone and generic courses at six of the responding institutions and six reported both attempts at integrating courses into subject curricula, often at first-year level, as well as running generic courses. Some institutions also indicated that new courses were being planned, or that subject librarians were sometimes asked by academics to present subject-specific classes to their students. The impression was gained that, although practitioners were aware that information literacy should ideally be fully incorporated into curricula, the primary evidence of this being put into practice was found where subject librarians offered subject specific training in the use of information resources.

Courses at the various institutions were clearly differentiated according to year of study. Eight institutions offered courses aimed specifically at first years, but only two of these were compulsory. In two instances there were reports of courses specifically designed for postgraduate students.

There seemed to be evidence of an increasing need for assessment of information literacy courses. Seven institutions reported offering fully assessed courses; three reported some assessment, and two none. Where credit-bearing courses had been introduced, they were fully assessed, by means of assignments, tests, portfolios or examinations; otherwise questionnaires or course evaluation forms were used by all but two of the respondents.

Interestingly, even where courses were assessed, they were not always credit-bearing. Four institutions had no credit-bearing courses on offer. Course delivery was varied; six respondents specifically noted reliance on computer-aided instruction or work in computer laboratories. Two of the responding institutions offer distance education and they both noted that their distance-training packages were augmented by contact sessions or
workshops with librarians. The distance education institutions explicitly mentioned the use of study guides and "activity books" as course materials. Other institutions mentioned computer-aided instruction (with or without contact sessions), videos, lectures, tutorials, practices, and PowerPoint presentations as aids to course delivery.

A list of information literacy competencies, based on a breakdown by Godwin (2001) and representing both the "lower order" and the "higher order" information skills, was offered to the respondents with the request that they tick all that are taught in their institutions. The competencies were:

1. To recognize a need for information;
2. To define a topic as a preliminary step in the search for information;
3. To select the main concepts in a topic;
4. To identify keywords to search for information on a topic;
5. To understand that a range of information sources is needed to research a topic;
6. To know that general reference sources may be used to gain a broad understanding of a topic;
7. To know that different kinds of information will be found in different kinds of sources;
8. To be able to choose the most appropriate resources; both print and electronic;
9. To be able to distinguish among catalogs, indexes, online databases, and Web resources;
10. To be able to locate and access information from different resources;
11. To know how to formulate search strategies;
12. To be able to construct search statements;
13. To use Boolean logic;
14. To know how search engines work;
15. To be able to compare and evaluate information from different resources;
16. To know about issues such as currency, bias, and authority;
17. To be able to organize, use, and communicate information;
18. To quote and cite others' work correctly;
19. To know about issues such as copyright and plagiarism;
20. To produce and present an organized piece of work;
21. To synthesize and build new knowledge based upon existing information.

Seven institutions responded that they taught all of them. The competency that was most frequently not taught was knowing how search engines work ("14"; five institutions) and there was some evidence of doubt in these five institutions as to whether they were teaching the "higher order" information literacy skills of evaluation, communication, production, presentation and synthesis of information ("15", "17", "20", and "21"). Two institu-
tions mentioned that these skills were taught by the academic departments and not by the library; two suggested that they were not really taught at all.

The final question, asking for elaboration or any further comments on the issue of information literacy at the respondents' institutions, produced further points of interest. One institution noted that, while they believed there was "a definite need for information literacy to be integrated into the curriculum," it was not happening, as the academic staff needed to be "brought on board." They were attempting to address this issue by holding workshops for academics during vacation periods and in so doing sensitize them to what the library could do for them and their students. Another institution, also concerned about the lack of information literacy on campus, mentioned that about 60 percent of students were not computer literate and 70 percent were not library literate.

Common Concerns

The results of this survey seem to reinforce previous findings. Behrens, for example, had commented that South African librarians by and large did not document and publish their information literacy activities. The poor response to this questionnaire (responses from twelve institutions out of twenty-six) and the fact that it only produced evidence of fully accredited courses at four institutions, leads one to believe that librarians are still relatively unwilling to document and discuss their information literacy activities.

The government's lack of recognition of the contribution of libraries to its developmental goals seems to be paralleled by the responding institutions' general failure to acknowledge the role of information literacy in their strategic mission statements. Championship of information literacy at the highest levels of institutional governance has been shown by Bruce (1994) to be pivotal in the successful introduction of information literacy programs.

It is clear both from the literature and from the survey that most interventions are still primarily generic in nature in spite of an apparent awareness that information literacy is best taught and learned where it is fully integrated into subject curricula. It also seems evident that there is an assumption that these skills are transferable and an essential component of lifelong learning, although this has not been thoroughly investigated.

Both from the published literature and the survey, it is evident that practitioners are increasingly aware of the importance of the assessment of courses. The actual results of such assessments have however not been rigorously investigated. Walker "anecdotally" mentions that a seven-week intervention at the University of the Witwatersrand had a "noticeably positive effect on performance" and that students had evaluated a course very affirmatively (2001, p. 62). Most other reports on assessment concerned student evaluations, which were primarily favorable. (De Jager & Nassimbeni, 1998, pp. 139–143; Fourie & Van Niekerk, 2001, pp. 115–116).
It has also been noted in the international literature that there seems to be a measurable discrepancy between students’ perceptions about their own information literacy skills, and abilities acquired after interventions, and their actual skills as measured by answers to practical questions. Maughan had observed, after an investigation at the University of California-Berkeley, “graduating seniors surveyed held a higher opinion of their library research skills than they were able to demonstrate by their test scores” (2001, p. 77).

Such discrepancies were also evident in the Western Cape, where student information skills were tested after courses on information literacy on two campuses (De Jager & Nassimbeni, 2001). It was clear from this study that the results of information skills tests were “unimpressive” in both cases and, in spite of students’ declared confidence about performing information tasks, the actual performance was poor.

One survey respondent suggested that disappointing results from courses might be more widespread than has been reported in the literature: “Our students wish to learn material by rote and struggle with the concept that they are required to do something different. Another problem is that students do not actually go to the library and examine the resources that we cover in the course, such as indexes. For many students even classification is a mystery. . . .” In South Africa, therefore, problems that have been identified elsewhere, seem to be exacerbated where students come to higher education without even the lower order information skills that might have been regarded as prerequisite.

Responses from the survey above also confirms Rader’s observations of as early as 1996 (p. 73) that South African academic librarians have not managed to form the productive partnerships required to embed information literacy into curricula. It is therefore proposed that librarians are still not sufficiently sensitive to the academic discourses to have been able to convince faculty that they have a meaningful role to play in curriculum construction. They have also been insufficiently pro-active in identifying champions for information literacy in the curriculum among faculty, as only a few examples of integrated courses could be identified.

*Charting the Way Forward: Multiliteracies*

McClure’s information literacy typology provided an early example of the recognition that a number of different literacies combine to form information literacy. Sayed’s focus groups of faculty members confirmed that, especially in South Africa, “information literacy consisted of an infusion of various different skills, many of which may be taken for granted by teachers and lecturers, but which students simply did not possess” (1998, p. 9). He also noted that not many writers refer to the role of students’ prior experiences of learning in their handling of information in higher education (p. 7). These insights do not seem to have played a significant role in any of the South African information literacy interventions reported above.
The New London Group, who use the term “multiliteracies” to describe “the multiplicity of communication channels and media and the increasing saliency of cultural and linguistic diversity” (1996, p. 63), provides one with conceptual tools and a methodology with which to approach this problem. They emphasize that the concept of literacy is not a singular construct, but that textual literacy is connected to the visual, the spatial, and the behavioral literacies. Methodologically they propose that scaffolding and explicit instruction can reduce complexity; that situated practice should take into consideration students’ prior knowledge; that overt instruction should include students talking about what they are learning; critical framing occurs when students relate what they have learned to their lives and finally transforms practice when students apply what they have learned to a new context (pp. 83–88).

A few isolated instances that attest to the validity of such a multiliteracy approach at integration may begin to provide new direction to South African academic librarians. Two initiatives that have subsequently developed out of the original INFOLIT projects may be used to illustrate some of the pedagogical principles of the New London Group.

A course developed for first-year students at UCT deliberately set out to incorporate the framework of multiliteracies in its pedagogic practice in the context of teaching independent Web searching to very inexperienced students. Scaffolding consisted of restricting students’ initial attempts at searching to a limited database in order to ensure success. Incorporating students’ knowledge of South African rural contexts into the exercises required by the course ensured situated practice. Guiding the online class discussions and encouraging students to relate what they have learned to their own experiences provided both overt instruction and critical framing (Archer, Walton, & Wilson, 2000). At the conclusion of this course, the instructors could claim that “Students’ use of online sources was more sophisticated and critical than in previous years, and their general facility with web searching certainly improved” (p. 45).

In the second initiative, concern with issues of culture, language and gender led Makhubela to reflect on how these barriers may be overcome in information literacy education and how cultural and other differences among students may be incorporated into a positive approach to learning (2000a). In spite of significant technological difficulties at a “previously disadvantaged” university, she set about integrating all the learning skills captured in the motto: “thinking as a writer; thinking as a researcher; putting it all together” (2000a, p. 5). Her approach explicitly valued diversity and acknowledged prior learning in students’ contributions. As a result, students not only gained in confidence, but their grades improved significantly (p. 6). While this intervention may therefore not be a multiliteracies approach per se, it nevertheless may be regarded as a significant attempt at taking situated practice and prior learning into consideration, to explicitly beneficial effect.
CONCLUSION

An observable shift is discernible among librarians from being satisfied with the stand-alone, generic model for information literacy programs to the recognition that integration into subject curricula is a more effective approach to information literacy training. In order to reinforce and build upon this recognition, it is necessary to develop and enhance the sharing of best practices through more careful documentation and publication of successful interventions. Success should be measurable; this logically leads to a need for objective assessment and the recognition of benchmarks and standards to demonstrate improvement in performance.

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Strengthening Connections Between Information Literacy, General Education, and Assessment Efforts

ILENE F. ROCKMAN

ABSTRACT
Academic librarians have a long and rich tradition of collaborating with discipline-based faculty members to advance the mission and goals of the library. Included in this tradition is the area of information literacy, a foundation skill for academic success and a key component of independent, lifelong learning. With the rise of the general education reform movement on many campuses resurfacing in the last decade, libraries have been able to move beyond course-integrated library instruction into a formal planning role for general education programmatic offerings. This article shows the value of 1. strategic alliances, developed over time, to establish information literacy as a foundation for student learning; 2. strong partnerships within a multicampus higher education system to promote and advance information literacy efforts; and 3. assessment as a key component of outcomes-based information literacy activities.

BACKGROUND
Library instruction within the college and university setting has long been recognized as an important aspect of higher education (Evans, 1914). Over the years, academic librarians have consistently discussed the important role they can play by partnering with discipline-based classroom faculty to integrate library instruction programs into the university curriculum (Breivik and Gee, 1989; Rader, 1975).

This partnership, an evolutionary process of forging strategic alliances to advance library instruction goals, has included such pioneering efforts over the past several decades as:
Working with first-year students through a two-term humanities course which places emphasis on competence in the use of the library for research purposes (Farber, 1974);

Funding pilot projects, such as those sponsored by the Council on Library Resources, to enhance library services by integrating library instruction into established courses offered by academic departments (Dittmar, 1977);

Creating a separate credit-bearing library instruction course (taught by librarians, working closely with various discipline-based faculty members) for first-year students as an integral part of their undergraduate core learning experiences with the goals of integrating coursework and improving retention of underrepresented students (Rockman, 1978);

Including library skills in a discipline-based English composition course (Ball State, 1979).

The rise of the library instruction movement in the 1980s saw librarians heavily involved in course-integrated library instruction activities. The goal of these activities was to move beyond the traditional lecture model to one of an information-based or resource-centered teaching model (Pastine & Wilson, 1992). As such, academic libraries sought to parallel developments occurring elsewhere in higher education that placed greater emphasis upon integrated learning than on teaching specific library research and retrieval skills. As libraries mounted databases and online public access catalogs (OPACs), the opportunity to educate patrons about the effective use of these electronic systems provided a new means to enhance and integrate library instruction into the campus curriculum as an important tool (Rockman, 1989).

Some progressive voices have also suggested that librarians integrate library skills into the general education curriculum (Pastine, 1995). With the reform of university general education programs in the 1990s coinciding with the rise of technology (Lanham, 1997), reports of general education “gateway” courses linking library instruction and technology training appeared in the library literature (Varner, Schwartz, & George, 1996). Such courses helped students to use electronic information resources (Fenske, 1995), especially as complex choices and multiple database interfaces emerged.

The 1990s were an unprecedented time of change for libraries as it became clear that for students to function in a dynamic information environment they needed information literacy skills and strategies that could be applied to any information need (McCartin, 2001).

The reform movement of the 1990s saw some universities develop first-year experiences and seminars for undergraduates with courses focused on communication and composition skills (reading, writing, and critical thinking) as one method to deliver information literacy instruction (Higgins &

Other paths included the establishment of a lower-division, general education, course-integrated information literacy program (Sonntag & Ohr, 1996), professional development workshops targeted to discipline-based faculty members to integrate information literacy principles across the curriculum (Rockman, 2000), and a Web-based information literacy assessment tool (Rosen & Castro, 2002).

At the beginning of the twenty-first century, reports of activities such as reaching out to distant learners by including information literacy within the general education program (Wright, 2000), and increased focus on faculty partnerships (Raspa & Ward, 2000) were reported in the literature, bringing a renewed emphasis to these important topics.

All of these efforts recognized that for “on ground” and “online” students to acquire necessary information literacy skills, discipline-based faculty must be collaborative partners in the learning process across the curriculum, courses must be intellectually linked to each other whenever possible, information literacy skills must be reinforced and developed over time, and students must have built-in opportunities for success from freshman to senior levels.

**Restructured General Education Programs**

With internal and external public pressures for students to graduate with skills commensurate with the academic rigor of a comprehensive program of study, universities in the last decade have sought to restructure their curricular offerings to bring them more in line with current societal needs, to attract and retain students, and to help students progress toward graduation with critical reading, writing, thinking, and speaking well developed. Such restructuring would integrate the cocurriculum with the undergraduate experience; emphasize information literacy as an active learning process; inspire intellectual desire in students; promote the importance of continuous lifelong learning; and document to accreditation agencies, professional associations, legislative bodies, and other entities that undergraduate students are graduating with skills, knowledge, and abilities viewed as valuable assets in the workplace, in graduate school, and in society at large.

The goals of many restructured general education programs reaffirmed learning at the center of the educational enterprise, with a renewed focus on quality and coherence in curricular offerings (Ratcliff, 1997). In addition, as the enabler for continuous learning in a technologically rich and globally diverse society, information literacy has been viewed by some universities as the foundation piece of this restructuring effort. As noted by
Patricia Breivik in a 2000 keynote address to the International Lifelong Learning Conference, “Within today's information society, the most important learning outcome for all students is their being able to function as independent lifelong learners. The essential enabler to reaching that goal is information literacy” (p. 1).

Jacobson and Mark (2000) note that, while some institutions choose to include information literacy as part of the lower-division general education curriculum, others have made it a central component of a first-year experience program. At James Madison University, a competency-based general education curriculum strives to make every student accountable for learning specific objectives, such as formulating and conducting effective search strategies and evaluating information policies in terms of accuracy, authority, bias, and relevance (Cameron & Feind, 2001). In addition, students are required to pass an Information Seeking Skills Test (ISST) before the end of the freshman year.

At California State University, Hayward, a large urban university with a majority of upper-division transfer students, information literacy is part of both the first-year experience and the general education program on the campus. This institution recognizes the value of weaving information literacy into the lower division general education program via a one-unit credit course targeted to all freshmen, “Fundamentals of Information Literacy,” and as part of the upper-division information literacy general education experience for junior-level transfer students.

At San Jose State University, another campus in the California State University system, information literacy is targeted to lower-division students through their English composition classes (English 1B) with instruction also occurring in the upper division (Reynolds, 1989, p. 83). In Spring 2002, the library began testing a new model for English 1B (Reynolds, 2002) using an adapted version of the Texas Information Literacy Tutorial (TILT) to increase the effectiveness of the information competence instruction and engage students more fully in the learning process.

Support for Changing Curricula

Support for a changing university curriculum that includes information literacy has also come from a variety of external stakeholders, including the business community. Anthony Comper, president of the Bank of Montreal, told the 1999 graduating class at the University of Toronto that information literacy is essential to success in the next millennium:

whatever else you bring to the 21st century workplace, however great your technical skills and however attractive your attitude and however deep your commitment to excellence, the bottom line is that to be successful, you need to acquire a high level of information literacy. What we need in the knowledge industries are people who know how to absorb and analyze and integrate and create and effectively convey infor-
Terry Crane, vice president for education products at America Online, writes in the September 2000 issue of *Converge*, “Young people need a baseline of communication, analytical and technical skills. We are no longer teaching about technology, but about information literacy—which is the process of turning information into meaning, understanding, and new ideas. Students need the thinking, reasoning, and civic abilities that enable them to succeed in—and ultimately lead—a contemporary democratic economy, workforce and society” (Future of Education section, para. 3).

Taizo Nishimuro, president of the Toshiba Corporation adds, “In short, information literacy is the ability to solve problems, taking advantage of information technology and networks. Information literacy is not a new concept, rather a traditional one in terms of problem-solving” (p. 13).

As various sectors of the business community have embraced the principles of information literacy, there is also evidence that information literacy concepts are being recognized by governments as “new economy” skills (O'Sullivan, 2002, p. 7). Support for this position includes the fact that the move to a knowledge-based economy has revealed that many workers are poorly prepared and equipped to effectively deal with using and managing information on a daily basis, lacking the abilities to locate relevant information, critically analyze and assess its value and authority, and present it within legal and ethical parameters. Goad (2002) adds renewed emphasis to the importance of workplace literacy by noting—in the dustjacket of his book—that “information is the new currency” of the contemporary society.

So, ideally, curricular restructuring helps students at various places in their academic studies by seamlessly weaving information competence horizontally and vertically throughout the curriculum, with ample reinforcement occurring in both lower-division and upper-division courses (whether in major requirements, support courses, general education offerings, or electives). As such, students are able to develop critical analysis and communication skills, recognize and appreciate the variety of information formats available in today’s society, and critically evaluate and ethically use the desired information.

**Library Approaches**

Libraries have accepted the challenge of advancing the information literacy agenda on their campuses. While some have championed information literacy as the key competency for the twenty-first century (Bundy, 1998), others have recognized that local cultures and climates may affect desired outcomes of such pronouncements. There is no one solution for all. Campuses have chosen to pursue various models, such as separate programs, seminars, and courses for first-year students which include an infor-
mation literacy component; stand-alone credit and/or noncredit information literacy courses open to all students regardless of class standing or major; information literacy courses integrated within, and linked to, a general education program; information literacy instructional enrichment to an existing course commonly taken by all students (such as a core writing or rhetoric class); or capstone experiences in which students can demonstrate independent learning based upon previous experiences which demonstrate and reflect continuous intellectual growth and development as part of a senior project, undergraduate thesis, performance, or internship experience.

Whatever the chosen path, it is essential to collaborate with discipline-based campus faculty leaders to advance information competence goals. Faculty, with responsibility for the curriculum, have strong voices on campus curriculum committees and in academic senates which can lend needed support to the inclusion of information literacy principles into general education offerings, prerequisites, major courses, support courses, and/or electives.

A MULTICAMPUS APPROACH

Recognizing the importance of contributing to an information literate society, the Council of Library Directors (COLD) of the California State University (CSU), the largest and most diverse system of higher education in the country, serving over 388,000 students, identified information competence as a key component of its 1994 collective strategic plan, *Transforming CSU Libraries for the 21st Century: A Strategic Plan of the CSU Council of Library Directors*. A year after completing the strategic plan, the twenty-three-campus CSU system launched an Information Competence Initiative in 1995, partly as a reaction to the lack of skills of the entering students but also to strengthen the academic success of students at various university campuses (Curzon, 2000). With support from the CSU Commission on Learning Resources and Instructional Technology (CLRIT), charged with developing and recommending policy guidelines to the chancellor to facilitate the effective uses of learning resources and instructional technology throughout the CSU, an Information Competence Work Group was created to recommend basic competence levels, and to recommend processes for assessment of student information competence (Curzon, 1995).

Then and now the work group reflects a broad and diverse membership—librarians (who have faculty status), discipline-based faculty members representing the Statewide Academic Senate, assessment coordinators, and senior-level administrators based on the campuses and in the CSU chancellor’s office. Central to the program has been a series of grant opportunities for individual campuses to mount local programs and projects, or for campuses to work together in multicampus partnerships. Such projects have included partnerships with general education faculty to develop academic
orientation courses; the development of Web-based tutorials, electronic workbooks, and other instructional materials to teach principles and fundamentals of information literacy; the creation of summer workshops for discipline-based faculty members to learn more about information competence principles and to help them rethink their syllabi, assignments, and learning outcomes; outreach activities to high schools and community colleges through teacher-librarian collaboration; support on one campus for an online information competence graduation requirement; establishment of first-year experience programs; assessment activities; and the integration of information competence into the learning outcomes of academic departments using the *Information Competency Standards for Higher Education* produced by the Association of College and Research Libraries (ACRL, 2000). Faculty-librarian partnering has been a key objective underlying the work group's activities.

In addition, the CSU system has supported faculty professional development opportunities such as summer fellowships and system-wide conferences to further advance the goals of information competence on the campuses. Successes have been achieved locally, between campuses, and across the system (Clay, Harlan, & Swanson, 2000; Curzon, 2000; Dunn, 2002; Rockman, 2000; Roth, 1999).

In 2002, two of the campuses received national recognition by the Association of College and Research Libraries (ACRL). The Fullerton campus was chosen as a "Best Practices" library, and the ACRL Instruction Section bestowed its "Innovation in Instruction" award to the Fresno campus library for the creative "InfoRadio" project. Both of these campus projects received funding from the CSU Information Competence Initiative.

Exclusive of the grants, several campuses have also developed successful local information literacy activities. These have focused on information literacy programs to assist first-generation college students (Tyckoson, 2000), and the establishment of a foundation one-unit information literacy course as part of the general education program which thematically links core courses together in a yearlong freshmen-learning community (Faust, 2001). At the core of the experience is an integrated rigorous educational experience for all entry-level first-year students with a strong emphasis on composition, communication, critical thinking, and information literacy. As noted by Tsui (2001), "students deserve challenging coursework from the start of their freshmen year and throughout each of the college years, rather than having it received at the end of their undergraduate experience" (p. 20). Information literacy has a clear and strong contribution to make toward meeting this goal.

**Assessment Strategies**

Within the last several years, academic libraries have responded to a changing academic environment by becoming more involved with issues
related to assessment, especially outcomes-based assessment. Ideally, libraries want to be able to show that the role of the library has a strong impact on campus mission and goals by strengthening the quality of a student’s educational experience, empowering students with a renewed confidence in learning, contributing to student motivation and educational persistence, and providing a strong foundation for the retention and transferability of learning to any new experience. Much can be learned from the higher education assessment movement as libraries move into this arena (Pausch & Popp, 1997). Although some may view the role of the library difficult to quantify (Hernon & Dugan, 2002, p. 65), its contributions can best be defined and shaped by its connections to institutional goals and desired educational outcomes (Lindauer, 1998).

Such outcomes-based assessment can be conducted independently as a single library unit, or as a central component of a larger campus-based assessment project such as the general education program. Either way, it is important to collect appropriate evidence to show the library’s impact on campus by including the development of information literacy skills in course learning objectives in order to guide improvements, make informed decisions about instructional or curricular adjustments, and document change over a period of time. Improving student learning is the goal.

Although some have used quantitative summative assessment techniques (pre- and posttests, questionnaires, surveys, etc.) to collect appropriate evidence, it is equally important for students to be able to demonstrate mastery of information competence principles through other means such as academic portfolios (both print and electronic), performance-based assignments and activities, and senior-level capstone experiences and demonstration projects.

Embedded assessment approaches—examining student work within a course or discipline—provide another technique that can be useful for improving or advancing information competence goals on the campus. Such assessment can reveal if there are areas of student performance needing improvement, if students have retained and effectively applied knowledge and skills from course to course, and if instructional strategies and learning objectives are well aligned.

Methods

Not every campus can follow the examples of Appalachian State University, which cancels classes to conduct formal assessments of student learning (Mitchell & Viles, 2001), or James Madison University, which has formal assessment days to test entering students, sophomores, and juniors (Sundre & Cameron, 1996), building upon the competence-based general education program which includes information-seeking objectives. Based on a decade of experience, the Carrier Library at James Madison University has determined that assessment efforts produce the most useful informa-
tion and results if skills are measured through performance-based demonstrations, if both the instruction and the assessment programs are based on clearly stated objectives, and if students have opportunities to practice skills before they are assessed (Palomba & Banta, 1999, p. 261).

Most campuses tend to follow a less systematic method of assessment, relying on traditional methods of pre- and posttests (Kaplowitz, 1986), undergraduate surveys (Caravello, Borah, Herschman, & Mitchell, 2001 and 2001a; Greer, Weston, & Alm, 1991; Kunkel, Weaver, & Cook, 1996), or longitudinal surveys to measure the skills of students in selected academic departments (Maughan, 2002). Although these measures (e.g., multiple choice, true/false) can be used to establish benchmarks of knowledge or to provide a snapshot of performance at a certain point in a student’s academic career, they are not necessarily linked to performance objectives, and do not demonstrate how well a student has actually learned to navigate through a search strategy process to find, evaluate, use, and apply information to meet a specific need. As noted by Maki (2002), “tests may measure how well students have learned information, but they may not demonstrate how well students can solve problems using that information” (p. 10).

In order to reach beyond the campus environment, Ochs (1991) reports a technique not commonly employed—sending surveys to graduates of a library program to determine skills they retained, and to the students’ employers to determine how well the employees met job requirements. This “postcampus” assessment technique can be useful for gaining valuable feedback about the usefulness and applicability of course content, instructional strategies, and the campus learning environment. In a similar fashion, Smalley (2000) followed students on the job in selected occupational programs to see how they employed information literacy skills in the “real world” of work and to determine how well their campus-based academic preparation met the needs of actual on-the-job experiences.

The California State University system, under the guidance of its Information Competence Assessment Task Force, embarked on a different method of assessment—a multidimensional, multiyear qualitative and quantitative approach—utilizing the expertise of the Social and Behavioral Research Institute, affiliated with California State University, San Marcos (Dunn, 2002).

Such an approach is complex. As noted by Wright (1997), “judgments about the quality of an individual’s performance are increasingly made on the basis of a wide variety of evidence, not merely test scores or other numeric data; and the evidence is evaluated narratively and multi-dimensionally for strengths and weaknesses not merely in command of factual information or concepts, but in terms of skill levels and qualities such as creativity, risk taking, persistence, meticulousness, ethical or social consciousness, empathy, cultural sensitivity, and the like” (p. 573).

The first phase of the CSU assessment study was conducted in spring 2000 and focused on the need to determine a baseline of information com-
petence skills. A random sample of 3309 students from twenty-one campuses was selected for a telephone survey which lasted approximately twenty-five minutes. The centerpiece of the survey was a series of scenario questions that corresponded to the CSU information competencies.

This problem-based approach was designed to engage students in a verbal demonstration and explanation of how they would solve common questions such as informing the local city council about the state of homelessness in the community, or locating and evaluating information after receiving a medical diagnosis requiring surgery. Interviewers were trained to record both breadth (the number of different types of responses) and depth (the number of discrete ideas presented) of responses which were deemed as predictors of information competence. Data from a series of "research process" companion questions about the students' academic status, comfort level with writing papers, self-rated library skills, computer use, and reading comprehension were also collected. After analysis, results showed that freshmen had underperformed the older students due to lack of experience in an academic setting. As students used library resources more and acquired better research-process skills, their responses improved (Dunn, 2002, p. 30).

A year later, in spring 2001, phase two of the CSU information competence assessment project began to shed light on students' information-seeking behaviors, and their abilities to evaluate, analyze, and use information. This aspect of the assessment project utilized qualitative methods to identify what students actually do when they search for information. As described by Dunn (2002), a series of questions framed the research:

- How do students approach and complete information tasks with a set time period using computer and library resources?
- How are strategies and resources students use related to the products of their work?
- What pedagogical issues might emerge from an analysis of observed information-seeking strategies?
- What similarities and differences exist among faculty, librarians, and students in their conceptualization of information-seeking strategies?

In order to provide answers to these questions, a random sample of seventy-six lower- and upper-division students was engaged in open-ended activities on one of four regionally based CSU campuses on four separate Saturdays. The students were joined by twenty librarians and ten discipline-based faculty members. Using ethnographic research techniques, focus groups of students, librarians, and faculty were conducted and both video and audi-taped; special computer screen capture software was installed on library workstations to record students' computer keystrokes as they searched through library online catalogs and Web sites to complete open-ended assignments; ethnographers recorded field notes of selected students as they worked.
Dunn (2002) notes that the data is rich and will take some time to fully analyze. Nonetheless, based on recorded focus groups, observation, field notes, and screen capture keystroke patterns, preliminary results indicate that students tend to exhibit an overreliance on Web-based resources rather than using library catalogs and databases; do not understand the differences between keyword and controlled vocabularies; do not make distinctions between scholarly and popular works; for the most part, do not seem to be systematic and confident searchers; often guess rather than demonstrate discrete research skills; and tend to embrace the virtual library (the Web) over the traditional library for its convenience, flexibility, timeliness, and access to large amounts of up-to-date information. As a result, they run the risk of overvaluing current sources of information over in-depth discussions often found in books. One of the researchers noted that, although technology promises to make information more accessible, it can also limit (or telescope) the information that students may actually receive, especially if students place primary or sole emphasis on the World Wide Web.

These experiences are consistent with other reports in the literature that indicate that students do not display “a high level of information competence” (Caravello et al., 2001, p. 199) and “at best... possess sporadic knowledge” (p. 200), and “that students think they know more about accessing information and conducting library research than they are able to demonstrate when put to the test” (Maughan, 2002, p. 71).

Additional research projects using both qualitative and quantitative assessment techniques are needed so that libraries can learn more about the information-seeking behaviors of their students and their patterns for finding, evaluating, and using information. Such results can be used to “make the case” for including information literacy prominently in the general education core curriculum, courses in the major, and support courses to strengthen “connections” between course content with the ultimate goal to facilitate learning, and assist students to develop into confident, self-directed, and independent lifelong learners.

CONCLUSION

As learning organizations, libraries have been successful over the years in transforming themselves according to the changing nature of teaching, learning, and scholarship. As information choices have become more complex and diverse, libraries have recognized the need to infuse information literacy activities throughout the curriculum, both horizontally and vertically. The general education reform movement on many campuses has provided academic libraries with opportunities and possibilities to weave information literacy into both lower- and upper-division courses, redesign services, reshape librarian roles and responsibilities, and revisit with discipline-based faculty members about course descriptions and student assignments to include information literacy principles.
Utilizing the ACRL, *Information Literacy Competency Standards for Higher Education*, many libraries have begun to reach out to faculty colleagues to educate them about information literacy principles, help them to reshape assignments into problem-based learning activities in which students can more prominently demonstrate information literacy skills, and discuss with them the importance of providing a common baseline of information literacy experiences for all students—first-year, lower-division, transfer, upper-division, senior, and graduate students—that is reinforced through major courses, and assessed on a regular and systematic basis. As noted by Lindauer (2002), "probably the most direct contribution the library makes to institutional goals is its role in developing clear student learning objectives for information literacy skills; assessing the progress and achievement of these objectives; and showing how the outcomes are used to improve student learning" (p. 19).

Reconceptualizing the process around achievement-based learning outcomes, with strong foundation skills of information literacy serving as the "connection" between courses, can provide useful information to curriculum planners and educational policy makers. Assessment that is realistic and integral to the educational mission of the institution has the greatest potential to yield meaningful results for gradual improvement in learning with the chief beneficiaries being our students.

**REFERENCES**


Aspects of Dealing with Digital Information:
"Mature" Novices on the Internet

JACQUELINE DE RUITER

ABSTRACT
This article seeks to address the following questions: Why do certain people, who are fully information literate with printed materials, become hesitant and even reluctant when it comes to finding something on the Internet? And why do we, information professionals, find it difficult to support them adequately?

Mature users of digital information are often skeptical about the value of the Internet as a source for professional information. Over the years much has been achieved, but many prophecies of the experts on digitalization from the early hours still have not yet been fulfilled. Mature users do possess all skills needed to be digital-information literate, but they need to be assisted in specific areas where those skills are insufficient. They tend to blame themselves even if shortcomings in accessibility of digital sources and computer errors obstruct their search. Operating hardware requires a dexterity that can only be acquired by experience. Instruction should be hands-on; demonstration is far less effective. Special attention should be given to reading and interpreting navigation information on the screen and to the search strategies the Internet requires. Use of imagination and trial-and-error methods are to be recommended in this respect.

INTRODUCTION
The combination of digitalization and electronic communication has provided us with a marvellous, well-nigh inexhaustible source of information: the Internet. Young people who are growing up with the Internet are its natural users, and librarians focus their attention to teaching them how to use the Internet efficiently when they are searching for professional information.1

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Because of this focus on the young, the needs of another group that can benefit from this rich source are neglected. This is the group of mature researchers. They are well-educated, intelligent professionals who are experienced in dealing with information. They are used to working with word processors, e-mail programs, and other computer applications and know how to search databases. Yet, many of them rarely turn to the Internet for information and, whenever they do, they are not able to use it effectively. This is due partly to the researchers and partly to the character of the Internet as a source of professional information. This paper will discuss those two obstacles and what can be done to assist the mature users in overcoming them.

**DEFINITION OF MATURE INTERNET USERS**

The group described here as "mature" users—so as not to hurt anybody's feelings about age—consists of professionals thirty and over, with no upper age limit (and some significantly younger than thirty). In my work as a librarian, I was often confronted with the younger category, and in my personal life I am regularly consulted by friends of over seventy, some of them in their eighties. In my experience, there is little difference in type of difficulties according to age, it only gets harder to overcome them. All mature researchers do know their way around printed sources, but have received their professional training before the boom in digitalization and electronic communication. The skills to deal with digital information they picked up along the way as computers slowly penetrated first their offices at work and then their studies at home. The transition was gradual on all fronts: From typewriter to word processor is but a small step and from card catalog to an online catalog is (to the library patron) just a change in how to search the records. The possibility of sending e-mail is a welcome addition to the usual channels of communication, but it is not seen as really "new," as it is perceived as a written phone message. Yet, in electronic mail and other online applications lies the real giant leap made possible by digitizing information. Thanks to electronic communication, computers can be linked in ever increasing and highly complicated networks, and hyperlinking makes it possible to connect the content of all those computers.

Mature users often do not bother with the Internet as a source, because they know how and where to find what they need efficiently in printed sources. If they do decide to turn to the Internet, they often have great difficulty in finding the desired information. One clear obstacle in searching the Internet is their computer skills, in particular operating a mouse and interpreting the navigation information on a screen. Another difficulty lies in the difference in search strategies required.

**COMPUTER SKILLS**

Applications such as word processing are mainly key-operated, while the Internet is very much mouse-operated. Instruction can easily be given
on basics such as the difference between left and right click (command versus dropdown menu). When to use single or double click is less easily conveyed. There is no visible indication, and it usually boils down to experience to know how often to click. Besides, experienced users often are not aware this may pose a problem, as they themselves will recognize and correct any error almost instantly. Many mature users are not very adept at using a mouse, because it takes finely tuned motor control to point a mouse at a specific spot and click without moving away from that spot. The younger a person, the easier it is to train for this control, and the only way to learn is by practicing. But when work has to be done on the computer, poor mouse control is an encumbrance and a nuisance, so people rather rely on their keyboard skills. Playing mouse-operated computer games in which speed does not matter (such as solitaire) is one of the best ways to train oneself for mouse skills. It provides an opportunity to practice without the irritation of being hampered in one’s work, because the outcome of a game does not have the same importance. But sadly, most mature users are not very enthusiastic about playing computer games.

A second important skill is the ability to interpret the navigation pointers on the screen. In applications there is a certain convention in the use of symbols and the position of information on the screen that helps operate the program. A menu bar is at the top, an arrow to the right means “forward” and a tiny picture (two squares and some horizontal lines) indicates a print button. Any number of actions may cause to appear on the screen a dialog box that contains information on how to proceed. (Often the content of dialog boxes is not very clear, but that is another matter, not considered here.) In many programs, however, there is no clear indication on the screen how to exit safely at any given moment.

Navigation information on the Internet often does not comply with these conventions. Every designer of Web pages decides what is the ideal way to present the navigation pointers. A search button may be disguised as a signpost or a dog or a magnifying glass; a help button as a question mark or a life buoy, and so on. Interpreting icons on the Internet calls for enough imagination to match a designer’s creativity. Even the feature that is at the core of Internet navigation, the hyperlink, is often not easily recognizable due to graphic design. To find links and hot spots one needs to move the mouse across the screen and check where its shape changes to indicate something clickable.

How important it is to “read” a screen effectively may be illustrated by an example of a friend of mine who is an accomplished digital-information literate but could not find what he was looking for because the buttons to browse the hit list were in an unusual place on the page.

Brushing Up

When librarians are assisting mature users in brushing up on their computer skills, they need to be aware that these mature users witnessed
the birth and growth of digital information. They know that predictions regarding new possibilities often are too optimistic, and their own experience of not being able to find what they are looking for only confirms this impression. A less apparent complication is that mature users can be quite insecure about the skills they do possess. When one is used to being in control, it is unpleasant not to be able to master a machine. Even when technology fails, as it frequently does, mature users often feel that they themselves are probably to blame.

Instruction must be hands-on. A “Let me just show you how to find it” demonstration usually is executed far too quickly, because the demonstrator knows where to look, and does not need to read the whole screen to locate the navigation information. Besides, as stated previously, using a mouse can only be learned hands-on. Instruction on how to read a screen should also encompass encouragement to use imagination and exploratory behavior: guess what icons are meant to symbolize or click them just to find out what they are for; move your mouse around to locate clickable objects and click to find out what happens.

In manuals it is important not only to list steps. Every action must be described in detail to make sure that a procedure can be executed correctly. Apart from this, it is important to describe what the results of any action should be, to enable the user to check whether he or she is still on the right course.

Choosing a Source

Choosing which source is best suited to fulfill one’s need for information is complex. All kinds of considerations come into play:

- Do I know a source in which I expect to find the answer to my question?
- Can I go straight to a document (content-source) or do I need a reference source (such as a catalog) to locate it?
- Can I get hold of a document, once located?
- Is the source reliable?
- Will I be able to consult it again?

The very first consideration is decided by the experience and expert knowledge of the researcher. Mature researchers know their way around the traditional professional sources such as bibliographies, handbooks, catalogs, and professional databases. But someone who does not yet have this overview will nowadays probably turn to the Internet for a preliminary search. Depending on the success of this Internet search and the standard the researcher requires for his information, many leave it at that. The possibility to assess the reliability of the information that is found in the search is a deciding factor in whether a search needs to be extended.

There is a large gap between printed and Internet sources with respect to the assessment of their reliability. In printed materials, the title page of
a document provides information about the author and the publisher and both have their reputation at stake where quality is concerned. If no name is connected to a document, or if the author has published it independently, it is not so obvious what kind of quality may be expected, since there is no claim to responsibility. These printed materials are referred to as "grey literature." Digital sources, such as databases or e-magazines, that are published and maintained by large institutions or by publishers, do have the name of their publisher as a hallmark for quality. For Web sites, on the other hand, there is no consensus yet on how to indicate the responsibility for its content. The domain of a large company or institution will often be taken as an indication of "corporate" responsibility, but it is rare to find an "imprint" of some kind that gives information on the actual person who is responsible for the content of a page. In this regard most of the information on the Internet is more or less "grey" by nature.

Once located, digital documents usually are more readily available than printed matters. With printed materials access to the actual source is determined by possession, and, consequently, by the opening hours of the library. Digital sources like databases are quite often licensed. Their availability will probably be restricted by passwords or IP recognition, but usually they can be searched from anywhere on the intranet of the organization. Internet sites are available 24/7 and at any place in the world, as long as you have a means of hooking up to the Internet.

A new factor to be taken into account, related to the Internet, is the question of whether the same information may be consulted again on a future date, at the same site. This may seem to be rather a strange consideration, but the Internet is a dynamic source that is not only being added to but is also being taken away from. A document, a page, or even a whole site may disappear as suddenly as it became available. Even more treacherous is that the content of a document may be altered unnoticeably and without notification. This instability in availability is mainly due to the fact that the content of the Internet is governed by supply. A printed document, however, once acquired, is available for an unlimited space of time.

**Content of the Internet**

As mentioned, the content of the Internet is almost exclusively based on supply. Sites are put online by organizations, businesses, and individuals who feel they have something to share with the rest of the world. This is why there is such a variety of information to be found: reference and full-text information, commercial and not-for-profit information, common-interest and strictly personal information, professional and recreational information, Internet art, and so forth. It is also why there may be an overload of information on one subject and nothing at all on another. And it is the main reason why there are no standards for design or description of content that might improve access to the content.
All in all, the Internet contains a chaotic and unstable abundance of information, with hardly any structure or logic to it. This is in contrast to sources such as bibliographies, indexes, and (digital) databases, that encompass a limited number of subjects and are highly structured. Searching structured bodies of information calls for different search strategies than searching unstructured ones.

**Search Strategies**

Because of their structured nature, search strategies for printed materials and digital databases can be defined clearly. This does not mean, however, that those strategies are always uncomplicated and searching a printed source may also be laborious. On the other hand, the lack of structure within the Internet makes it necessary to use one’s own strategies.

**Structured Sources**

Reference sources such as catalogs and indexes are ordered alphabetically or by subject and are devised with the express purpose to be searched. A printed source is accessible through a limited number of entries. Author and subject are the most common, but a library catalog may also provide access by call number. The entries are ordered according to strict rules, that can get quite complicated. In an index of author names, for example, my name will be filed under “D” in American catalogs, while in a Dutch catalog you will find me under “R”. Diacritical marks that indicate vowel mutation also give rise to a different order. An o-umlaut, “ö”, should be filed under “oe”. Diacritical signs can be resolved automatically in digital indexes, but most people do not know how to produce them on a keyboard anyway. In older sources, spelling may also differ, and forgotten conventions may have to be rediscovered. (Few will remember the Prussian rules for ordering titles in a catalog.) If a printed source is to be searched full-text, the only help available is from the table of contents and the index, otherwise the only way to search it is reading it from cover to cover.

A digital database can be searched through the same entries as a printed one, and through additional entries such as (key)word, title, ISBN, etc., according to which fields have been made searchable. However, the number of databases in which the records can be searched full-text is increasing rapidly. This means that one no longer needs to bear all filing rules in mind. When a database also contains full-text information, the advantage of a full-text search is even greater. The enormous Dutch dictionary *Woordenboek der Nederlandsche taal*, the production of which took over a century, has been published both in print and digitally. It is known to contain synonyms that are only discussed in the explanation of other words and that have no entry of their own. With a full-text search, these words will turn up all the same, and their meaning is clear from the head entry of which they are a part. Here the possibility of a full-text search gives a clear added value to the dictionary.
The Internet

From a very early stage it was clear that surfing alone would not be sufficient to unlock the information on the Internet when looking for something specific. Special tools had to be built to search sites, and standards had to be agreed upon to make information accessible for these search engines. A lot of progress has been made in both areas, with varying levels of success.

To guide search engines without confusing humans, certain information was placed in metatags that are not immediately visible in the Web presentation of a screen. This has proven to be a mixed blessing. On the one hand, a search engine can find the information efficiently, but on the other hand it often is unclear for users why a page has come up in the search. (Commercial sites, in particular the shadier ones, take advantage of the possibility to include neutral key words that allow them to pop up in hit lists of perfectly innocent searches.) Individual site owners rarely are aware of the important role metatags can play in the traceability of their sites.

The progress made in developing search engines is encouraging. The interfaces are getting more user-friendly and, thanks to Web crawlers, the results they come up with are getting better. It has also become possible to search for different types of media: text, images, and sound. But no matter how good a search engine is, none of them covers all of the Internet and because they also overlap, a great part of the Internet remains unexplored during any search. Another confusing factor in the use of search engines is that some are designed to execute general searches, while others only search preselected sites. This selection improves the quality of the search results, but does restrict the quantity.

The most important techniques for Internet searches are:

- Start simple. First try www.<organization>.<country> or .<com> etc. before trying anything else.
- Be imaginative. Try as many different terms and phrases as you can think of. By using advanced search forms or boolean operators, you can combine terms.6
- Do not rely on one search engine in particular. Different engines search different parts of the Internet and will come up with differing hit lists given the same search phrase.
- Do not rely on search engines alone. Find a page that offers links and enables you to surf the Internet. These starting pages are compiled by humans and link to selected sources.
- Keep track of where you find something useful for later reference. Some search paths are difficult to duplicate and sometimes you may wonder whether it is your fault that you cannot find something again, or that the information has disappeared altogether.
• Be aware that an Internet nanny may be installed on a computer in a library, at work, or at some other public place. Internet nannies will filter search results for undesirable sites, often without giving notice of their interference. Depending on the humans who maintain the nannies’ indexes, they may be more or less strict on certain terms. An amusing example of the dangers of filtering is the Dutch word “borst” (breast) that may cause sites to be barred for understandable reasons. However, “Borst” also happens to be the name of a secretary of state.

• Always, always, always be aware that there is more. Just because a search term cannot be found does not mean that it does not exist. One may be missing out on the most important document.

REFFERING TO INTERNET SOURCES

If the desired information has been found and should be referred to, the following information needs to be included:

• The URL and the full title of the site and, if possible, the exact subpage;
• The date on which the source was consulted;
• Any name or indication of responsibility (the source-view should be checked for information in metatags).

The most important consideration when deciding which source to consult is what type of information the researcher is looking for. Regular sources, in which responsibility for the content is clearly stated, are easier to find and handle than grey literature. The type of carrier for the information, a digital or a printed source, is secondary to the type of information it contains. The more experienced a researcher is, the quicker and more accurate the search will be. Due to the abundance of information of all kinds on the Internet and the lack of structure, it may be difficult to find something useful at all. When searching a structured database, one needs to keep in mind what the rules of that specific database are. When searching the Internet, search strategies should be adapted according to necessity. The Internet is a rich source, but does have limitations.

ASSISTING THE MATURE INTERNET USER

Librarians as a professional group are in the fortunate circumstances of being able to evolve their information literacy techniques in pace with the development of the Internet. Not all professionals have the same opportunity to keep themselves abreast of the latest innovations, nor do they need to do so on the same level as information professionals. When they are motivated to find information—like the address of a colleague abroad—most will teach themselves how to handle the Internet by trial and error. They do cope, but can improve a lot on their skills with a little help. Only very few people will not want to use the Internet at all once they understand its possibilities. Librarians can offer assistance on an individual or on a group level.
Individual Level

If a mature researcher is of the opinion that the Internet has nothing to offer that cannot be found in another way, it may be time to acquaint him or her with some unique advantages of the Internet. The best way to motivate someone to use a new tool is by showing the added value of that tool. The obvious advantages of the Internet are its availability and the diversity and quantity of information it offers. Apart from that, it is possible to download information for later reference and for quotation in any document one is currently working on. (The question of copyright and intellectual property will have to be dealt with, however.) Interactive tools on the Internet provide options like direct document delivery that the researcher can use in the comfort of his or her own study. To encourage someone’s enthusiasm, it is important to be realistic about the possibilities. Disappointment is a powerful demotivator.

Instruction should be aimed at giving insight into two characteristics of the Internet: the nature of the information it provides and ways to navigate this information. When it is clear that information on the Internet is unstructured and diverse in nature, an information literate person will know that he or she needs to adapt his or her search strategies, but it will be necessary to pay special attention to what degree. The Internet calls for a far more imaginative approach than any other source. It is also important to clarify the ways in which navigational information can be presented. To find one’s way around, it is essential to be able to find, interpret, and use the navigational pointers on a screen. Also the difference between surfing and searching must be explained. When surfing one departs from a (known or accidental) starting point. If links (and the starting page) are chosen carefully, this may take one efficiently to the right destination (though it may also lead one astray in about two clicks). On the other hand, there are the search engines. Using these calls for a careful and imaginative choice in search terms. The common sense approach of typing in the most likely URL often may prove to be the quickest and most efficient way, but it leaves little room for serendipity and the joy of finding something unexpected and unlooked for.

When one is working with the Internet on a daily basis, it may be difficult to empathize with the problems of someone who only ventures there occasionally. Especially with mature users, it should suffice to explain to them only once how to work the system, because they are intelligent, well-educated professionals. But all computer skills are mastered through regular use only. When someone keeps needing support for the same operations, it does not mean that he or she is unable or unwilling to learn, but that he or she just does not use the Internet that often. Most mature users hesitate to ask for support because they feel embarrassed by their lack of competence. (And some of those who need support are younger then one would expect.)
Group Level

On a group level, two lines of action may be followed to support the user: Providing tools and providing structure.

A convenient tool for the user is a manual that one can consult at the very moment support is needed. A good manual gives step-by-step instructions on specific actions that include descriptions of the desired result of the actions, so the user can benchmark what he or she is doing. A manual will have to be updated regularly so digital publication seems the obvious choice, but publication should not be online solely, as the Internet is the very place where users will have difficulties consulting it. Including URLs in a manual is inadvisable, as they tend to change.

It is impossible to organize the unstructured body of information that the Internet is, but librarians can provide structured entrances to that information. Most libraries offer link pages on their site. Librarians assess newly found sites before adding them to the listed links. They often make a short description of the content of information that the link leads to and they check regularly whether the site is still available. Being librarians, they categorize and order the links they offer. This is an excellent way of assisting all library patrons, both the actual and the virtual, because patrons can rely on the quality of the information being offered.

CONCLUSION

The questions posed at the beginning of this article can now be answered.

Why do certain people, who are fully information literate with printed materials, become hesitant and even reluctant when it comes to finding something on the Internet?

These “certain people” are mature researchers who feel they do not really need the Internet, because they know where and how to find professional information in printed documents and digital databases. The Internet is just another source and using it calls for search strategies and skills which they have not yet mastered as fully as needed. As the amount of useful information is growing, mature users are getting interested in learning the necessary skills.

Why do we, information professionals, find it difficult to support them adequately?

When a mature researcher asks for support, we usually assume that the main problem lies in some aspect of missing computer skills. In reality, there are two problems that are part of the Internet itself. First, it takes experience to navigate the Internet. Recognizing and interpreting navigational pointers on the screen takes training and so do surfing and searching the Internet. Second, use of the Internet involves dealing with an extremely unstructured source, and search strategies need to be adapted. If
the focus is placed on these underlying problems, library support will be far more effective.

In short, to assist mature researchers in expanding their information literacy competencies to include the effective use of the Internet, librarians need to:

- Demonstrate the added value of the Internet as a source;
- Explain the nature of the Internet as an unstructured, dynamic body of very diverse information;
- Offer training in necessary navigational skills;
- Offer training in search strategies;
- Make Internet sites available in a structured way and with a quality mark by building links into Web pages.

Acknowledgments
For Hans, my favorite mature Internet user.

Notes
1. An interesting contrast to the problem discussed in this article is that young people tend to forget, ignore, or even be ignorant about the printed sources that are at their disposal. "If it cannot be found on the Internet it does not exist, and if it does, it cannot be important," seems to be their attitude. Teachers and librarians should address this issue and make sure that printed sources are being referred to right until the very moment this presumption comes true, if ever.
2. Keyboards pose no problem. The use of command keys became common knowledge through word processing. Even the difference between "delete" and "backspace" is no longer a mystery to anyone.
3. Lack of precise information also makes grey literature more difficult to locate and to refer to.
4. Many of the suppliers of information on the Internet are individuals. In search of professional information, most people will rarely consult individuals other than friends or colleagues. But when it comes to the Internet, they rely on perfect strangers.
5. Libraries, whose objective it is to provide information to their patrons, should try to look at their sites from the visitor's point of view. Usually, the first links on the homepage of a library lead to practical information about the organization, the location of the physical library, its staff, the composition of their collection, lending rules, etc. The online catalog most often is only the third or fourth item listed. If a search option is presented on the homepage, it often is not quite clear what exactly will be searched by clicking the button: the site, the catalog, the Internet? As a visitor, my first interest always is whether this particular library can provide me with the information I need; all else is secondary. So from the point of view of demand, I would argue that the catalog should be the very first item.
6. It is an art to narrow your search down in such a way that the search engine only comes up with the one hit.
Information Literacy in Chinese Higher Education

Ping Sun

ABSTRACT
With the development of the information society, education is facing great challenges and opportunities. Information literacy is recognized as a basic competency of individuals that ought to be incorporated into the educational mission. In order to enhance information education, Chinese educators and librarians have been reviewing traditional information instruction, and they are preparing to establish their exclusive information education role in this new century.

This paper deals with the new informational and educational environment in China and discusses the increasing needs for information and knowledge in Chinese higher education. Some modes and measurements are proposed to promote information literacy and some experiences and experiments are described. Librarians in China have already done much work related to information literacy, as they prepare to become part of modern education.

INTRODUCTION
At the beginning of this century, the information environment is greatly changing throughout the world, and China is no exception. One of the biggest challenges is the exponential growth of information. Information has been regarded as a valuable commodity affected by the knowledge-based economy. The Chinese central government has made it a policy to promote industrialization in relationship to information. A group headed by the prime minister has been organized to lead the information development. This development is a very important factor and will influence the national economy and social activities, thus inevitably affecting the entire educa-
tion environment as well as the fundamentals of education. Education, especially information education, has become one of the crucial issues. Furthermore, information literacy is an essential component to help individuals gain the competencies to meet the needs of the evolving information society. In China, more than ever, people who deal with education, library, and information science, are becoming involved in discussions on information literacy and are broadening their studies and practices in this arena.

What exactly is information literacy? What purposes or standards of information literacy should be proposed? How should standards of information literacy be enforced? What has been done and what needs to be done next to promote information literacy? These are major concerns in Chinese education, especially on university campuses.

Individuals are facing multiple information choices within the escalating complexity of the environment. Information literacy forms the basis for lifelong learning and can lead to unlimited sources to produce knowledge. Colleges and universities need to pay serious attention to information literacy and to incorporate it into their educational goals.

The academic library is the information resources center as well as the center of study on the university campus. Due to their expertise and training, librarians are the natural educators for information literacy.

CHINA’S NEW EDUCATION MISSION

In order to advance the goal of information literacy within the population, the Chinese State Department has resolved “To deepen the reform of education and to promote information literacy” for schools, colleges, and universities. Beginning in 2001, the goal that “every school will be networked” began to be realized gradually throughout the country. Information technology will be a major component and requirement for the curriculum in schools. During the next five to ten years, 150,000 schools in China and their 30 million students will be able to learn the fundamentals of information technology because it will become integrated into their basic curricula.

NEW LEARNING ENVIRONMENT

Presently more than 80 percent of Chinese universities are connected to the CERNET (The China Education and Research Network, which began operating in 1994 and has two gateways to the Internet). Many universities own their campus LAN (Local Area Network) centers and support the various online computer servers for the use of libraries, offices, and labs, as well as dormitories. Advanced information infrastructures help create a new learning environment, which forms the base of initial digital libraries and virtual universities. New learning environments make higher education expand beyond the university and operate more effectively and efficiently. This also enables higher education to collaborate with other social agencies.
The Internet enables student self-learning via virtual distance education any time and any place. This makes it possible for students to learn more actively and freely, and it enables them to increasingly utilize current information. Learning can thus be based on the information resources of the world. It will be the main task of information literacy endeavors to train students to use information effectively and efficiently.

New Challenges in Education

Higher education in the new century has to deal with competition. Flexible learning and critical thinking will enable students to become more productive. Traditionally, there is a famous saying in Chinese education circles, “Equip students with hunting rifles rather than bags of food.” By “rifles” are meant people’s skills and abilities. Nowadays what are these “rifles” like? Information literacy can be a “rifle.” It is one of the four essential abilities, along with reading, writing, and mathematics. Information literacy teaches students the skills of storing, organizing, and accessing information. Students should be self-directing and self-deciding, and they should know how to find and use information to complete their projects or tasks. They need to learn how to learn and become lifelong learners. A document entitled “Information Literacy Competency Standards for Higher Education” was published in 2000 by the Association of College and Research Libraries (ACRL) in the United States. In order to improve the assessment and outcome measurements within education, Chinese educators have to review the traditional education and begin to reform curricula that will include information literacy components.

New Focus

In January 2001 China held the first international conference on “Teaching and Learning in the Networked Environment: Practice, Challenge and Prospect in China.” It emphasized the skills needed to collect and process information, and it encouraged schools and colleges to teach basic computer skills. This conference was followed by a “National Workshop on Information Literacy for Higher Education,” held in Harbin City in January 2002. Academic librarians and educators from China and abroad met together to discuss information literacy competencies. At the same time, many publications about this topic have been issued in Chinese journals and newspapers.

Review of Information Skills Education in Chinese Universities

Under the supervision of the Chinese Education Committee, information skills education in academic libraries has been well developed during the past twenty years. Not only in the form of credit courses but also diversified instruction and training modules were designed by most Chinese universities and colleges for their specific needs and purposes.
THE CREDIT COURSES

The library at Tsinghua University in Beijing presents a good example for teaching information and library skills utilizing credit courses. It offers ten credit courses related to library and information literacy and teaches them to more than 2,000 students, both undergraduates and graduates, on an annual basis. These systematic courses cover such subjects as "Using the modern library," "Using reference books," and "Information (document) retrieval," and they are taught on different levels and have different requirements. The main purpose of the courses is to teach students today’s information access technology, focusing on the searching methodology and computer applications. Some courses for graduates on information and document preparation are taught to prepare them for their thesis work—e.g., "Information gathering and synthesizing for special academic research topics," "Information access principles and technology," and "Information resource management."

TEXTBOOKS AND TEACHING MATERIALS

The various features, purposes, and objectives of the courses on "information retrieval" have been organized and revised repeatedly by the special office of the Chinese Education Committee. The textbooks and teaching materials have been written, edited, and reworked by the librarians who instruct the students. Statistical data indicates that more than 400 textbooks have been published during the past twenty years to teach the information skills courses. Some are serial textbooks, some focus on computerized searching and some concentrate on special subjects. Most of them feature computerized and networked information retrieval.

COMPUTER LABS

Many university libraries in China have built computer labs for instruction and information search practice. Usually there are dozens of computer terminals connected to the library or the campus LAN or to the Internet. Thus these labs make learning more convenient and effective and they are highly popular among students. The search systems and databases are realistic, can be "seen" and "touched." The search process can be interactive for the students. Information resources can be selected from a great number of databases and Web sites. The labs provide free space and free time to enable students to learn on their own. In these labs, supervision and examinations are part of the learning process.

CAI COURSEWARE

More and more classrooms, large and small, have been rebuilt and provided with advanced technological facilities, involving television projectors, photo cameras, computers, and related equipment. All teaching materials and CAI courseware can be provided in electronic formats, be stored
in computers and transferred through the network to give class demon-
strations and, ultimately, be available for use by students after class.

In the networked environment, simulative and digital versions of the
courses can be easily communicated via microwaves, satellites, and the In-
ternet. Distance instruction of computerized information retrieval is encour-
aged. Tsinghua University Library did the pioneering work for this in 1997.

**Variety of Instruction**

Many training sessions are held for a variety of information needs, in-
cluding tours during freshmen orientation and special-topic instructions
for students, staff, and faculty. Librarians collaborate with colleges and
departments to address their information-retrieval needs. Currently, librar-
ians in Chinese universities are increasingly focusing on information skills
training. Librarians who deal with information courses and instruction are
collecting feedback from students and their advisors to improve the cours-
es and to make them more effective.

**Website for Discussion**

For the convenient communication of the librarians in charge of in-
formation instruction and training, a special homepage on Tsinghua Uni-
versity Library’s Web site has been built. It is dynamic and interactive. All
librarians, instructors, students, and faculty who are interested in informa-
tion education are encouraged to share relevant news, comments, ideas,
and suggestions and are encouraged to jointly promote information edu-
dation (http://www.tshingua.edu.cn/eng/index.htm).

**The Need for Information Literacy**

The new generation of students wants more information to expand
their views and their knowledge bases. They deal with social issues not only
with their textbooks. They also use their own gathered information and
their own critical thinking. They are no longer satisfied with what is taught
in class; they intend to be more self-directed. Besides, faculty and adminis-
trators need to ensure that their education prepares students to be lifelong
learners. To prepare for the information arena, instructors are eager to
renew their knowledge-base formulations and to enhance their abilities to
collect and use digital information resources. Their teaching outcomes and
research achievements need to be evaluated on a scientific basis and sup-
ported by appropriate and relevant information.

**Course Reform**

The course “Information retrieval” assigned by the Chinese Education
Committee as a for-credit course has existed continually in higher educa-
tion. Librarians have been innovating the goals, the content, and the modes
of teaching and learning as an important aspect of information literacy.
They have redesigned the instruction guidelines and extended the course coverage. Courses and instructions related to the information retrieval course are also being developed. These provide good opportunities to promote information literacy. Some experimentation has begun. For instance, students search and organize relevant information and then evaluate the information resources for an assignment in special subjects. The graduate course, "Information access principles and technology," at Tsinghua University Library experimented with various teaching methods and content with excellent results.

**Extension of Instruction**

Many librarians offer library and information instruction to undergraduates, graduates, and subject majors. These are usually separate instructional sessions not integrated into coursework, and they supplement courses. Some are offered on a regular basis, some are at time of need, and some are held to introduce users to up-to-date resources and databases. Academic librarians often place their training programs on the network to educate students and faculty more rapidly. Information education is needed throughout the campus to address the need of all disciplines.

Faculty are at the core of education. "What is called a university is not based on its large buildings but on its faculty," is a famous saying by a Chinese educator. In higher education, there must first be educated persons with information competencies. Educators are busy and have little time to update their knowledge frequently. Librarians need to closely connect to them and find out their various requirements so they can address pertinent and current information needs. This will help to build good librarian-faculty partnerships.

**Cooperation with Professional Education**

Almost every discipline and every course has some relationship to gathering information and knowledge. Information literacy runs through all professional learning and studying. Selecting information resources and digging up new knowledge should be the most important part of professional education, necessitating the collaboration between librarians and faculty.

There are two ways to enhance both information literacy and professional learning. One is the incorporation of professional education with information literacy so the information skills course can be combined with professional learning. For example, information and document preparation are taught to graduate students for thesis work. Information ability training and practice in relationship to special professional needs are most effective and pertinent. In that case, the leading instructor is the librarian dealing with information literacy. The development of information literacy, in this case, needs the cooperation of faculty.
Another is the incorporation of information education into professional lectures. This means the professional courses include components of information literacy. Faculty ought to be the leading instructors and should supervise students to find relevant information resources to complete their professional learning. Through discussion in or out of class and through their critical thinking, they will be able to integrate information into their own knowledge base. During the course process students experience and enhance their information competency. All these methods promote collaboration between librarians and faculty.

**DISTANCE EDUCATION**

The development of information literacy education relies on information technology, including networks and computers. Recently, Chinese universities established more multimedia classrooms and computer labs. Multimedia and networked CAI courseware are gradually being developed and used to make education more effective. They can be used for courses in distance learning situations and offer learning opportunities to adults off campus. Audiovisuals, animations, and other images make lectures lively and help to make learning more exciting. Many teaching materials and practice databases are extracted from the networks. This gives students self-learning opportunities and formulates their self-directed study environment. Many academic librarians prepare the networked CAI to include information literacy instruction and some libraries have had excellent results with that.

**NOVEL EDUCATIONAL MODE**

Information skills include the ability to access, evaluate, and use information effectively, efficiently, and critically, as well as ethically and legally. Librarians cannot accomplish this complicated education task by themselves. All departments and administrators need to work together. Tsinghua University Library is planning an array of information literacy courses and is seeking the support of other departments and units. Thus the computer center, the media center, the network center, the distance learning center, the education research center, the school of information, the law school, and the school of economics and management are working on becoming partners with the library in teaching information literacy. The teaching group consists of faculty from those schools and departments. They discuss and organize the courses cooperatively to teach the students information literacy competencies more fully.

**STANDARDS AND EVALUATION**

In reviewing traditional information education, it became apparent that more needs to be done to strengthen the teaching of information literacy in China. It will be necessary to consult the existing international standards
and formulate comparable Chinese standards for information literacy to create an evaluation system based on Chinese characteristics. The information literacy competencies need to be integrated into library literacy, media literacy, computer literacy, Internet literacy, and research literacy as well as critical-thinking skills. A special research program will be prepared and a national standard for higher education will be proposed. The evaluation criteria might be to assess students to see if they know how to learn and how successful they are in their careers and in the social environment.

CONCLUSION

Information literacy is becoming deeply integrated into the Chinese education system with the development of the information society. The attention and support of the whole society as well as the educational sector are needed. It will take a while to establish a viable information literacy education program in Chinese universities but a good beginning has been achieved. In order to realize the established goals in the near future, education needs to be streamlined so that it can include information skills training.

ADDITIONAL READINGS
Information Literacy Accreditation Mandates:
What They Mean for Faculty and Librarians

GARY B. THOMPSON

ABSTRACT
REGIONAL ACCREDITATION AGENCIES have established mandates for higher education institutions to implement information literacy programs and to assess the resultant learning outcomes. This mandate calls for a shift in the established library instruction paradigm at many institutions. Responsibility shifts from librarians teaching students how to locate materials for particular assignments, to faculty and librarians working together to embed the teaching and learning of information literacy skills systematically into syllabi and curricula. The new paradigm requires librarians and faculty to adapt a broader sense of the role of information literacy skills in higher education and in the preparation for the professional workforce. It also demands the learning of new methods and concepts by both teaching faculty and librarians, as they develop a collaborative approach to the integration of information literacy into general education and disciplinary education.

INTRODUCTION
When I went to college I continued to work in the library. Because the stacks were closed, I also continued to help students, helping them to find things on their own. I questioned the reserve system: why should anyone want to be limited to just what was on reserve? I argued with faculty that if students were to really learn, they needed to go beyond the reserve system. A few were convinced. I guess I was interested in information literacy even then. . . . Most students never developed any strategies in using a library. It seemed strange that someone would think that bringing in an English class at the beginning of the semester for half an hour would allow the students to learn everything they needed.

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to know about a library. Where were the connections to the undergraduate experience, the undergraduate curriculum? (Adams, 1992, p.442)

This quotation from an 1992 interview with Howard L. Simmons, executive director of the Commission on Higher Education of the Middle States Association of Colleges and Schools, on the role of academic libraries in higher education, sums up the challenges that have faced academic librarians in the twentieth century: How do you change the pedagogy of higher education so that professors take advantage of the growing print, audiovisual, and electronic resources in college libraries to enhance learning and create excitement about scholarship and research? How do we get instructional librarians and teaching faculty to work as true partners in the development of a curriculum that motivates students to become more engaged with learning and to develop higher-level thinking skills?

In past decades, when librarians talked to faculty about teaching students “library skills,” there was only lukewarm support. Many faculty saw “library skills” as an isolated set of skills that could be useful for students to know but that was not really central to the student’s intellectual growth, academic success, or future careers. With little emphasis by teaching faculty, undergraduates realized that learning library skills would not get them many points in the classroom. More recent decades have witnessed reform in higher education with greater focus on active learning, lifelong learning, critical thinking, problem-solving, career preparation, undergraduate research, and assessment of learning outcomes. During the later decades of the twentieth century, an information explosion fueled in part by a revolution in information technology has deeply affected academic libraries and higher education. The confluence of these changes makes the time ripe for a transformation of the traditional mission for teaching “library skills” into a broader mandate for teaching “information literacy.”

THE INFORMATION MANDATE

In 1987 the American Library Association formed the Presidential Committee on Information Literacy to explore the role of information in education, business, government, and everyday life and to put forth models for how information literacy could contribute to informal and formal learning at all levels. The final report in 1989 stated:

Information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand. (ALA, 1989, p.1)

The report emphasizes the central importance of information for learning, careers, business, and citizenship. It shows how information literacy aligns with educational reforms to improve the quality of education in kin-
dergarten through twelfth grade as well as in undergraduate institutions. Among its recommendations are: 1. That library associations must work more closely with other professional associations to promote information literacy; 2. That state departments of education and commissions on higher education must mandate the inclusion of information literacy in all curricula; and 3. That teacher education programs should introduce future teachers to the concepts of information literacy (ALA, 1989, pp. 11–13). By the time this final report was issued, all three of these efforts above were already underway. The Carnegie Foundation report by Ernest Boyer (1987) prominently mentioned the direct contribution of libraries to the community of learners. Educators went beyond simple proclamations of the importance of information to establish blueprints for integrating information literacy into school curricula. One clear sign was the publication in 1988 of Information Power: Guidelines for Media Programs, by the American Association of School Librarians and the Association for Educational Communication and Technology. This article focuses on the information literacy mandate for higher education and its effect upon undergraduate faculty and librarians. However, in many cases colleges are playing catch-up with the efforts of K–12 educators to make elementary and secondary students information literate. Undergraduate faculty and librarians would do well to take note of the methods and materials developed by schoolteachers and librarians.

Where are we in 2002 in terms of the mandate for information literacy in higher education? While there has been an outpouring of articles and books published upon this topic in the last decade, the word “mandate” implies greater recognition of the importance of information literacy in the education establishment. For my purposes, I am concentrating upon the current statements by regional accreditation commissions for colleges and schools as barometers of acceptance of this concept. In general terms, these accreditation bodies have been moving in the direction of requiring greater accountability from institutions of higher education to ensure that students are learning and that students acquire the competencies to function effectively after graduation. The current buzzwords are “educational effectiveness,” “student engagement,” “learning outcomes,” and “assessment.” Libraries are no longer seen, if they ever were, as isolated agencies separate and apart from the major teaching and learning activities. The Northwest Association of Schools and Colleges [NASC] (1999) standard 5.B.2 has a general statement about the library’s active educational mission: “Library and information resources and services contribute to developing the ability of students, faculty, and staff to use the resources independently and effectively.” In the section of the standards devoted to educational effectiveness, NASC makes an even stronger commitment to integrating the library with the educational mission and curriculum:
2.A.3 Degree and certificate programs demonstrate a coherent design; are characterized by appropriate breadth, depth, sequencing of courses, synthesis of learning, and the assessment of learning outcomes; and require the use of library and other information sources. (NASC, 1999)

2.A.8 Faculty, in partnership with library and information resources personnel, ensure that the use of library and information resources is integrated into the learning process. (NASC, 1999)

These statements make clear that faculty and librarians must collaborate to ensure that students are required to use library resources as a part of the learning process. In sum, NASC colleges must ensure that students can use information resources independently and effectively. In the section on undergraduate curricula, the New England Association of Schools and Colleges [NEASC] makes a similar statement: “All undergraduate programs require the use of information resources in addition to course texts and formal instruction” (NEASC, 2001, standard 4.14). North Central Association of Colleges and School’s section 5 on “Evaluation and Assessment” includes two library measures: 1. Use of library and learning resources and instructor assignments that require such usage; and 2. the extent to which students use library and learning resources appropriately (NCA, 2001). The latter is significant because it alludes to critical thinking and the critical evaluation of information, both of which are so important.

The Southern Association of College and Schools [SACS] emphasizes more of the “teaching library” approach to this mandate: “The institution ensures that users have access to regular and timely instruction in the use of the library and other learning/information resources” (SACS, 2001, standard 26). Here the responsibility seems to be with the instructional librarians to work with the teaching faculty to arrange for “regular and timely instruction” about information gathering and use of library resources.

Four of the regional accreditation commissions mention the “IL words” explicitly in their standards. In the section on library and information resources, NEASC affirms: “The institution provides appropriate orientation and training for use of these resources, as well as instruction in basic information literacy” (NEASC, 2001, standard 7.4, emphasis added). This wording is instructive in drawing a distinction between orientation and training on library resources and information literacy instruction. The Western Association of Schools and Colleges [WASC] identifies information literacy as one of the “core learning abilities and competencies” along with written and oral communication, quantitative skills, and critical thinking (WASC, 2001, standard 2.2, emphasis added). WASC also mentions in standard 2.3 that institutions clearly must articulate expectations about student learning in regards to use of library and information resources, with evidence from syllabi and the curriculum. The North Central Association of Colleges and Schools [NCA] places information literacy and the associated skills in in-
The Middle States Commission on Higher Education has been one of the most vociferous proponents of information literacy as an intrinsic part of the standards of accreditation. Howard Simmons (1994) reviewed the early 1990s developments of the concepts of information literacy for the book, The Challenge and Practice of Academic Accreditation. The 2001 draft accreditation standards for Middle States, Characteristics of Excellence, states: “Information literacy—the understanding and set of skills necessary to carry out the functions of effective information access, evaluation, and application—is an essential component of any general education program” (p. 32, emphasis added). Section XI, which deals with disciplinary education, has three paragraphs dealing with information literacy, including this detailed statement of learning objectives: “Institutions of higher education need to provide students and instructors with the knowledge, skills, and tools to obtain information in many formats and media in order to identify, retrieve, and apply relevant and valid knowledge and information resources to their study, teaching, or research” (p. 28).

Middle States [MS] institutions are required to show the integration of information literacy into the curriculum by providing evidence such as: 1. Collaboration between professional library staff and faculty in teaching and fostering information literacy relevant to the curriculum; 2. evidence of information literacy incorporated into the syllabi and other teaching materials describing expectations for students’ demonstration of information literacy skills; and 3. assessment of information literacy outcomes, including assessment of related learner abilities (pp. 29, 31).

Middle States started a pilot project, “Learning Outcomes for the Millennium,” to stimulate campus dialogues on the relationship of general education, disciplinary education, and information literacy. For this project, a number of regional meetings of librarians, faculty, and administrators were held to discuss collaborative efforts to improve classroom instruction, distance education, and student learning. Project participants have been encouraged to discuss plans for implementation of these ideas in their curricula. Middle States recommended that colleges use the Information Literacy Competency Standards for Higher Education (2000), developed by the Association of College and Research Libraries working with other associations in higher education, as a starting point for discussion of integration of information literacy skills into general education programs as well as into disciplinary education programs. Middle States considers information lit-
eracy as a "metacognitive device for enhancing learning" and as a "metaphor for the entire learning experience" (MS, 2000, p.1). Siena College, where this author resides, has been a participant in this pilot project, and thus has held campus discussions of the Middle States mandate for information literacy and presently is experimenting with different methodologies for better integrating information literacy into the curriculum.

The March 1998 Progress Report on Information Literacy, produced by the Association of College and Research Libraries, mentions the efforts of some eighty educational organizations, including the College Board, EDUCOM, the Council of Independent Colleges, and the National Council of Teachers of English, to create the National Forum on Information Literacy, with the goal "to promote information literacy as a means of empowering individuals and enhancing the educational potential and economics goals of communities everywhere" (ACRL, 1998, Challenges Yet To Be Met section, para. 2). The Progress Report (1998) calls for research into: 1. How to benchmark information literacy skills; 2. how to measure the effectiveness of information literacy programs on student performance; and 3. how information literacy is manifested and enhances productivity in the workplace (Recommendation 5, "Progress", para. 1). In spring 2000, the American Association of Higher Education endorsed the ACRL's Information Literacy Competency Standards for Higher Education, with the following call: "With societal well-being so dependent upon how its citizens find, review, and use information, institutions must help students become information literate, in the fullest sense of the term" (Breivik, 2000, AAHE's Board Endorses Information Literacy Standards section, para. 1).

THE PARADIGM SHIFT TO INFORMATION LITERACY

If you tie the beginning of the "library instruction movement" to the first Library Orientation Exchange (LOEX) Conference in 1971, then the movement is now over thirty years old. As they acquired more experience in teaching in various contexts, librarians realized that traditional ways of instructing students about library skills were becoming insufficient and that a new paradigm was necessary to move the profession forward in terms of providing effective instruction to meet the information needs of students at all levels. The final report of the ALA Presidential Committee on Information Literacy in 1989 proclaimed the central rationale for "information literacy" as the new rallying call for instruction librarians:

This call for more attention to information literacy comes at a time when many other learning deficiencies are being expressed by educators, business leaders, and parents. . . . Because we have been hit by a tidal wave of information, what used to suffice as literacy no longer suffices; what used to count as effective knowledge no longer meets our needs; what used to pass as a good education no longer is adequate. (p. 10)
THE SHIFT IN WHAT WE ARE TRYING TO TEACH

In his seminal work, *Teaching with Books*, published in 1940, Harvie Branscomb, Director of Libraries at Duke University, called for educational reform that would transform undergraduate education from teaching relying primarily upon lectures and textbooks to a more challenging and engaging education that encourages students to take more responsibility for their own learning and stimulates investigation and discovery through reading and research using the vast resources of college libraries (p. 9). The kernel of his idea—to motivate students to have more inquisitiveness through independent learning—is still a major thrust in higher education today. Information literacy is necessary to this effort because independent learners need to know how to access, collect, evaluate, synthesize, and report information that is important to the tasks at hand.

Traditional library instruction was designed to teach students the “library skills” necessary to use the library effectively. The teaching focused upon making students aware of and knowledgeable about library resources: the library catalog as the gateway to the book collection, the periodical indexes as the gateway to the periodical collection, and the reference collection. To make effective use of library resources, librarians wanted students to know about gathering background information, identifying appropriate subject headings and keywords, locating books by call number, citing sources properly, and distinguishing between popular and scholarly literature. Students who acquired these skills could use the library resources effectively to find relevant resources for their assignments and research papers. The learning objectives were fairly limited in scope.

A number of recent trends in higher education raise questions about the adequacy of the traditional approach to library instruction. First, advances in information technology have created new dimensions to library collections as well as alternative sources of information outside the library: online catalogs, full-text databases, e-books, and free and commercial Web sites. Since most faculty find it difficult to keep up with the rapid growth in electronic information sources, instructional librarians need to instruct both students and faculty about these new sources. Second, many educators have modified their instructional programs to include more independent study, active learning, internships, and undergraduate research, leading to greater reliance upon library and information-gathering skills. Thirdly, professional as well as regional accreditation agencies have placed increasing importance upon student competencies and assessment of learning outcomes.

These trends in information technology, higher education, and the growth and maturing of library instruction led to the transformation from a narrow focus on “bibliographic instruction” to a broader concept of “information literacy.” While traditional library instruction concentrated upon library resources and library tools, information literacy goes beyond those confines to deal with information in any format located anywhere. Informa-
Education literacy is linked closely with computer literacy, due to the burgeoning of electronic publishing and Web publishing. Students must know information technology in order to use the contemporary library. Librarians must be conversant with software programs dealing with Web browsing, printing, bibliographic management, and data management in order to deliver information effectively to students and faculty. As Chart 1 demonstrates, information literacy advocates assert that information-gathering skills are directly connected to and should be integrated closely with the teaching of research methods, critical thinking, problem-solving, and scholarly communication. Just as instruction librarians must tailor their presentations to the subject matter of a particular course, so they must now be aware of the trends in research methods and scholarly communication in the discipline, so that students see the connections between specific resources being discussed and the processes involved in conducting research and communicating findings. Chart 1 also points out that information literacy espouses that students must learn about the broader political, economic, legal, social, cultural, and ethical issues surrounding the creation, distribution, and use of information. Finally, graduating students must have been exposed to the concept that information literacy is one of the liberal arts (along with reading, writing, computational, and thinking skills) essential for career preparation, professional development, lifelong learning, and civic participation in a democracy. An interesting discourse on this topic can be found in a 1996 Educom Review article entitled: “Information Literacy as a Liberal Art: Enlightenment Proposals for a New Curriculum” (Shapiro, 1996).

The Shift in the Approach to Teaching

LOEX (Library Orientation Exchange) connoted the academic librarians’ instructional emphasis on orienting students to library facilities, resources, and services. In 1971 college librarians gave lots of tours and orientations for new students, especially at the beginning of the year. The purpose was to orient students to the library building, the organization of the resources, and the services provided. The message was that students needed to be familiar with the surroundings when they returned to do their assignments. Sometimes faculty would ask librarians to give tours and orientations for students enrolled in particular courses. While many did give the tours, librarians knew that this surface approach to the library was counterproductive. It implied 1. that once a student knew what resources were available and where they were located, it would be easy to use the library for their assignments and research papers, and 2. that the librarian’s main role was to select resources and give students directional help. The “library instruction movement” was founded because college librarians wanted to provide students with more in-depth education about how to use resources. As a result, the paradigm shifted to librarians reaching out to faculty for time in their courses to demonstrate to students how to use the library resources
<table>
<thead>
<tr>
<th>Traditional Library Instruction (narrow view)</th>
<th>Information Literacy</th>
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<tbody>
<tr>
<td>1. Identifies the focus of the research topic</td>
<td>Faculty</td>
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<tr>
<td>2. Identifies sources of background information</td>
<td>Librarian</td>
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<tr>
<td>3. Teaches how to search library catalog</td>
<td>Librarian</td>
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<td>4. Teaches students about search terms</td>
<td>Librarian</td>
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<td>5. Instructs how to search periodical literature</td>
<td>Librarian</td>
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<tr>
<td>6. Identifies key reference sources</td>
<td>Librarian</td>
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<tr>
<td>7. Teaches how to cite sources and create bibliography</td>
<td>Faculty/librarian</td>
</tr>
<tr>
<td>8. Teaches library classification schemes</td>
<td>Librarian</td>
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<td>9. Informs students about library services (reference, ILL, etc.)</td>
<td>Librarian</td>
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<td>10. Informs students about popular and scholarly lit.</td>
<td>Librarian</td>
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<td>11. Instructs students how to develop search strategies</td>
<td>Librarian</td>
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<tr>
<td>12. Teaches how to determine information needed</td>
<td>Faculty</td>
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<tr>
<td>13. Instructs students about evaluating source of information</td>
<td>Librarian</td>
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<tr>
<td>14. Teaches students about evaluating information content</td>
<td>Faculty</td>
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<tr>
<td>15. Teaches students about scholarly communication</td>
<td>Librarian/ faculty</td>
</tr>
<tr>
<td>16. Instructs students about how to determine the information needed</td>
<td>Librarian/ faculty</td>
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<tr>
<td>17. Instructs students about research methods</td>
<td>Librarian/ faculty</td>
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<tr>
<td>18. Teaches students about how to evaluate information content</td>
<td>Librarian/ faculty</td>
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<td>19. Teaches students about how to synthesize information</td>
<td>Librarian/ faculty</td>
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<tr>
<td>20. Teaches critical thinking skills</td>
<td>Librarian/ faculty</td>
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<tr>
<td>21. Teaches problem solving skills</td>
<td>Librarian/ faculty</td>
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<tr>
<td>22. Teaches students about data manipulation and data management</td>
<td>Librarian/ faculty</td>
</tr>
<tr>
<td>23. Prepares students for lifelong learning, career preparation and professional development</td>
<td>Librarian/ faculty</td>
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effectively. Over the next decades, instructional librarians were successful in most settings in getting faculty to understand that, if a class were brought to the library to receive instruction on how to use the library effectively, students would do better work on their research papers. Evan Farber at Earlham College demonstrated the benefits of the “course-related instruction” approach to user instruction most dramatically.

This approach is widely followed at most colleges and universities today and established two important premises: That librarians are willing and able to teach students about the use of information resources; and that the educational programs and students benefit from exposure to library instruction. However, there are inherent drawbacks to course-related instruction, as it presently exists: 1. The ability to reach students is dependent upon faculty interest in such instruction, resulting in scattered coverage across departments; 2. some students receive little if any instruction depending upon the courses selected; 3. librarians try to cover a whole host of topics in a single hour since it may be their only chance with some students; 4. even though librarians tailor presentations to the specific course, students are exposed to some repetition of subject matter, since the librarian must assume there has been no prior learning for each classroom presentation.

The information literacy advocates build upon the success of the course-related instruction to convince colleges and universities that faculty and librarians collaboratively must provide students and faculty with the requisite skills to access, identify, locate, evaluate, and synthesize information and educate the academic community how these skills fit into the broader context of teaching critical thinking, problem-solving, research methods, scholarly communication, and lifelong learning. The difference between the approach in traditional library instruction and information literacy is that the former assumes that library instruction is an add-on or a plum to make the course better if the librarian is able to convince the professor to give up the class time, whereas the latter establishes as a principle that information literacy is an essential ingredient in the education process and must be embedded into the course structure along with the other vital components of the course. Information literacy asserts that library instruction is not a frill or a desirable extra component, but rather is an intrinsic part of education today.

Information literacy is linked to the current educational reforms, which call for integrative education. In their book, *Fostering Information Literacy*, Helen Thompson and Susan Henley (2000) show how information literacy competencies connect with the Secretary of Education’s Commission on National Standards and the competencies established for mathematics, science, social studies, English, and fine arts by their professional standards committees. Middle States establishes these yardsticks for measuring the success of integrating information literacy into the educational process: 1. Is it embedded into course syllabi? 2. Are librarians and faculty collaborat-
ing to include information literacy into curriculum design? 3. How are information literacy learning outcomes being assessed?

These new standards change the approach to library instruction. If information literacy is to be embedded into courses, then faculty must accept some level of responsibility for teaching these skills, whether they teach the skills or a librarian teaches them or they collaboratively develop modules for students to learn these skills. Librarians must become more acquainted with the courses’ objectives, pedagogy, and content. These standards call for colleges to consider how students should acquire information competencies over their four years and how the skills should be distributed across the curriculum, in a similar fashion to when writing changed from “composition” or “expository writing” to “writing across the curriculum.” When they are no longer confined to teaching course-related library instruction upon demand, librarians and faculty can start to talk about “building blocks” which can be taught one or two or three at a time, but not all in one single lecture. Faculty and librarians are better situated to assume that students in a particular class received some previous level of library instruction, so that they can build upon those acquired skills. Faculty and librarians can start to assess at different intervals how much students have learned in terms of information competencies. In the senior years, students may be expected to put together these skills in some kind of a capstone project, whether it is a thesis, a portfolio, or an internship, showing their mastery of how the various pieces of the information puzzle fit together. In this model, faculty and librarians are true partners in the educational process, working together to ensure that graduating students are able to function effectively in our information society.

THE ROLE OF THE LIBRARIAN IN THE INFORMATION LITERACY PARADIGM

Instructional librarians engaged in traditional library instruction during the last thirty years have created a wealth of literature about the theory and practice of teaching students about library and information-gathering skills and strategies. Information literacy advocates used that vast experience base to build a new model for imparting library and information skills to meet the changing environment of today’s students. Most of these changes are logical extensions of traditional library instruction and are not a radical departure from what the best academic librarians have been doing. The total effect is to proclaim that the college library is a “center of learning” and to broadcast to higher education that the academic librarian is an “educator” as well as a “teacher-librarian.”

The Information Expert

Traditionally, librarians have been perceived as keepers of the books and the journals. Students and faculty generally have considered librarians
as knowledgeable about books, journals, and reference materials in their collections; publishing trends; and cataloging and classifying resources. With the advent of the Internet, librarians must expand their horizons and become knowledgeable about important academic Web sites and help to organize the Internet resources so that students and faculty may find their way through the maze to high quality Internet resources for the subjects that they are researching. Topsy Smalley (1998) from Cabrillo College shows how librarians can fill the gap by working with faculty to teach students about "Internet research." The Librarians Association of the University of California [LAUC] has created an instructional Web site about the "New Horizons in Scholarly Communication" (LAUC, 1998).

Knowledge about trends in electronic publishing is not enough in this new environment in which information may be published on the Web without undergoing any review process whatsoever. Instructional librarians must assist students to evaluate the source of information (print or electronic) and to evaluate the information content of whatever they read. This makes the librarian's role much more vital, because it is in the details of the content that students become aware that scholars often are uncertain or disagree about the "facts" and/or the "conclusions" about a given topic. The student's task is not simply to regurgitate what is stated, rather it is to develop skills to gather and evaluate evidence and reach a conclusion based upon a synthesis of the evidence gathered. While librarians usually cannot claim the in-depth knowledge of a field to analyze the evidence from the vantage point of a subject expertise, librarians do have broad experience with interpreting information and in evaluating information for its content and meaning and, therefore, can and should pass that expertise to students. In an article on the role of librarians written in 1992, Sonia Bodi goes a step further in suggesting that librarians must share responsibility with teaching faculty to ensure that students learn critical thinking skills at the appropriate moments in the research process.

The Educator

If college faculty and administrators are going to take librarians seriously as colleagues, the librarians must demonstrate commitment to and knowledge of academics. Libraries must sponsor and promote educational programming, whether it is lectures, poetry readings, symposia, awards, displays, or research fairs. Librarians must attend and contribute to academic events. The teaching library maximizes the use of its facilities, its information resources, and its information technology to promote learning, so that the library becomes a central or the prime "learning place" on the campus. The campus library should be the "gymnasium for the mind," the place where students and faculty exercise their mental capacities and stretch their learning abilities, their thinking, and their creativity. Academic libraries must have strong liaison programs with academic departments to dem-
onstrate to faculty the library's obvious interest in collaborating with faculty in the enterprise of improving the academic environment for education and research (Yang, 2000). In her article, "What I Want in a Librarian," Professor Aletha Stahl (1997) states that she wants an educational colleague who will be proactive in letting faculty know what print and electronic resources are available to aid in their teaching and research and in suggesting ways that the faculty member may contribute to the library's educational mission. Sally Kalin and Loanne Snively (2001) from Penn State describe the kind of outreach and synergy needed if the library is to be recognized as a key partner in the educational enterprise.

Librarians also may contribute to higher education by conducting research about information competencies and creating theoretical constructs that help to understand student learning. Starting with the founding of the LOEX conference in 1971 and then with the annual annotated bibliography on library instruction in Reference Services Review, Hannelore Rader has been a major advocate for the specialized study of library instruction and information literacy. Since its inception in 1983, the journal Research Strategies has encouraged librarians and faculty to publish strategies for teaching information competencies. Pat Breivik (1998, 2000) has been responsible for promoting information literacy with the major associations affiliated with higher education. Carol Kulthau and Michael Eisenberg are two prominent researchers who have done considerable scholarship and writing about the mental processes involved in searching for, evaluating and synthesizing information. The fact that information literacy is now receiving attention from educators in many fields, in many different journals, and in many countries is a testimony to the determination of those mentioned above as well as many others who advanced information literacy as a useful concept for educators.

The Teacher-Librarian

By the 1990s academic libraries felt confident enough about their efforts in classroom instruction to use the term "instructional librarian" when advertising to fill positions. In 2002 with the push for information literacy, it seems that academic libraries may go further and talk about the "teacher-librarian," connoting that the profession views the role as teacher as vital to the overall position of academic librarian. Those who are interested in historical comparisons may read, compare, and contrast the activities related to the teacher-librarian in 1970 (Brown, 1970) and the statement by the Australian Council of School Library Associations [CoSLA] on the role of the teacher-librarian in 2001 (CoSLA, 2001).

In the abstract beginning his article entitled "The Art of Learning with Difficulty," Yale Professor of Philosophy George Allan (2000) states: "Librarians should be actively involved in educating students; not merely teaching them the techniques needed for bibliographic searches, but helping them
learn the artistry involved in thinking for themselves" (p. 5). Two of the central goals of information literacy are to teach students how to learn and how to become independent learners. Librarians have been criticized for spending their time on “training” students to know how to use the library catalog, how to search for periodicals, how to locate material in the library, and other specific techniques for accessing information, without sharing the broader intellectual concepts which are important to information-gathering and research methods. Likewise, librarians who talk about the information technology to retrieve information without commenting upon the pros and cons of the technology (e.g., the Internet) as a mode of scholarly communication are missing a great teaching opportunity to connect with the wider educational context. Information literacy and critical thinking go hand-in-hand (Gibson, 1989; MacAdam & Kemp, 1989).

If librarians are to be effective teachers, they must utilize a wide range of teaching techniques depending upon class size, the level of the students, the subject matter, and the time allotted. Teacher-librarians must go beyond lectures and demonstrations to use discussion, guided exercises, group projects, testing, printed materials, Web-based instructional modules, and other standard teaching methods to improve student learning. ACRL’s Institute for Information Literacy’s Immersion Program (2002) offers a track entitled “Librarian as Teacher,” for those interested in improving their instruction by applying the techniques of classroom teaching, learning theory, leadership and assessment to information literacy. The University of New South Wales in Australia offers a course designed to provide academic librarians with teaching skills. The modules include: 1. Adult learning and development; 2. human memory; 3. communication and experiential learning; 4. evaluation; 5. instructional design; and 6. instructional technology (Barrett & Trahn, 1999). Librarians have numerous continuing education opportunities to help them become better teachers.

Curriculum Developer

The 1997 Middle States Guidelines for Librarian Evaluators contains a checklist entitled “Assessing Librarian Effectiveness as Teacher/Facilitator of Information Management.” The checklist makes clear that librarians must be deeply involved in all aspects of curriculum development (Middle States, 1997):

- “In which campus-wide committees are librarians involved? (Give special attention to committees on curriculum, assessment and strategic planning). . . . To what extent do the faculty call upon librarians for assistance with developing courses or conducting their own research?” (pp. 13-14)
- “Do librarians review the institution’s outcomes assessment data to determine if institutional or course-specific findings relate to opportunities the library may have to improve learning?” “Do the librarians review ev-
idence of students' learning in their projects and classroom work. . .?

"When competency-based education is the avowed criterion for designing instruction, is "information literacy" clearly identified as an outcome to be measured?" (p. 13)

2001 mandates from regional accreditation agencies and trends in higher education clearly call for academic librarians to serve on curriculum committees, to speak out on the direction of general education and disciplinary education, to be involved through the liaison programs with the development and revision of courses, to work with faculty on exercises and assignments to improve student learning, and to assess student outcomes. In all these matters, librarians have a special role to play to foster the integration of information literacy into the curriculum. Drawing upon the growing literature in print and upon the Web, librarians need to bring to the attention of faculty examples of successful assignments, exercises, and handouts that could be used to teach information literacy. ACRL's Institute for Information Literacy's Immersion Program has a track devoted to "Librarian as Program Developer" that shows participants how to use learning theory, pedagogy, and assessment tools to develop information literacy programs (ACRL, 2001). The institute also has a Web site on the "Characteristics of Programs of Information Literacy that Illustrate Best Practices" which discusses the essential steps librarians must follow in order to be successful at integrating information literacy into the curriculum (ACRL, 2002). Librarians may also draw upon a growing body of literature on assessment of information literacy to help with curriculum design.

THE ROLE OF THE TEACHING FACULTY IN THE NEW INFORMATION LITERACY PARADIGM

Main Rather Than Sole Educator of Students

In traditional college settings, faculty sometimes complained that librarians, as guardians of the books and the journals, kept faculty from using treasured resources that they needed for their research. Likewise, librarians sometimes complained that faculty, as guardians of the classroom, kept librarians from teaching library skills to students because they considered this less important than other topics being covered in class. If information literacy programs are to succeed, this kind of protectionism must come to an end and faculty and librarians must change their roles in teaching and learning and in their relationships with each other. Librarians must open up their collections to faculty for both research and teaching without burdensome restrictions. If educational reform is really to have an impact in higher education, faculty must change their culture centered on autonomy and superiority to be more collegial and collaborative. Wade Kotter (1999) provides a useful review of the recent library literature concerning how to enhance and deepen the relationship between librarians and faculty.
Librarians are natural allies to faculty because the library mission is founded upon support for the curricular and research mission of the academy, which is so dear to the faculty. If information literacy is to be successful, faculty must acknowledge and accept that librarians feel a special kinship with faculty and a special interest in what they are teaching in the classroom. Reference librarians feel the “impact” of teaching on a daily basis. In a collegial model, there should be much more regular communication between librarians and faculty to ensure that library and information resources are available when needed for assignments and that librarians may direct students to meet course objectives by knowing them ahead of time. In the article “What I Want in a Faculty Member” Christine Larson (1998) from Earlham makes these requests of faculty:

- Recognize that librarians and faculty are in the same business;
- Give clear communication with librarians about what is going on in a course, especially about assignments that might involve student research or use of the library;
- Give research assignments that are possible for students to complete with the campus' library resources;
- Inform librarians about new courses or curricular initiatives, so that the library collections can support the institution’s programs (pp. 259–260).

Teacher of Information Literacy

While a small core of faculty have accepted library instruction as an essential component of their courses that require student investigation and student research, most faculty do not believe that library instruction is that vital to their courses. In the past, librarians offered faculty the opportunity for students to receive library instruction, but many faculty said “no, thanks.” The major reasons given were a lack of time to cover everything in the course, that students already have the skills needed, or that the skills were not required in the course. Library instruction has simply not been on the radar of most faculty (Hardesty, 1995).

As was shown in the first section of this article, regional accreditation agencies now are stating outright that regular library instruction should be an essential part of higher education and that more educational standards call for information literacy to become a central core set of skills required for an undergraduate degree. This changes the definition of the situation. If it is incumbent upon institutions to teach information literacy competencies, then teachers have an obligation to accept part of the responsibility to ensure that students receive instruction in this area. This has major implications for the librarian and the professor:

1. The professor must consider how to incorporate information literacy into his/her courses.
2. Faculty can no longer simply rely upon librarians to provide instruction
as a last minute add-on to the course; on the other hand, faculty may have good ideas about how the librarian may approach certain topics. Team-teaching is also possible.

3. If the professor is teaching information literacy, he/she must ensure that they are up-to-date and informed about library and information resources available.

4. Faculty knowledgeable about the curriculum could make valuable suggestions about how to sequence the learning of information competencies.

5. Faculty may incorporate more formal assessment of information literacy into the existing assessment measures for the course.

It is important to note that information literacy is not hitting a hard wall of nonacceptance by all faculty. Many faculty are discovering that the concepts of information literacy are in tune with the competency-based standards being adopted in their own fields (Thompson & Henley, 2000). Faculty also are finding that they already cover many of the ACRL information competencies in their courses, especially the research methods courses and senior seminars. Other faculty prefer the broader, conceptual approach to teaching students about research methods and critical thinking to the narrow focus upon library skills and technology, which accompanied the one-hour lectures in more traditional library instruction. Both librarians and faculty must look for connections between information literacy and the important concepts in disciplinary education.

Fellow Learner As Well As Teacher

Many teaching faculty rely upon traditional sources of information that they were taught in graduate school to teach and advise students about how to conduct a literature review for a research paper. However, there has been tremendous change in academic publishing and information technology during the last two decades, resulting in an explosion of new sources and new approaches to conducting information searches in most fields. Thus, many faculty feel increasingly uneasy about the resources that students may use for doing library research. The logical solution is either to give more of the responsibility for teaching information competencies to librarians or to provide continuing education to the faculty, so that they are better informed and better able to teach and guide students to the full complement of resources, or a combination of the two. R. L. Smith (1997) from Dakota State states the preferred option clearly:

Faculty control the learning environment and are in a better position than library faculty to create situations which allow students to see information seeking as an essential part of problem-solving in a discipline. The time has come to shift our focus from students to the faculty—to teach the faculty to teach information literacy. (p. 1)

Librarians at a number of institutions are giving more attention to faculty development as a way of moving from offering the one-shot library
lecture to a more integrated approach to library instruction. Lewis and Clark College (Portland, Oregon) received a grant from the M. J. Murdock Charitable Trust in 1999 to hold faculty development workshops covering the concepts of information literacy, newer information technologies and information resources and techniques for enhancing the teaching and learning of information competencies (Dorner & Gass, 2001).

From my experience at Cleveland State, faculty prefer to receive instruction on the educational and research use of information technology from librarians than from computing center staff, because librarians usually are rated as better teachers and are more attuned to faculty objectives and needs. If time is set aside and some compensation is given, faculty are receptive to learning about new academic electronic and Web resources from librarians, whom they recognize as the experts in electronic publishing. New approaches must continue to be developed. Weber State offered new faculty retreats entitled, "Information Literacy across the Curriculum." Topics included information literacy competencies, learning objectives, learning activities, integration into courses, and use of technology (Newby & Hansen, 1998). George Washington University librarians offered a number of Web publishing workshops (Stebelman, 2001).

In any approach to teaching faculty about information resources and about information literacy, librarians must respect that faculty are the experts in teaching in general as well as in their respective disciplines. It is important that any workshops and seminars presented to the faculty give faculty a chance to put forth and exchange ideas about pedagogy and give feedback upon what is needed to be learned. Tom Rocklin (2001) from the University of Iowa said this about the experience after leading faculty workshops on information literacy:

There are approaches to teaching that are more prevalent in one discipline than in others and the workshops have proven to be productive arenas for exposing participants to thinking about teaching that is different from their own. Second, in these workshops, we present a wide range of technological possibilities. Occasionally, a participant wonders out loud what possible use a particular possibility could have. The workshop leader could answer, but it is much more compelling when, as often happens, a fellow participant answers. (p. 59)

Curriculum Developer

As the campus moves to implement "information literacy across the curriculum," faculty and librarians should build upon ideas learned during the transition from composition courses to "writing across the curriculum." The goals are similar: 1. To expose all students to small doses of information literacy over the four years of undergraduate education; 2. to demonstrate the importance of information literacy to the study of many different subjects; 3. to teach information literacy as a set of concepts and skills related to learning of other skills, and not in isolation; and 4. to en-
sure that college graduates are information literate. This is something upon which all educators should agree.

Three major curricular changes confront the teaching faculty: 1. Information literacy is a broader set of skills and concepts than those offered under traditional library instruction; 2. accreditation agencies call for institutions to define information competencies and assess how well students learn them; and 3. faculty are requested to collaborate with librarians to embed information literacy into their course syllabi.

If faculty are to implement these changes, they must engage in curriculum development with the aid of librarians. R. L. Smith (1997) puts it bluntly that librarians need “to discourage faculty from expecting us to teach and will have to offer them a reasonable alternative—to provide them with materials, ideas, and instruction in how they can move toward resource-based active learning” (Librarian Commitment to Faculty Development section, para. 1). Patricia Iannuzzi (1998) reminds us to build upon common interests: “Librarians have an opportunity to use information literacy to help faculty succeed in their own objectives” (p. 100). Writing, reading, critical thinking, research methods, problem-solving, plagiarism, computer literacy, and communication are some of the important ingredients in most courses with a close link to information literacy. At faculty development seminars on information literacy, faculty may discover that their colleagues are already integrating new resource-based instructional techniques into their courses.

CONCLUSION: COLLABORATION IS THE KEY TO ACHIEVING INFORMATION LITERACY

Information literacy competencies are linked to the educational reform calling for more concentration upon higher level thinking skills. Likewise, information literacy is founded upon a higher level of integration of library instruction with the teaching of other concepts and skills by embedding that teaching into the syllabi and curricula. Finally, information literacy requires a higher level of interaction, communication, and planning between faculty, librarians and others.

In an insightful book entitled The Collaborative Imperative (2000), Dick Raspa and Dane Ward, a librarian and professor who have collaborated for years, define and give examples of the continuum in faculty-librarian cooperation, starting with simple networking through exchanging information, to coordination through joint problem-solving, to collaboration through a sustained relationship to meet set educational goals. Information literacy represents the highest level of collaboration, where faculty and librarians recognize and act upon their joint responsibility for ensuring that students acquire information competencies. Cerise Oberman, Bonnie Gratch, and Betsy Wilson (1998) developed a useful yardstick for measuring how far along an institution of higher education is toward integrating information
literacy into the curriculum. The "Information Literacy IQ (Institutional Quotient) Test" includes these questions about the level of collaboration:

- Is information literacy evident in campus-planning documents?
- Do faculty accept/partake in responsibility for information literacy?
- Are there support and rewards for faculty who develop and redesign curriculum to include concepts of information literacy?
- Is there collaboration among curricula designers, faculty, academic advisors, computing staff?

The integrative and holistic approaches to educational reform usually view information literacy and technology as part of the educational package. These approaches clearly call for a team-approach to curriculum design, recognizing the contributions to be made by educational technologists, librarians, and persons responsible for distance education, writing centers, teaching centers, strategic planning, as well as many others. Trudi Jacobson (2000) has a recent article about successful partnerships between library instruction programs and teaching centers. Deborah Huerta (science librarian) and Victoria McMillan (chair, interdisciplinary writing) (2000) give a useful discourse on collaborating on a two-tiered approach to teaching scientific writing. The Web is creating opportunities for new ways of collaborating through online guides, instructional modules, exercises, and tests to instruct students and faculty about information literacy concepts and skills (Meldrem, Johnson, & Spradling, 2001). In 1997 The Journal of Library Services for Distance Education was established in recognition of the importance of distance education and the role that libraries must play in that form of education.

Colgate's Collaboration for Enhanced Learning is but one example of information technologists and librarians working together to create new solutions and new opportunities for student learning about information technology and information resources (Petrowski, Baird, Leach, & Noyes, 2000). EDUCAUSE has created a Library/IT Partnerships Constituent Group "to provide a forum for discussing management issues and sharing experiences about such partnerships and collaborative efforts" (EDUCAUSE, n.d., para. 1). The University of Washington has developed a campus-wide program to enhance teaching and learning called UWIRED. "The Primary goal of UWIRED is to create an electronic community in which communication, collaboration, and information technologies are integral to teaching and learning; ultimately, the aim is information literacy to be the hallmark of a UW degree" (Williams & Zald, 1997, p. 2).

Middle States and other regional accreditation agencies are requiring that institutions incorporate information literacy into general education and disciplinary education programs. Professional organizations responsible for teaching in the disciplines are preaching competency-based learning, including information literacy. Funding organizations and agencies are
providing grants to colleges and universities who are organizing librarians and teaching faculty to develop curricular plans incorporating information literacy. The Institute of Museum and Library Services approved a two-year study by Gustavus Adolphus and other Minnesota academic libraries for developing a model for librarians and faculty to enhance “developmental research skills across the curriculum” (Gustavus Adolphus, 2000, para. 1). Five California public campuses applied for a grant on “Information Competence Implementation Through Interactive Instructional Materials: A Systemwide Collaboration” (CSU at San Luis Obispo, n.d.). Five Ohio private colleges received funding from the Mellon Foundation for monies to integrate information literacy into the liberal arts curriculum (Five Colleges of Ohio, 2000). The new book Making the Grade: Academic Libraries and Student Success (2002), by Maurie Kelly and Andrea Kross shows again how librarians and faculty can work together to enhance learning. Two major books that give useful tips and many examples on how to partner with faculty are: Working with Faculty to Design Undergraduate Information Literacy Programs (1999), by Rosemary M. Young and Stephena Harmony, and Library User Education: Powerful Learning, Powerful Partnerships (2001), edited by Barbara I. Dewey.

Steven Bell (2000) calls for the establishment of “learning libraries” that support and promote “seamless learning cultures” (pp. 48–54). Students need to receive an education where the various components of their education fit together to create a unified approach that they can understand and that gives them the wherewithal to cope with and succeed in their chosen professions. Faculty and librarians are natural allies in the educational process: they both encourage reading, writing, and research; they both stress critical thinking; they both are interested in the life of the mind; and they both are educators. Let us hope that the accreditation standards for information literacy push faculty and librarians to collaborate more closely to achieve joint goals, so that students will benefit by becoming sophisticated information consumers, able to discern knowledge and truth, appreciate diversity, and synthesize information to create new knowledge, so that they are successful in business, government, and the arts, as well as in their personal and professional lives.

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Middle States Commission on Higher Education. (2000). Learning outcomes for the millennium: Core disciplinary knowledge, general education, and information literacy—Concept for a commission initiative and a planning document for discussion. Philadelphia, PA: Middle States. (May be obtained from Publications Department, Middle States Association, 3624 Market St., Philadelphia, PA 19104; http://www.msache.org.)


Information Literacy 1973–2002: 
A Selected Literature Review

HANNELORE B. RADER

ABSTRACT
MORE THAN 5000 PUBLICATIONS related to library user instruction and information literacy have been published and reviewed in the past thirty years. New developments in education and technology during the last two decades have affected user instruction and have led to the emergence of information literacy. Based on needs related to the rapid development of information technology and the evolving information society, librarians have begun teaching information skills to all types of users to ensure that they gain information fluency so they can become productive and effective information users both in the education environment and in the work environment.

The number of publications related to user instruction and information literacy, like the field itself, show phenomenal growth during the past three decades as demonstrated by the fact that in 1973 twenty-eight publications were reviewed, and in 2002 more than 300 publications dealing with the topic of information literacy will be issued. It is noteworthy that in the last decade there has been a tremendous growth in publications related to information literacy globally. During the 1970s, publications indicate that user instruction activities were of concern primarily to librarians in the United States, Canada, the United Kingdom, Australia, and New Zealand. At the present time, publications indicate a major concern with information literacy not only in the countries mentioned above but also in China, Germany, Mexico, Scandinavia, Singapore, South Africa, South America, Spain, and others.

On an annual basis, the majority of the publications have addressed information literacy in academic libraries (60 percent) followed by publications related to information literacy instruction in school media centers (20 percent).

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### Table 1. Number of Publications Reviewed 1973–2002

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### Information Literacy and Higher Education

The review of the literature indicates that the majority of the publications address information literacy in higher education. During the twentieth century and at the beginning of the twenty-first century, academic and school librarians developed the concept of information skills instruction from library orientation to library instruction to course-integrated user instruction. Librarians developed teaching materials, guides, teaching methods, library skills tests, Web-based tutorials and other online teaching modules. Although the information skills teaching units were often separate from the academic curriculum and not integrated into total instructional programs for students, librarians have continually tried to integrate the teaching of information skills modules into the curriculum.

Throughout this period librarians have worked diligently to form partnerships with faculty and teachers in teaching and learning, but success has often eluded them. In isolated instances, private liberal arts colleges were able to develop strong faculty-librarian partnerships for course-integrated information literacy instruction.

### User Instruction in Schools

The literature indicates that school librarians and school media specialists have shared academic librarians’ concern to teach students information skills from kindergarten through high school. Media specialists had to address situations similar to their academic colleagues but they have begun to be more successful in these endeavors in recent years. The emergence of “Information Power,” a document outlining information skills needs and appropriate instruction for students in kindergarten through the
twelfth grade, has had a major impact on information skills instruction in schools. State education agencies and school districts continue to mandate information skills instruction as part of the curriculum.

**User Instruction in Public Libraries**

As documented through the library literature, past user instruction in public libraries has been minimal. However, during the last decade, the infusion of information technology and the development of the Internet have created many needs and demands in the public libraries for information and technical skill instruction. New demands for information support related to distance education and information support for students from K–12 have been growing and public librarians have to address these new training needs.

**User Instruction in Special Libraries**

Based on the published literature, special libraries in business environments tend to do very little instruction for their users because special library users expect to receive from their librarians information ready to use. Librarians in medical, law, and other professional libraries provide very specific and intense information skills instruction to their users as shown in the literature. Excellent course-integrated modules have been developed by these special librarians to aid their library users in learning necessary information skills.

**Information Skills Training in the Workplace**

In this new century it is becoming apparent that most employees in the workforce have to deal with both a constantly increasing volume of information and constantly changing technology. To be successful in the information-rich work environment, employees need continual training and development related to information literacy. Employers are beginning to realize that new information skills training is necessary for their workers and librarians could become leaders in this endeavor.

**Assessment of Information Literacy**

During the past three decades the evaluation of user instruction outcomes was minimal. During the first two decades, measurement concerns related to how librarians performed as teachers, and what the students gained from the instruction in terms of finding information, compiling good bibliographies and using appropriate references in term papers. During the last decade there has been more concern with evaluating student learning outcomes and students' research products as well as students' acquisition of information skills, which will enable them perform productively in the work environment.
THE GLOBAL ENVIRONMENT

Although, during the first two decades reviewed, many of the publications are in the English language, they include publications from Australia, New Zealand, Canada, the United Kingdom, and other countries where articles and books were published in English. These countries shared the concerns of librarians in the United States regarding information skills instructions and many noteworthy programs are in existence in many of these countries. It is interesting to note that, in the formerly Eastern bloc countries, such as Russia and East Germany, the teaching of library skills was required. This has also been the case in China. During the last decade the interest in and concern with teaching of information skills has truly become an international concern. This can be seen in terms of publications and national conferences held on the topic of information literacy.

NATIONAL AND INTERNATIONAL CONFERENCES

During the past three decades major conferences, national, regional, and local, have been held to address topics related to user instruction. In fact the LOEX Conference originating at Eastern Michigan University in 1970 has been held for more than thirty years and the Canadian academic librarians have also sponsored more than thirty workshops on "Instruction in Library Use." In recent years Australian academic librarians have held four national conferences on information literacy and Mexican academic librarians have held three national conferences on information literacy. In the 1970s academic librarians in the United Kingdom held several workshops on user instruction, and recently Sweden and China sponsored national workshops on this topic.

NOTABLE WEB SITES

With the emergence of the World Wide Web, information literacy Web sites are being developed by academic librarians to provide online information. These Web sites provide guides, virtual library tours, tutorials, and interactive learning modules to teach information skills. Here are a few examples of Web sites for organizations, clearinghouses, and institutions related to information literacy.

The LOEX Clearinghouse was started thirty years ago as the national clearinghouse for library instruction materials for academic libraries. It has sponsored annual national conferences and has published the papers presented at these conferences, produced a newsletter, collected and lent print and audiovisual materials, and now features a Web site (http://www.emich.edu/public/loex).

The National Forum on Information Literacy, http://www.infolit.org, was created in 1990 to respond to the ALA initiatives regarding information literacy. More than seventy nonprofit and profit organizations are
members and work together to address information education challenges nationally and internationally.

The Association of College and Research Libraries (ACRL) has been deeply involved in facilitating information literacy developments nationally. The ACRL Web site offers information related to information literacy, including the Institute for Information Literacy (http://www.ala.org/acrl/nili/nilihp.html).

The American Association of School Librarians (AASL) has developed many initiatives related to "Information Power," nine information literacy standards for student learning in the K–12 schools environment (http://www.ala.org/aasl/ip_nine.html).

**EXAMPLES OF MODEL PROGRAMS**

In California academic librarians have developed several noteworthy information literacy programs. The California State Universities have developed a program of information competence throughout the system (http://www.calstate.edu/LS/infocomp.shtml).

California State University, San Marcos, features an information literacy program based on faculty-librarian partnerships. The program aims to infuse the teaching of information skill throughout the curriculum (http://library.csusm.edu/departments/ilp/).

The teaching library at the University of California-Berkeley promotes information literacy as part of the undergraduate experience for students (http://www.lib.berkeley.edu/teachinglib/).

The Colorado Department of Education has developed a model of information literacy guidelines to focus on students as knowledge seekers, quality producers, self-directed learners, group contributors and responsible information users.

At Florida International University librarians have developed a curriculum-integrated information literacy program using online tutorials, print materials and a variety of instructions (http://www.fiu.edu/~library/assistance/index.html).

Several interactive information skills modules from basic skills to advanced skills were developed by librarians from all types of libraries in Kentucky and can be found at http://www.kyvl.org/html/tutorial/research/. The modules are being used in distance education, throughout the Kentucky commonwealth education environment, in public and school libraries. The Kentucky Virtual Library is a consortium of all types of libraries, public and private in the state.

The University of Massachusetts developed an information literacy project entitled "information literacy competencies" as part of the statewide UMASS Information Literacy Project (http://www.lib.umassd.edu/INFOLIT/InfoLitComp.html).
Librarians and faculty at the University of Louisville have developed an integrated information literacy program throughout the curricula including a required module for the general education component (http://www.louisville.edu/infoliteracy).

The University of Washington has developed the U-Wired model program which integrates electronic communication and information navigation skills into instruction and learning on campus (http://www.washington.edu/uwired).

The Wisconsin Association of Academic Libraries developed “information literacy competencies and criteria” for the academic institutions in the state (http://www.wla.lib.wi.us/waal/infolit/ilcc.html).

INTERNATIONAL PROGRAMS FOR INFORMATION LITERACY

Africa

The University of Cape Town is part of the Cape Higher Education Consortium Infolit Program. This group has worked successfully during the last decade to develop information literacy initiatives for their many students (http://www.library.uct.ac.za/infolit/).

UNISA—The University of South Africa—is the world’s largest distance education university and has been that for many years. Librarians at UNISA have spent many years developing library instruction for the distance education environment and they are now using Web tutorials and other online methodology (http://www.unisa.ac.za/library/afdeling/client/usered/students/libinfo.html).

Australia

University of Sydney librarians have a well-developed information skills program using self-paced tutorials and offering training courses and seminars throughout the curriculum (http://www.library.usyd.edu.au/skills/).

Queensland University of Technology offers an interesting online tutorial program to assist students in finding, using, and evaluating information (http://www.library.qut.edu.au/elearn/tutorial.html).

Canada

The University of Guelph librarians are addressing information literacy on their campus with tutorials, classes and instructions sessions of various kinds (http://www.lib.uoguelph.ca/LibEd/).

China

Librarians at Tsinghua University in Beijing are teaching many credit courses to help their students in all disciplines gain valuable information and technology skills to enable them to do better research and to use information more effectively (http://www.tsinghua.edu.cn/eng/index.htm).
Germany

The University of Heidelberg librarians have developed an information skills instruction program to teach their students a variety of information use skills (http://www.ub.uni-heidelberg.de/allg/schulung.html).

United Kingdom

The Society of College, National, and University Libraries (SCONUL) in the UK and Ireland is working on improving the quality of libraries and extending the influence of libraries in higher education. As part of these initiatives they have developed a position paper on “Information skills in higher education” (http://www.sconul.ac.uk/).

The University of Glasgow librarians have developed tutorials and training courses for their students to teach library, information and Internet skills (http://www.lib.gla.ac.uk/Training/index.html).

SELECTED INFORMATION LITERACY PUBLICATIONS 1973–2002

The following publications have been selected from the past three decades to demonstrate trends related to library user instruction and information literacy predominantly in the United States. The publications are listed in chronological order.


This is a summary of collected information about bibliographic instruction programs in 174 academic libraries in the United States. The report is divided into formal courses, course-related library instruction, individualized library instruction and miscellaneous types of user instruction and orientation.


This comprehensive collection of essays, case studies and research reports is related to instructing library users and nonusers in school, public, and academic library settings. Includes information from overviews and surveys to program descriptions and research.


This volume summarizes papers from a conference held December 13–14, 1973 at the University of Denver on evaluating bibliographic instruction. The content of the papers reviews research and psychological aspects of evaluating bibliographic instruction. Included also are summaries of some case studies.

Points out that for more than a hundred years academic librarians were concerned about teaching users how to use library collections, that librarians are educators and that the library should be the focus of instruction on the campus.


Provides the first guidelines for bibliographic instruction in academic libraries, developed by the ACRL Bibliographic Instruction Task Force and approved by ACRL in 1977.


Provides a state-of-the-art review during the 1970s on providing library use instruction in different types of libraries in the United States, Canada and the United Kingdom. Includes a lengthy bibliography and a directory of library instruction clearinghouses.


This manual provides basic information and techniques for bibliographic instruction. Includes guidelines, needs assessment guidelines, administrative considerations, objectives, and other planning guides.


This publication summarizes the papers from the ninth LOEX conference held at Eastern Michigan University in 1979. Discusses various aspects of library instruction and describes different case studies.


Discusses the use of seven conceptual frameworks to organize the content of bibliographic instruction. Includes analysis of cognitive learning theory.


Addresses concepts, theoretical frameworks and mental thought processes related to bibliographic instruction in higher education. It is a guide for program development and explores education principles in teaching information and library skills.

Presents a theoretical foundation for bibliographic instruction and a conception-based learning approach to the teaching of library skills. Includes contributions by various practitioners related to the teaching of library and research skills.


Provides various types of evaluation methodologies to aid academic librarians in their assessment endeavors.


Reviews the pedagogical model used by librarians to teach library and information use. Describes an emerging model using cognitive learning theory and problem-solving skills.


Part of this volume summarizes twenty-five years of quantitative research related to library instruction. A subject guide provides access points to allow for the scanning of the enclosed information.


Discusses the use of conceptual frameworks in the teaching of library skills based on Bruner’s theory of instruction.


This is a collection of writings instrumental in transforming user instruction from a grassroots movement to an academic necessity. Identified are key issues such as history, development, key concepts, and future concerns during the 1970s and 1980s.


Provides school library media specialists with an information skills curriculum designed around an information problem-solving process based on Bloom’s taxonomy of cognitive objectives.


Demonstrates the need for integrating bibliographic instruction into the research process and cooperating with faculty to accomplish this successfully.

A college president and an academic librarian collaborated to write this monograph in order to look at the future of higher education in terms of reforming instruction, improving research productivity, building faculty-librarian teams, and increasing teaching and learning effectiveness.


Provides practical, step-by-step advice to enable institutions to develop programs for library instruction based on sound theory. It promotes some standardization for program development in different types of libraries. Information is provided related to assessment, instructional methods, staffing, budget, and public relations.


Discusses the broadest possible application of learning principles to bibliographic instruction. Explains that motivation, response, and reinforcement are necessary components to ensure effective learning.


Provides several case studies about librarians and faculty cooperative efforts to evaluate bibliographic instruction outcomes. Includes a variety of questions to further cooperative efforts.


This monograph summarizes the results of an ACRL-sponsored think tank meeting resulting in recommendations to link bibliographic instruction with information literacy, to strengthen the library education mission and to reward leadership within the profession.


Provides information on bibliographic instruction from the point of view of students, administrators and faculty. Surveyed collections in 473 college libraries to assess the relationship between the collection strength and assignments resulting from library instruction.


Discusses resource-based learning and how it can develop students to become lifelong learners. Includes information on assessment, curriculum development and teaching methodologies.

This how-to-do-it manual was written to help librarians, teachers, and trainers in the 1990s teach access and use of electronic information to users. It addresses the teaching of electronic database use, the Internet and related skills in a variety of ways, including special courses. It also gives information on designing an electronic classroom and how to manage information literacy education.


This publication, produced by the Library Instruction Roundtable of ALA, discusses types of evaluations and assessments for library instruction. This is a useful guide for librarians interested in assessing library instruction and provides a variety of instruments for such evaluation activities.


Describes reforms in higher education as related to information literacy and provides a model at California State University, San Marcos, within the general education curriculum.


Examines information literacy experiences in higher education and proposes a model for information literacy instruction as an alternative to the behavioral model now in use in higher education. Provides new insight and ideas for information literacy education and research.


Discusses the teaching of library and information skills to high school students, including information retrieval expertise and active learning activities.


This represents the final approved version of ACRL’s (Association of College and Research Libraries) guidelines for instruction programs in academic libraries including major aspects of user instruction.


Gives an in-depth portrait of resource-based learning used in higher education to prepare students for lifelong learning. Provides examples of
colleges and universities where resource-based learning has been implemented.


Describes how academic librarians assumed a leadership role in faculty development to address information literacy issues at Florida International University where they built successful partnerships with faculty.


This is an update of the 1987 report defining information literacy. The progress report summarizes information skills needed for the twenty-first century in terms of experience gained with teaching information skills during the past decade.


Surveys the past three decades of library instruction in terms of collaborations between librarians and teaching faculty in liberal arts college settings.


Documents thirty years of library instruction, including the first LOEX (Library Orientation Exchange) Conference at Eastern Michigan. Highlights information literacy projects in the national and international arena.


This book addresses many of the issues related to information literacy and challenges the reader to reflect and contemplate on important issues related to research, benchmarking, workplace education, learners' backgrounds, and learning outcomes. Information literacy is addressed from a global perspective and the study includes Australia, New Zealand, South Africa, Sweden, Singapore, Canada, and the United Kingdom.


This monograph proposes a program of peer tutoring for academic library instruction. It offers an additional learning technique to supplement and enrich the regular information literacy instruction.

The University of Texas, Austin, created the TILT (Texas Information Literacy Tutorial) to teach a progression of skills through problem-based learning. TILT has been used for several years in undergraduate and distance education. It has also been adapted in a number of academic institutions throughout the United States (http://tilt.lib.utsystem.edu).


Summarizes a national survey of information literacy instruction in academic libraries in Canada. Results indicate that there has been little change during the past five years and only a small percentage of the academic librarians record their objectives and evaluation formally. The results of the survey are compared with an earlier Canadian survey and similar surveys from the United States and New Zealand.


This volume discusses collaborations between academic librarians and faculty in terms of teaching, learning and research. Examples of collaborations on various campuses are provided to demonstrate possibilities for further partnering.


This work is aimed at teachers and librarians to help and guide them in teaching information skills throughout the school curriculum. Its purpose is to help teachers understand the importance of teaching information skills to all students. It provides definitions, teaching guidelines, examples of lesson plans, and much more.


This work is a guide for anyone interested in teaching information skills. It provides fundamental instructional plans and development, needs assessment, goal-setting guidelines, as well as instructional theories. It can serve as both a text and reference book for instruction librarians.


Documents a relatively new trend in Mexican higher education of building librarian-faculty partnerships. Academic librarians have been working to
educate users in the area of information skills but they face many challenges
due to the fact the students enter higher education with little library experi-
ence. Describes an exemplary user education program at Juarez University.

Maughan, P. D. (2001). Assessing information literacy among undergrad-
uates: A discussion of the literature and the University of California-Berke-

Discusses possibilities for undergraduates to meet outcomes related to
the *ACRL Information Literacy Competency Standards for Higher Education*. De-
scribes activities to assess students’ information literacy skills at the Univer-
sity of California-Berkeley where seniors have been surveyed since 1994 re-
garding their ability to find and access information.

Goad, T. W. (2002). *Information literacy and workplace performance*. Westport,
CN: Quorum Books.

Defines and describes information literacy in terms of skills needed by
people to become information literate in the workplace. Provides an ex-
panded description and gives a sixteen-step model for information related
job challenges. Gives directions for lifelong learning and information lit-
eracy for the future.

**BIBLIOGRAPHIES**

This bibliographic review would not be complete without providing a
list of bibliographies published during the past three decades dealing with
publications related to user instruction and information literacy.


Behrens, S. J. (1994). A conceptual analysis and historical overview of in-

Reviews the concepts of information literacy by looking at definitions
and the range of skills and knowledge required for information literacy over
the last two decades.


Discusses reasons for evaluating information literacy, what is evaluat-
ed and which methodologies are utilized.

Central Jersey Regional Library Cooperative: Bibliography of Sites on In-
www.cjrlc.org/Help/infolitsites.html.

This is a comprehensive list of Web sites related to information litera-
cy in academic and school libraries.

Summarizes the literature on user instruction in public libraries. It discusses such items as: Public libraries should offer user instruction; patrons of public libraries do not know how to use libraries; and patrons would like to have user instruction.


This bibliography features references to bibliographic instruction, critical thinking, and information literacy publications.


Summarizes a study of the bibliographic instruction literature and found that the volume of publications has increased but the ratio of research to nonresearch publications fluctuates greatly every year. Survey research, evaluation, and experimental research are most often used in library instruction research studies.


Reviews library instruction literature from 1980 to 1989. Includes information on the value of OPAC instruction, teaching methods, staffing needs, faculty education, and serving remote users.


Lists sources for academic reference and instruction librarians interested in teaching and assisting novice or nonprofessional end-user searchers.


This is an excellent literature review of recent efforts regarding information literacy standards, primarily in higher education.


This work illustrates the historical development of user instruction in academic libraries from 1880 to 1980 by providing summaries of twenty selected publications from this period.


This annotated bibliography includes references to items dealing with computer programs to teach library use.

Discusses how postmodernism can assist in making information studies an integrated part of the academic curriculum.


This bibliography was compiled to help librarians find methodology to assist library users in using library resources. More than 1000 entries deal with library skills.


The bibliography is arranged chronologically and includes author, subject and institution indexes. No annotations are given.


This is a selective bibliography of materials related to library instruction published before 1970. The list is divided into three groups: Philosophy and state of the art, types of libraries, and methods of instruction; each of these groups is divided into subsections.


This is a list of approximately 300 print publications on library user instruction divided into history, active learning, teaching methods, international, issues in higher education, and technology.


Provides an overview of bibliographic instruction in academic libraries, an indexing language for literature searches and a bibliography of 174 items.


Reviews library literature to outline new trends and ideas for instruction librarians. Focuses on user needs for library instruction.


Provides a definition of information literacy, explains the need for coalitions to bring about national information literacy and highlights major publications on these topics.

Presents a review of the literature in the area of academic library orientation from 1950–1972. It is arranged by author and by source to assist the literature searcher.


This unannotated listing of library instruction publications is arranged in four sections, general, academic, public, and school libraries. It includes an author, title, and keyword index.


This annotated bibliography lists journal articles on library use instruction in academic institutions in the United States from 1876 to 1932. Provides an historical view of library instruction.


This comprehensive bibliography is intended for academic librarians, computer services professionals, and faculty interested in developing an information literacy program on a college campus. It addresses how to implement information literacy programs in terms of critical thinking, outcome assessment and curriculum materials.


Identifies programmed materials for library education from 1960–1974. Contains programmed texts designed to instruct graduate students in various library programs. The entries are not annotated.

**Conclusion**

This brief literature and Web survey shows a high interest in information literacy throughout educational communities in the United States and in other countries. Although librarians have been dealing with information skills training for several decades, teachers, faculty, and employers are becoming interested in teaching people appropriate information and technical skills for improved learning and job performance. The most recent publications are no longer mostly in the education and library literature but in business and other disciplines. There are many documented activities in this brief survey where information skills are taught in schools and academic institutions. However, more librarians will have to address additional challenges related to information literacy to ensure that they assume a leadership role in educating students and preparing them for a productive life.
REFERENCES

ADDITIONAL READINGS
About the Contributors

LORI E. BUCHANAN is a User Education Librarian and Professor at Austin Peay State University in Clarksville, Tennessee, and is the 2002 recipient of Tennessee’s James E. Ward Library Instruction Award. She was selected to participate in both the national ACRL/IMLS Assessing Student Information Literacy Learning Outcomes Project, 2001–2002, and the ACRL Institute for Information Literacy Immersion 2000 Program. Her most recent presented papers cover information literacy in the online environment, virtual reference, and faculty/librarian collaboration.

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HANNELORE B. RADER is Dean of the University Libraries at the University of Louisville in Kentucky. She has authored more than eighty publications related to reference, management, user instruction, and information literacy and has been a speaker on these and related topics nationally and internationally during the last three decades. She has won several national awards for her work on user instruction.

ILENE F. ROCKMAN is the Manager of the Information Competence Initiative for the Office of the Chancellor of the twenty-three-campus California State University. She is the author of numerous articles and book chapters on information competence, teaching and learning, reference and instructional services, library management, and campus partnerships.

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PING SUN is a professor of information education at Tsinghua University Library, Beijing, China. Sun is a 1970 graduate of the Department of Electronic Engineering at Tsinghua University, where she worked until 1989. Since 1989, Sun has worked for the Tsinghua University Library. Sun has also been a visiting scholar at both Stanford University and Ohio University in the United States.

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