



A Discipline-Based Approach to Information Literacy

by Ann Grafstein

This article, which proposes a discipline-based approach to teaching information literacy, argues that the responsibility for teaching information literacy should be shared throughout an academic institution, rather than limited to the library. An outline of the complementary responsibilities of librarians and classroom faculty in teaching information literacy is presented.

Over the past decade, information literacy (IL) has been an area of increasing interest to librarians. This interest is reflected in the extensive literature on IL that has mushroomed since the 1990s.¹ Much of this literature argues that IL is a core educational goal and should figure as a central component of the academic curriculum.² Nevertheless, despite an increasing recognition of the importance of IL, there has been little concrete discussion of the educational underpinnings involved in implementing an integrated IL program. Similarly, the literature has devoted little attention to the role of classroom faculty in incorporating such an integrated IL program into their courses, beyond that of collaborating with librarians.

Much of the IL literature emphasizes the teaching of generic skills related to the general process of retrieving and evaluating information, as opposed to the skills required for acquiring knowledge or doing research in a specific subject area. Additionally, there has been a tendency in the literature to focus on IL as a field of study in its own right,³ isolating it to some degree from knowledge about any particular topic or discipline.⁴ In the approach adopted here, however, the concept of IL is integrally linked to discipline-based knowledge and research.

This article explores the relationship between teaching IL skills and principles as a process that applies across the curriculum and teaching them in the context of discipline-specific research paradigms. It views IL as defining an independent and critical way of thinking and reasoning about disciplines, and it argues that imparting IL skills to students involves equipping them with both knowledge about the subject-specific content and research practices of particular disciplines, as well as the broader, process-based principles of research and information re-

trieval that apply generally across disciplines. In a holistic conception of IL, classroom faculty and academic librarians should have complementary, though distinct, roles in helping students become information literate.

LIBRARIANS AND IL: A HISTORICAL CONTEXT

Although the expression *IL* did not come into use until 1974,⁵ the role of librarians as instructors is not new. In the United States, librarians have been offering library, or bibliographic, instruction in various forms since before the Civil War.⁶ Although the distinctions between IL and bibliographic instruction (BI) are not always clear or consistent, there does appear to be a general consensus that an important difference is that BI refers to instruction in traditional (i.e., print) library resources compared with IL, which, as will be shown below, is a more inclusive concept. Thus, according to the *Encyclopedia of Library History*, "[t]he terms 'library instruction' and 'bibliographic instruction' may be used interchangeably to connote teaching the use of access tools such as catalogs of library holdings, abstracts, encyclopedias, and other reference sources that aid library users searching for information."⁷

IL instruction, on the other hand, is defined much more broadly. The concept of IL developed and grew largely in response to the expanding variety of information formats that were available to students, many of which were becoming increasingly accessible beyond the walls of the library. In view of these alternative information sources, many librarians were discovering that teaching only the traditional tools did not prepare students to use these new research tools effectively. With these factors in mind, Hannelore Rader and William Coons draw a conceptual distinction be-

Ann Grafstein is Reference Librarian and Circulation Coordinator at College of Staten Island/CUNY, Building 1L, 2800 Victory Boulevard, Staten Island, New York 10314 <grafstein@postbox.csi.cuny.edu>.

tween IL and BI, observing that, unlike BI, IL is not bound to a specific medium; its concepts are taught cumulatively over time, and its focus is not restricted to the library.⁸

Although there are occasional references in the pre-World War II literature to the need for collaboration between librarians and classroom faculty,⁹ Patricia Knapp was the first to articulate the position that the library is an integral and organic part of a college and that library instruction should not be offered as a discrete event, but rather should be woven into the general curriculum.¹⁰ The 1990s saw library instruction develop from a sporadic service delivered occasionally on an ad hoc basis into an expected service at institutions of higher education.¹¹ The increasing recognition of the importance of library instruction that this indicates is related to the growth of digital information resources.

Rapid advances in digital technologies have resulted not only in a proliferation of the amount of information available to students, but also in the packaging of that information in an increasing variety of formats. It is within this context that the expression *IL* has achieved its current popularity. The term embodies a challenge to librarians to extend the skills that they teach beyond instruction in traditional library resources in order to prepare students to exploit effectively the vast array of digital information that is available.¹² Understood this way, *IL*—as opposed to library instruction or *BI*—is not restricted to library resources or holdings; it presupposes the acquisition of the technical skills needed to access digital information, and, crucially, it extends beyond the ability to *locate* information simply to include the ability to understand it, evaluate it, and use it appropriately.¹³

“Understood this way, *IL*—as opposed to library or *BI*—is not restricted to library instruction resources or holdings; it presupposes the acquisition of the technical skills needed to access digital information, and, crucially, it extends beyond the ability to *locate* information simply to include the ability to understand it, evaluate it, and use it appropriately.”

IL: THE LIBRARY AND BEYOND

In his study of higher education in the United States, Ernest Boyer characterizes the college library as a seriously underused and under-funded resource. He contends that the quality of higher education depends on the library becoming a focal learning resource on campus.¹⁴ More specifically, Patricia Senn Breivik and Gordon Gee argue that the integration of the library into the college curriculum, a closing of the gap between the library and the classroom, is an essential component in developing information literate graduates.¹⁵ In their view, libraries provide a model of the kind of information environment in which graduates who are independent, self-directed learners will be called on to function in an information society.

It should be emphasized that in the approach advocated by Breivik and Gee the library does not bear the exclusive responsibility for *IL*. An effective program involves a shared responsibility among librarians, academic administration, and classroom faculty. According to Breivik and Gee, although librarians have in one form or another been teaching *IL* for many years, these projects have met, and will continue to meet, with minimal success, as long as they are initiated solely by librarians and supported only within the confines of the library. They argue that such programs can meet with success only when they are developed within an explicit statement of philosophy from the highest levels of academic administration that establishes *IL* as part of the educational mandate of the institution.

It has, in principle, become widely acknowledged that, if *IL* programs are to be successful, they cannot be deployed under the exclusive initiation, development, implementation, direction, and support of academic libraries along with the few committed and overworked classroom faculty whom librarians can convince to “buy into” the enterprise by collaborating with them on select courses. This growing acknowledgment is demonstrated by the fact that accrediting agencies are increasingly incorporating the teaching of *IL* skills into their accreditation guidelines.¹⁶

In a summary of a set of two symposia on *IL* sponsored by the Commission on Higher Education, Middle States Association of Colleges and Schools (CHE), the CHE characterizes the incorporation of *IL* into the higher education curriculum as an educational imperative that requires “a

collaborative effort by the administrative staff, faculty, and information providers.”¹⁷ Arguing that an effective program of *IL* requires that its importance be recognized by every segment of the campus community, the CHE stresses the crucial role of “chief academic officers”¹⁸ in spearheading its institutionalization. The report specifically states that “information literacy is *not the unique and sole province of librarians or other information providers* [emphasis added], but is an integral part of the objectives for every course on campus, and it requires administrative support for effective implementation.”¹⁹

TEACHING IL: GOALS AND OBJECTIVES

Despite this increasing emphasis on collaboration between the library and the discipline-based faculty in teaching *IL*, the skills emphasized in the *IL* literature are, in fact, generic. It is often noted in the literature that the ultimate goal of *IL* programs is to develop in students the capability of both critically evaluating the information they encounter and of continuing to use the skills that they have acquired to confidently handle the new challenges that will confront them throughout their lives.²⁰ Critical thinking skills and the capacity for lifelong learning are not viewed as skills that are related to specific disciplines, but rather are seen as applying to information seeking generally, independent of any particular discipline or endeavor. The manifest importance of these skills notwithstanding, their broad, general character makes it difficult to characterize in any specific way where classroom faculty can fit into this enterprise.

It will be shown in this section, however, that these basic objectives of *IL* are not new educational goals and that educators have, for a number of decades at least, recognized their importance. The emphasis in the *IL* literature on the necessity for promoting critical thinking skills and developing the capacity for lifelong learning would suggest that the significance of these skills has only recently been recognized, spurred on by the digital information explosion. However, considerably older works on the philosophy of liberal education have advanced both critical thinking skills and the capacity for independent learning as important goals of a good education. It is suggested in these works that the development of crit-

ical, independent students falls very much within the purview of classroom faculty, even within the older, more traditional higher education model that forms their context.

Consider first the concept of lifelong learning. Almost without exception, the literature notes that the ultimate goal of IL is to impart the skill of *lifelong learning* or *learning how to learn*. Breivik notes, for example, that "there is growing acceptance of the need to have more active learning environments that prepare students for lifelong learning."²¹ According to the American Library Association's Presidential Committee's report, "ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how information is organized, how to find information, and how to use information,"²² and, according to Christine Bruce, the recognition of the necessity of developing lifelong learning skills in students has been a large factor in the growth of interest in IL.²³

That *lifelong learning* is so often explicitly articulated in the literature as a central goal of IL might lead one to believe that this is an innovative concept developed within contemporary pedagogical practice and the IL movement. This would not, however, be a correct inference. A glance at some not very recent literature on the nature of a liberal arts education reveals notions very similar to lifelong learning or learning to learn. As far back as 1934, Clarence Howe Thurber observed, "I fear we sometimes have fancied that a liberal education consists of acquiring a great many facts and details, and we have too often resorted to drill, memorization, and routine processes."²⁴ He goes on to state that "[a]n education, we believe, cannot be 'poured in' or 'plastered on'; it must be 'rooted out' for oneself. An education worthy of the name must be self-education."²⁵

Along a similar vein, in 1954, in his *Essays on Education*, A. Whitney Griswold, then president of Yale University, in a discussion of a report by the committee on general education at that same institution, noted that a liberal education should "instill in the individual such qualities as intellectual curiosity, a love of excellence, inner strength and integrity, and above all, the capacity for self-education"[emphasis added].²⁶

Turning now to critical thinking skills, the recent proliferation of information available electronically has highlighted

the importance of these skills and led to an increased emphasis on them in the IL literature. Given the seductively easy accessibility of masses of unregulated information, it is imperative that students, from the very beginning of their academic careers, adopt a critical approach to information and develop the ability to evaluate the information they encounter for authenticity, accuracy, credibility, authority, relevance, concealed bias, logical inconsistency, and so on. As was seen with respect to lifelong learning skills, that critical thinking skills are continually referred to in the literature as being a crucial goal of IL instruction suggests that this is a relatively new concern of higher education pedagogy. Once again, however, this conclusion would not be warranted. Nancy Douglas observes, that, although the importance of critical thinking has been underscored by the information explosion, it has always occupied a prominent place among educational goals.²⁷ Confirmation of her observation can again be found in some earlier literature on higher education.

"Given the seductively easy accessibility of masses of unregulated information, it is imperative that students, from the very beginning of their academic careers, adopt a critical approach to information and develop the ability to evaluate the information they encounter for authenticity, accuracy, credibility, authority, relevance, concealed bias, logical inconsistency, and so on."

In a report published in 1945, the Harvard Committee discussed the abilities that a liberal education should develop in students. "These abilities, in our opinion, are: *to think effectively, to communicate thought, to make relevant judgments, to discriminate among values.*"²⁸ It may be noted that these abilities do not refer to specific skills, nor does the Committee seek to encourage students to accept blindly the authority of the written word.

Rather, the abilities referred to in this statement (effective thinking, making relevant judgments, discrimination among values) are very close to the way critical thinking skills are presented in the more contemporary literature. More specifically, in a 1953 article discussing a course in basic natural science that was required of all freshmen liberal arts students at Champlain College of the State University of New York, Edward C. Fuller noted that one of the objectives of the course was to instill critical thinking skills in each student. His description of the way in which students learn to think critically bears a striking resemblance to far more contemporary discussions of *active learning* or *resource-based learning*.²⁹ He contends that:

[S]tudents do not learn critical thinking by listening to lectures about it. To learn to think critically—and to give evidence of this ability—they must read printed materials, observe natural phenomena at first hand or in pictures, digest the impressions they gain, and communicate their thoughts clearly by written or spoken word.³⁰

Even as far back as 1933, Thurber, in advocating individualized instruction, contrasted it with the more traditional classroom instruction, saying that it "involves infinitely more than the memorizing of lecture notes or textbooks. It demands the development of the critical abilities and the power and insight to take and defend positions, which may be opposed to those of the instructor."³¹

The literature cited above indicates that the skills associated with lifelong learning and critical thinking are not recent innovations in educational philosophy, but rather, have for some time been recognized as being part and parcel of a good education. A solid education continues to be one that encourages students to think critically and to develop the capacity for lifelong learning.

THE FOCUS OF TEACHING: CONTENT OR PROCESS?

Although the core objectives of IL are not new, the imperative for teaching IL skills has strengthened as a result of recent advances in information technology. Underlying this strengthened imperative is the general undercurrent of pervasive and continual change. It is widely recognized among educators that students are currently operating in a radically different information universe from the one in which their faculty learned and practiced

their *métier*. The perception that these changes continue at what seems like breakneck speed has most likely contributed to foregrounding the importance of lifelong learning and critical thinking skills and to the widespread belief that there is something new, if not unique, about the need for these skills in the current information environment. Educators and librarians are concerned that students be able to adapt to rapid changes in the academic, professional, vocational, and personal arenas by being empowered with the capacity for lifelong learning. They also hope to equip students with the ability to locate and use appropriately the vast and growing amounts of information that are available to them, as well as to be able to distinguish the gems from the rocks, the valuable information from the misinformation.

The question then is how best to impart the necessary skills. It will be argued that the appropriate educational response to the information explosion is best developed with an understanding of the differences between information and knowledge and with a recognition that knowledge can be quite enduring and is not subject to continual, anarchic change.

The general impression of an information environment that appears to be constantly reinventing itself impacts on views of what should be taught when teaching IL. The literature conveys a widely held belief that because the *content* of disciplines is constantly changing, subject content cannot be taught effectively; therefore, teaching should focus on *process*. As succinctly stated by Marueen Pastine and Linda Wilson, for example, "[t]he process of research is more important than the product."³²

With the rapid generation and dissemination of new information, many believe that the importance of factual knowledge of a subject decreases, as it is likely to become obsolete. Moreover, it is often held that facts about a subject are easily forgotten and what is recognized today as true may likely not be true or accurate in the future.³³ Under this view, emphasis should therefore be placed on the *process* of locating and retrieving information because these are the skills that students will need and that will facilitate their ability to acquire new information as the need arises. Such a view may be a partial outcome of the fact that academic librarians function primarily as information specialists rather than subject specialists.³⁴ Thus, when librarians consider the best ap-

proaches to teaching IL, they quite reasonably focus on the enduring and transferable skills required to identify, locate, retrieve, and evaluate information.

What Is Constantly Changing?

The perception that the specific content of any subject is constantly changing is widespread. It has become almost a truism that information is growing at an exponential rate,³⁵ and it is not uncommon for statistics to be cited in speeches and articles that attest to the astounding rate of growth in available information or knowledge.³⁶ However, in attempting to help students cope with the constant and expanding barrage of new information, it is important not to overstate the claim that subject content is in a state of continual flux, making factual knowledge rapidly obsolete and irrelevant.

"The perception that the specific content of any subject is constantly changing is widespread."

Although the terms *information* and *knowledge* are sometimes conflated in informal discussions, they are not synonymous. It is no accident, according to Gavriel Salomon, that people speak of the *information age*, rather than the *knowledge age*.³⁷ There are important differences between information and knowledge, some of which are outlined below, that bear on the issue of the ever-changing quality of content:

- Information is discrete, whereas knowledge consists of a network of connections;
- Information need not be contextualized, whereas knowledge is created and exists within a cumulative intellectual and social context; and
- Information can be *accessed* and *transmitted*; knowledge is *constructed* within a community of thought.³⁸

Bearing in mind the distinctions between knowledge and information, it can be truly stated that information—not knowledge—is constantly changing. Decontextualized data and information become knowledge only when someone, working within the framework of a discipline, integrates it into the knowledge-base of that discipline. This core knowl-

edge-base of a discipline, moreover, is not in a constant state of flux. Rather, the core knowledge of a discipline is expanded and perpetuated in relation to a current theoretical or research paradigm. The paradigms and knowledge-base of a discipline are a conservative force, and are not subject to rapid, sudden changes.³⁹

The Risk of Isolating Process from Content

The argument being developed here is that there is a risk in carrying too far the dichotomy between information seeking as a process and more concrete subject-based knowledge. The risk is that of isolating entirely information-seeking skills from knowledge, thereby losing sight of information-seeking skills as a tool whose ultimate goal is the synthesis of information into knowledge. Alistair Mutch, for example, observes in the IL literature "a continuing approach based around the concept of information as a thing and an alarming divorce of information from knowledge."⁴⁰

Information retrieval is certainly a skill, features of which are transferable across disciplines and applications. Similarly, there are essential aspects of the ability to use a basic knowledge of the structure of logical argumentation to evaluate critically claims and evidence, which, having been acquired in the context of one discipline, are applicable in a wide variety of other contexts. In the zeal to impart generalized skills of analytical reasoning, critical thinking, and learning to learn, however, care should be taken to avoid overlooking the importance of subject-based knowledge in facilitating these very goals.

"Information retrieval is certainly a skill, features of which are transferable across disciplines and applications."

There is, for example, a substantial body of research that supports the view that prior related knowledge is an essential element in the acquisition of new knowledge,⁴¹ and even in reading comprehension.⁴² Many learning theorists believe that knowledge acquisition crucially depends on the ability to associate ideas with other related ideas.⁴³ As Barbara MacAdam notes in her discussion of this

issue, "[t]he most important single factor influencing learning is what the learner already knows."⁴⁴

Knowledge of the subject matter and language of discourse of particular disciplines, moreover, has important implications for the ability to acquire and synthesize new information within that discipline. Disciplines have different epistemological structures, and, for this reason, the research process is not identical across disciplines. The ways in which knowledge is organized in different disciplines determine, among other things, the scope of the research questions that can be asked, the rules of evidence that are recognized within the discipline as valid for supporting claims, the kind of criteria that can be used to evaluate claims critically, the sources researchers consult to find information, and the nature of the statements that must be cited. Broadly speaking, research is conducted differently in the humanities, the social sciences, the physical sciences, and the formal sciences (i.e., mathematics and logic). Critical thinking, moreover, does not take place in a vacuum. There are essential aspects of the ability to think critically that develop within the context of an understanding of the research concerns in particular disciplines. An understanding of the discipline, and not simply abstract critical thinking skills, is what provides students with the tools to evaluate research critically in that discipline.

Stephen Plum argues that the distinctive nature of disciplines affects the way library research is conducted, and, therefore, should figure heavily in determining the format of an effective BI course. He differentiates between the way in which the research process should be presented in a BI course for students in literary criticism from the way it should be presented in a BI course for science students.⁴⁵ He concludes that

[D]istinctive processes of original research, literature structures, and library systems that organize and identify that literature comprise particular discipline contexts. These function in important ways to influence patterns of thought in the independent library researcher. Bibliographic instruction that uses discipline context as conceptual framework fosters the growth of attitudes that mark the independent and critical inquirer.⁴⁶

LIBRARIANS AND CLASSROOM FACULTY

In an IL program that is integrated into the academic curriculum, librarians and

classroom faculty have complementary roles in the delivery of IL instruction. There is a set of generic skills that must crucially be imparted in developing information literate students. These are skills that apply to the process of information retrieval and evaluation across academic disciplines and, additionally, to addressing the information needs of daily life. It is this set of skills that librarians, in their capacity as information specialists, are uniquely qualified to teach.

The Role of Librarians: Generic Information Skills

Debbie Orr, Margaret Appleton, and Margie Wallin discuss an IL model developed at Central Queensland University in Australia that incorporates a recognition of the role of subject knowledge and of classroom faculty in implementing the program. They note that "mastery of generic information seeking skills is the precursor to, and lays the foundation for, the development of higher-level thinking and evaluative skills."⁴⁷ Listed below are some examples of the kinds of skills that are proposed here as essential for IL, regardless of discipline.

Searching Skills

To be able to locate information effectively in any area, students must have the ability to understand and formulate the nature of their information need. A reference interview will often reveal, for example, that the student who is seeking articles on special education is actually trying to do research on teaching dyslexic high school students. Once they have properly formulated their need, students must learn how to break down the topic from a discursive formulation into keywords, and then how to combine these terms with the proper use of Boolean logic. Helping students to develop effective search strategies also involves teaching them when and how to use controlled vocabularies, so that they understand the different kinds of results obtained from searching database-assigned subject headings as opposed to keyword searching.

Generic Critical Thinking Skills

It was argued above that at least some aspects of critical thinking skills develop within the context of discipline-based knowledge and research paradigms. There are, on the other hand, aspects of critical thinking that do seem to apply generally across disciplines. For example, regardless of the specific nature of the research

being undertaken, all sources (whatever their format) must be evaluated for appropriateness against certain criteria:

"There are, on the other hand, aspects of critical thinking that do seem to apply generally across disciplines."

- **Timeliness.** How recently was the information created? Regardless of the validity of the information at the time of writing, is it still valid? How important is currency for the information need in question?
- **Authority.** What are the credentials of the author? Does the author have recognized expertise in the field in which he or she is writing? Does an author's doctorate in physics, for example, endow him or her with special authority in the debate as to when life begins?
- **Bias.** Are there unacknowledged biases in the author's statements? Are prejudices or bigotry being masqueraded as "facts?" Are the claims/arguments scholarly and disinterested, or does the author have financial, career, or personal interests that are affected by the claims being advanced?⁴⁸
- **Verifiability.** The question here is not whether or not the author's statements are in fact true or accurate, but whether or not the author provides the documentation necessary to assess their accuracy.
- **Logical Consistency.** Are the statements or claims consistent with one another, or are there internal logical contradictions?

The information retrieval and source evaluation skills mentioned above are examples of skills that are required to locate and appropriately use information in any field. They are examples of the kind of skills that are essential characteristic of the process of information-seeking that apply generically across disciplines and that are best taught by librarians, whose specialty is the retrieval, structure, and organization of information.

The Role of Classroom Faculty: Discipline-Specific Skills

If the role of librarians is the teaching of generic IL skills, the role of classroom

faculty is to impart those IL skills that are embedded within the research paradigms and procedures of their disciplines. Examples of the kinds of evaluative skills that unfold within the context of a discipline are:

- **Evaluating the Content of Arguments.** Professional literature reports on research undertaken by professionals within a discipline and assumes that the consumers of that research have a certain level of knowledge about the discipline. The ability to evaluate the *content* of an argument is not a generic skill, but develops gradually from a knowledge and understanding of the basic commonplaces and standard research practices of a field. For example, a linguist, whose knowledge-base includes the specialized knowledge and understanding of the principles of argument justification that characterize the field of theoretical linguistics, will be able to critically evaluate a professional article on Japanese syntax. A novice, on the other hand, will not have the specialized knowledge of the discipline to do so.
- **Assessing the Validity of Evidence.** An argument may be logically valid in that, if the evidence adduced to support it is true, the argument holds. However, evaluating the truth of evidence often depends on specialized knowledge of the subject matter.⁴⁹ An example can be found in even the most common kind of political debate. Consider, for instance, the argument over whether or not large businesses should be granted tax breaks to stimulate a sagging economy. One piece of evidence often cited to bolster the argument in favor of such tax breaks is that they would benefit large numbers of people by encouraging businesses to create jobs, thus increasing employment and expanding the economy. However, the truth of the claim that tax cuts to businesses would increase employment is an empirical one: to evaluate its truth requires knowledge about the effect of tax cuts on job creation, as well as other economic factors influencing job creation and economic growth.
- **Proposing Original Solutions.** Although in most cases, the ability to

locate, understand, and evaluate information appropriately, as well as to incorporate it within the student's own knowledge-base, is a sufficient measure of IL, in some cases at least, the more advanced information-literate student will be called on to more actively contribute to the knowledge-base of a discipline. If research addressing a particular problem potentially leads a student to propose original solutions to additional problems or alternative solutions to those that have been proffered, this, once again, must be accomplished within the structures and normal research paradigms of the discipline.⁵⁰

Teaching students that knowledge in a discipline does not come handed down in a gilded frame like artwork hanging on a museum wall, but must be evaluated and justified, is not a value-added-by-product of a course. Rather, it is a necessary component of educating students in any course in any discipline. As Orr, Appleton, and Wallin note, "courses should be structured in such a way that inquiry is the norm, problem solving becomes the focus, and critical thinking is part of the process."⁵¹

Conclusion

Very often, the implications and goals of an area of research appear very different to those on the periphery of the research than they do to those who are actively involved in it.⁵² For librarians involved in IL research, IL, decontextualized from the goals and needs of any specific discipline, is often the focus of this research. Mutch, however, who is not a librarian, argues that "the quest for information literacy draws us inexorably into deeper questions about the nature of knowledge, pointing again to the need for it to be embedded in subject based thought, rather than being treated as a standalone specialism."⁵³ Still, there has been growing sentiment in the library and information science field against decontextualizing IL from more substance-oriented subject knowledge. Christine Bruce, for example, concludes that "[i]nformation literacy, like phenomena such as teaching and learning, does not have a life of its own, rather it is a way of thinking and reasoning about aspects of subject matter."⁵⁴ Risë Smith argues that IL will only be integrated into the curriculum if faculty recognize its importance and

adopt it as a goal in developing and delivering their courses.⁵⁵

The concept of IL that has been adopted in this article is one that contextualizes it within the structures and modes of thought of particular disciplines. The approach to teaching IL that has been outlined here assumes that being information literate crucially involves being literate *about something*. Acquiring that literacy entails having first learned a set of generic skills that enable subject-specific knowledge acquisition. It follows from this integrated view that IL cannot be effectively taught as a value-added addition to the regular course-based curriculum, nor can it be restricted to the domain of the library, with some sporadic collaboration with classroom faculty. Rather, in a robust, holistic IL program, these skills are presented and developed as the curriculum of each course is taught. Librarians and classroom faculty share the responsibility for teaching them, so that each teaches the skills that their credentials and background best qualify them to teach. Librarians are responsible for imparting the enabling skills that are prerequisite to information seeking and knowledge acquisition across the curriculum, while classroom faculty have the responsibility of teaching those skills that are required for subject-specific inquiry and research.

"The concept of IL that has been adopted in this article is one that contextualizes it within the structures and modes of thought of particular disciplines."

NOTES AND REFERENCES

1. See, for example, the references cited in Christine Bruce, *The Seven Faces of Information Literacy* (Adelaide, Australia: Auslib Press, 1997); Shirley Behrens, "A Conceptual Analysis and Historical Overview of Information Literacy," *College & Research Libraries News* 55 (July 1994): 309-322; Patricia Senn Breivik, *Student Learning in the Information Age* (Phoenix, AZ: Oryx Press, 1998).
2. This argument is made, for example, in such seminal works as the American Library Association, *ALA Presidential Committee on Information Literacy* (1989). [Online]. Available: <http://www.ala.org/acrl/nili/ilit1st.html> (accessed January 2,

- 2002); Patricia Senn Breivik & E. Gordon Gee, *Information Literacy: Revolution in the Library* (New York: Macmillan, 1989); and in much of the other research cited in this article.
3. For example, in Jeremy J. Shapiro & Shelley K. Hughes, "Information Technology as a Liberal Art: Enlightenment Proposals for a New Curriculum," *Education Review* 31 (March/April 1996): 31-35, it is claimed that information literacy should be viewed as a new liberal art.
 4. For some discussion of this point, see Alistair Mutch, "Information Literacy: An Exploration," *International Journal of Information Management* 17 (October 1997): 377-386.
 5. Behrens, "A Conceptual Analysis."
 6. Mary F. Salony, "The History of Bibliographic Instruction: Changing Trends from Books to the Electronic World," *Reference Librarian* 51/52 (1995): 31-51.
 7. Wayne A. Weigand & Donald G. Davis, "Encyclopedia of Library History (New York: Garland, 1994), p. 364.
 8. Hannelore Rader & William Coons, "Information Literacy: One Response to the New Decade," in *The Evolving Educational Mission of the Library*, edited by Betsy Baker & Mary Ellen Litzinger (Chicago: Bibliographic Instruction Section, Association of College & Research Libraries, 1992), p. 113.
 9. Salony, "The History of Bibliographic Instruction."
 10. Patricia B. Knapp, "A Suggested Program of College Instruction in the Use of the Library," *Library Quarterly* 26 (July 1956): 224-231; and Knapp, "College Teaching and the Library," *Illinois Libraries* 40 (1958): 828-833.
 11. Salony, "The History of Bibliographic Instruction," and William Miller, "The Future of Bibliographic Instruction and Information Literacy for the Academic Librarian," in *The Evolving Educational Mission of the Library*, pp. 140-157.
 12. Anita K. Lowry, "Beyond BI: Information Literacy in the Electronic Age," *Research Strategies* 8 (Winter 1990): 22-27.
 13. Behrens, "A Conceptual Analysis."
 14. Ernest L. Boyer, "College: The Undergraduate Experience in America (New York: Harper & Row, 1987), Chapter 10.
 15. Breivik & Gee, *Information Literacy*.
 16. In one form or another, the concept of information literacy is part of the guidelines of several accrediting commissions. It figures, perhaps most prominently, in guidelines of the Commission of Higher Education of the Middle States Association of Colleges and Schools. See The Commission on Higher Education, Middle States Association of Colleges and Schools, *Characteristics of Excellence in Higher Education: Standards for Accreditation* (1994). [Online]. Available: <http://www.msache.org/msachar.pdf> (accessed January 2, 2002). See also the draft revision of this document, The Commission on Higher Education, Middle States Association of Colleges and Schools, *Characteristics of Excellence in Higher Education: Standards for Accreditation* (February 14, 2001) [Online]. Available: <http://www.msache.org/CHX.pdf> (accessed January 2, 2002). Additionally, see Southern Association of Colleges and Schools, *Criteria for Accreditation*, (Modified December 1997). [Online]. Available: <http://www.sacscoc.org/criteria.asp> (accessed January 2, 2002); and Western Association of Schools and Colleges, *Handbook of Accreditation Standards* (January 2001). [Online]. Available: <http://www.wascweb.org/senior/handbook.pdf> (accessed January 2, 2002).
 17. The Commission on Higher Education, Middle States Association of Colleges and Schools, *Information Literacy: Lifelong Learning in the Middle States Region. A Summary of Two Symposia* (Philadelphia, PA, March 27, 1995, and Rochester, NY, May 1, 1995), p. 1. (ERIC Database ED386157).
 18. *Ibid.*, p. 12.
 19. *Ibid.*, p. 8.
 20. See, for example, Bruce, *The Seven Faces*, and Breivik, *Student Learning* for two well articulated examples.
 21. Patricia Senn Breivik, "Take II- Information Literacy: Revolution in Education," *Reference Services Review* 27 (1999): 272.
 22. American Library Association, *ALA Presidential Committee*.
 23. Bruce, *The Seven Faces*.
 24. Clarence Howe Thurber, "The Liberal-Arts College: The Part of a Liberal-Arts College in a Complete Education," *Journal of Higher Education* 5 (October 1934): 382-388.
 25. *Ibid.*, p. 382-383.
 26. A. Whitney Griswold, "Essays on Education (New Haven, CT: Yale University Press, 1954), p. 86.
 27. Nancy Douglas, "Enemies of Critical Thinking," *Reading Psychology* 21 (April 2000): 129.
 28. Harvard University, "Committee on the Objectives of a General Education in a Free Society," *General Education in a Free Society: Report of the Harvard Committee* (Cambridge, MA: Harvard University Press, 1945), p. 65.
 29. For a thorough discussion of resource-based learning, see Breivik, *Student Learning*, Chapter 2.
 30. Edward C. Fuller, "Basic Natural Science in Liberal Education," *Journal of Higher Education* 24 (November 1953): 420.
 31. Clarence Howe Thurber, "The Colgate Plan," *Journal of Higher Education* 4 (February 1933): 59.
 32. Maureen Pastine & Linda Wilson, "Curriculum Reform: The Role of Academic Libraries," in Baker and Litzinger, *The Evolving Educational Mission*, p. 96.
 33. *Ibid.*
 34. Breivik, *Student Learning*, p. 30. This is generally the case, regardless of any subject specialty an academic librarian may or may not have.
 35. Frank Webster, "Information: A Skeptical Account," in *Advances in Librarianship* 24 (San Diego, CA: Academic Press, 2000), pp. 1-23.
 36. James B. Appleberry, "Changes in Our Future: How Will We Cope?" (faculty speech presented at California State University, Long Beach, California, August 28, 1992), quoted in Breivik, *Student Learning*, p. 1; and Philip E. Johnson, "Changing Teaching for a Changing World: Implications of the Knowledge Explosion," *Community College Review* 19 (Winter 1991): 54-58.
 37. Gavriel Salamon, "It's Not Just the Tool, but the Educational Rationale That Counts" (keynote address presented at the ED-MEDIA Conference, Montreal, Quebec, June 28, 2000).
 38. *Ibid.*
 39. See Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962). Kuhn treats the physical sciences, but the framework he develops is applicable to other fields as well. Caroline A. Jones, "Modernist Paradigm: The Artworld and Thomas Kuhn," *Critical Inquiry* 26 (Spring 2000): 488-528 applies a Kuhnian approach to the field of art; and Hamilton Cravens, "History in an Ahistorical World," *Teachers College Record* 98 (Summer 1997): 730-737 discusses the application of Kuhn to history.
 40. Mutch, "Information Literacy," p. 381.
 41. For a few examples of such research, see David P. Ausubel, *Educational Psychology: A Cognitive View* (New York: Holt, Rinehart, and Winston, 1968); David H. Jonassen & Barbara L. Grabowski, *Handbook of Individual Differences, Learning, and Instruction* (Hillsdale, NJ: Lawrence Erlbaum, 1993), pp. 419-431; Sigmund Tobias, "Interest, Prior Knowledge, and Learning," *Review of Educational Research* 64 (Spring 1994); and William D. Wattenmaker, "The Influence of Prior Knowledge in Intentional versus Incidental Concept Learning," *Memory & Cognition* 27 (July 1999): 685-699.
 42. Sue Barry & Alejandro A. Lazarte, "Evidence for Mental Models: How Do Prior Knowledge, Syntactic Complexity, and Reading Topic Affect Inference Generation in a Recall Task for Nonnative Readers of Spanish?," *The Modern Language Journal* 82 (Summer 1998): 176-193.
 43. See, for example, Ausubel, *Educational*

- Psychology*; Barbara McAdam, "Sustaining the Culture of the Book: The Role of Enrichment Reading and Critical Thinking in the Undergraduate Curriculum," *Library Trends* 44 (Fall 1995): 240, 237-264; and E. D. Hirsch, *The Schools We Need and Why We Don't Have Them* (New York: Doubleday, 1996).
44. McAdam, "Sustaining the Culture of the Book."
 45. Stephen Plum, "Library Use and the Development of Critical Thought," in *Increasing the Teaching Role of Academic Libraries* no. 18, edited by Thomas G. Kirk; Kenneth E. Eble, editor, *New Directions for Teaching and Learning* (San Francisco: Jossey-Bass, 1984), pp. 25-33.
 46. *Ibid.*, p. 32.
 47. Debbie Orr, Margaret Appleton, & Margie Wallin, "Information Literacy and Flexible Delivery: Creating a Conceptual Framework and Model," *Journal of Academic Librarianship* 27 (November 2001): 459.
 48. For a good discussion on identifying bias in Internet sites, see Elizabeth E. Kirk, *Evaluating Information Found on the Internet* [Online] Available: <http://milton.mse.jhu.edu/research/e1996> (accessed December 26, 2001).
 49. See, for example John E. McPeck, "Critical Thinking and Education" (New York: St. Martin's Press, 1981), Chapter 2.
 50. Kuhn, *Scientific Revolutions*.
 51. Orr, Appleton and Wallin, "Information Literacy," p. 457. See also McPeck, *Critical Thinking*.
 52. Patrick Wilson, "Second-hand Knowledge: An Inquiry into Cognitive Authority (Westport, CT: Greenwood Press, 1983), Chapter 3.
 53. Mutch, "Information Literacy," p. 385.
 54. Christine Bruce, "Information Literacy: An International Review of Programs and Research," paper presented at the LIANZA Conference, Auckland, New Zealand, November 2-9, 1999 [Online] Available: <http://www.lianza.org.nz/conference99/bruce.htm> (accessed December 27, 2001).
 55. Risë L. Smith, "Philosophical Shift: Teach the Faculty to Teach Information Literacy" (paper presented at the Annual Conference of the Association of College & Research Libraries, Nashville, TN, April 11-14, 1997) [Online]. Available: <http://www.ala.org/acrl/paperhtm/d38.html> (accessed December 27, 2001).

