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Information Literacy

When students come in as freshmen they think that research is just another requirement. "You go out on your own and you do it. Research is something you are assigned to do." By the time they are juniors they have a sense of ownership and think of research as a life skill. As seniors they have confidence in doing it themselves.

They see research as an integral skill.
—high school principal

Information literacy is one of the five kinds of learning in Guided Inquiry. While you read this chapter, think about how you define information literacy. How have your ideas about information literacy changed over time? What will information literacy look like in the future?

As technology advances and computers take on more and more routine tasks and even some cognitive work, we are rethinking what skills are essential for students to have in the information age. What are the uniquely human skills that complement what computers can do and will do in the future? What knowledge and skills will help students to make the most of advancing information technologies? What is literacy for lifelong learning in the information age?

The new type of literacy incorporates research as an integral life skill. For decades, school librarians have been at the forefront of developing education for the evolving information environment. They have progressed from teaching library skills, to teaching information skills, to teaching information literacy, to taking a broad view of literacy that incorporates research abilities into an inquiry approach to learning.

This chapter presents a rationale for the information literacy curriculum that is accomplished through Guided Inquiry, introduced in the next chapter. We begin with some history on the information literacy initiative and the standards related to information literacy that have evolved over the years. Next we consider the increasingly more sophisticated computer technologies that call for new information age skills, what machines enable people to do, and what people can do that machines cannot. We explain the relationship of research to inquiry and the important role of the school library in the information age school. We emphasize school librarians' teaching qualifications and their expertise in the research process, as well as their special knowledge of resources for inquiry. We describe the school library as a lab for learning, emphasizing a concepts approach to information literacy for optimal transference to college, work, and lifelong learning.

Call for a New Type of Literacy

In the late 1980s librarians in many countries around the world began to notice that a new literacy was needed to access and use information sources in the rapidly growing technological information environment. The term *information literacy* began to be commonly applied to this type of ability. The American Library Association responded by organizing the President's Committee on Information Literacy, headed by Patricia Breivik, with representatives from all segments of education. Carol Kuhlthau joined the committee representing school librarians. The main purpose of the committee was "to define information literacy within the higher literacies and its importance to student performance, lifelong learning and active citizenship." The final report is a clear statement on information literacy that contains the following description of an information age school:

The school would be more interactive, because students, pursuing questions of personal interest, would be interacting with other students, with teachers, with a vast array of information resources, and the community at large to a far greater degree than they presently do today. One would expect to find every student engaged in at least one open-ended, long-term quest for an answer to a serious social, scientific, aesthetic, or political problem. Students' quests would involve not only searching print, electronic, and video data, but also interviewing people inside and outside of school. As a result, learning would be more self-initiated. There would be more reading of original sources and more extended writing. Both students and teachers would be familiar with the intellectual and emotional demands of asking productive questions, gathering data of all kinds, reducing and synthesizing information, and analyzing, interpreting, and evaluating information in all its forms.

In such an environment, teachers would be coaching and guiding students more and lecturing less. They would have long since discovered that the classroom computer with its access to the libraries and databases of the world is a better source of facts than they could ever hope to be. They would have come to see that their major importance lies in their capacity to arouse curiosity and guide it to a satisfactory conclusion, to ask the right questions at the right time, to stir debate and serious discussion, and to be models themselves of thoughtful inquiry. (American Library Association, 1989, p. 8)

This report views information literacy as embedded in an information-rich inquiry environment. At the time this description was written, it was considered a dream for the future. Now it stands as a surprisingly good description of Guided Inquiry in action to develop students' capacity for information literacy.

Information Literacy Standards

A decade later the American Association of School Librarians (AASL) and The Association for Educational Communications and Technology (AECT) published *Information Power Building Partnerships for Learning* (1998). This publication defined information literacy in nine standards, incorporating independent learning and social responsibility.

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Information Literacy

Standard 1: The student who is information literate accesses information efficiently and effectively.

Standard 2: The student who is information literate evaluates information critically and competently.

Standard 3: The student who is information literate uses information accurately and creatively.

Independent Learning

Standard 4: The student who is an independent learner is information literate and pursues information related to personal interests.

Standard 5: The student who is an independent learner is information literate and appreciates literature and other creative expressions of information.

Standard 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.

Social Responsibility

Standard 7: The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

Standard 8: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology.

Standard 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

Information Literacy Standards for Learning Through Inquiry

Another decade later, in 2007, advances in technology had increased the complexity of information literacy, necessitating a high level of thinking to find, evaluate, and use information appropriately and effectively. The American Association of School Librarians responded by publishing *Standards for the 21st Century Learner* (AASL, 2007), which completely embedded information literacy in the learning of the school.

The standards had evolved to incorporate a broad view of information literacy in the context of student learning. A statement of common beliefs recognized that inquiry provides a framework for learning as information literacy becomes more complex, with changing resources and technologies. Four standards state that learners using skills, resources, and tools are able to

- Inquire, think critically, and gain knowledge (Standard 1);
- Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge (Standard 2);
- Share knowledge and participate ethically and productively as members of our democratic society (Standard 3); and
- Pursue personal and aesthetic growth (Standard 4).

Each Standard is organized around skills, dispositions, responsibilities, and self-assessment strategies. These standards position inquiry and research as an integral component of learning in the information age and prompt school librarians to take an active role in all aspects of learning in the school.

ISTE Standards for Students

In the same year, the International Society for Technology in Education (ISTE) published standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world (ISTE, 2007). Four standards state what students can do using digital tools and resources:

1. Creativity and Innovation
Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
2. Communication and Collaboration
Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. Research and Information fluency
Students apply digital tools to gather, evaluate, and use information.
4. Critical thinking, problem solving, and decision making
Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

ISTE Standards stress competency in applying digital media as a key component of research and information fluency. Creativity, innovation, communication, collaboration, critical thinking, problem solving, and decision making are seen as essential to education for today's world.

Members of professional organizations continue to reenvision information literacy and devise new standards to reflect their latest thinking on information technology and learning. Standards are built on a sound conceptual knowledge and best practice of the field.

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Educational Testing Service has developed a test for information literacy that is aligned with the Association of College and Research Libraries (ACRL) standards. The *iSkills*TM assessment measures information literacy through seven task types—Define, Access, Evaluate, Manage, Integrate, Create, and Communicate—representing a range of ways that students handle information through digital technology. Developed with the assistance of leaders from both two- and four-year colleges, the *iSkills* assessment requires students to demonstrate their ability to synthesize many different types of data and make sound judgments about what is accurate, relevant, and useful. The assessment gauges how well students do the following:

- Evaluate the usefulness and sufficiency of information for a specific purpose.
- Create, generate, or adapt information to express and support a point.
- Communicate information to a particular audience or in a different medium.
- Define an information problem or formulate a research statement.
- Access, summarize, and integrate information from a variety of digital sources. (<http://www.ets.org/iskills>)

Information Literacy for Information Age Skills

Information literacy is continually evolving to prepare students for new information age skills. Computers are taking on many of the cognitive tasks that had been considered exclusively in the domain of humans. Advances in computer technology, what Brynjolfsson and McAfee (2014) refer to as “brilliant machines,” call for a shift in education to develop uniquely human abilities, those things people can do that machines cannot. Humans have a capacity for curiosity and enthusiasm to pursue something that sparks interest, to make sense of complex, conflicting information, and to bring together divergent ideas to create something new.

Reflecting on the changes in information literacy over the past few decades, we can see how it has evolved into a new kind of literacy for the information age. The President’s Committee on Information Literacy report in 1989 contained a forward-thinking description of a school centered on a new kind of literacy that depicts the inquiry-centered school of today. The 1998 AASL/AECT Standards, *Information Power: Building Partnerships for Learning*, contained “Information Literacy Standards for Student Learning,” which clearly spelled out in nine standards what students who are information literate would be able to do. The AASL *Standards for the 21st Century Learner* (2007) presented the integral role of information literacy in student learning, with inquiry providing a framework for learning. The ISTE Standards (2007) emphasized competency in research and information fluency that incorporates creativity and collaboration for problem solving and decision making. “Brilliant machines” require us to educate students with the expertise to take advantage of what computers can do and proficiency in what computers cannot do. Clearly, information literacy that incorporates digital and media literacies is emerging as a unique, essential literacy for the information age.

Advances in technology challenge educators to prepare students to be experts at what machines can’t do. Some uniquely human abilities for the information age are collaboration, commitment, curiosity, emotion, empathy, enthusiasm, meaning, and persistence. Although these abilities are natural to people, they need to be cultivated and developed over time through experience that requires a very different approach from traditional school lessons. An inquiry

environment with sustained research projects provides the context that supports the cultivation of these abilities. In Guided Inquiry, these uniquely human competencies are valued, learned, and honed as habits of mind.

Student Research Embedded in Guided Inquiry

Information literacy—the ability to locate, evaluate, and use information wisely in a wide range of situations—requires extensive research ability. Student research is an essential component of Guided Inquiry that is missing in other inquiry approaches. Guided Inquiry is inquiry learning integrated with information seeking and use. The Guided Inquiry Design framework incorporates student research into the inquiry process.

There may be some confusion about how inquiry and research are related and where student research fits into inquiry. Inquiry and research are not synonymous but are inextricably connected. Inquiry is a way of thinking and learning in the information technological society. It is a frame of mind for the information age learner that leads to research at every turn. In this way, research is embedded into inquiry. Inquiry learning is grounded in curiosity that inspires authentic, meaningful research (Kuhlthau, 2013a). It encourages students' natural curiosity about the world as an entrance into engaged learning and deep thinking. Research is the means of acting on initial curiosity to find out more and to learn something new. Research is the natural outcome of an inquiry environment. Guided inquiry begins with curiosity and incorporates the enthusiasm, commitment, and persistence that encourage deep learning.

An inquiry approach to learning opens multiple opportunities for research. A “let’s find out” attitude permeates the information age school. Of course, every question that comes up does not require an extensive research process. Some questions can be answered by a simple fact-finding search. Other complex, multifaceted problems require sustained research that leads to interpretation and a synthesis of ideas. Guided Inquiry enables students to learn the difference between simple and complex questions and what type of research addresses their questions. They learn a range of search strategies, understand the stages in the research process, and create ways to share their learning. In Guided Inquiry, information literacy is developed through a pervasive, research-embedded inquiry environment.

The Library in the Information Age School

School libraries are emerging as learning commons that are active knowledge-building centers (Loertscher and Koechlin, 2014). In Guided Inquiry, the library is an integral component of the school, providing a wide range of resources for learning and serving as an inquiry and information literacy lab. The library is the ideal place for students to learn the basics of information literacy and to apply and practice their knowledge. Many students have grown accustomed to quickly checking the Internet for information on any question that may arise. In Guided Inquiry, they learn the difference between the oceans of information on the Internet and an organized collection that has been selected and classified by professional librarians, particularly for deeper questions and academic research. Students learn strategies for finding, evaluating, and learning from a variety of sources of information in the process

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of inquiry. The concepts approach to information literacy, presented in the curriculum in the next chapter, helps students transfer their knowledge to a wide range of information-seeking situations.

School librarians, also called teacher librarians, have extensive knowledge of resources and special expertise in the research process that adds great value in the information age school. They have specialized training and additional certification required for curation of resources and teaching information literacy. Professional training in search strategies and information technology, as well as expertise in how to learn from a wide range of resources, makes them indispensable team members. In addition, they have vast knowledge of child and young adult literature and are able to connect literature to content. School librarians' teaching qualifications make them important contributors to the instructional program. With their combined expertise in teaching, librarianship, information science, and technology, they are essential collaborative partners on the Guided Inquiry team.

Research on the Impact of School Libraries on Student Learning

There is substantial evidence that students benefit from learning through school libraries. During the last half of the 20th century, a growing body of research demonstrated the impact of school libraries on academic achievement. In the 1960s Mary Gaver (1963) of Rutgers University compared the test scores of students in schools that had centralized school libraries with the scores of students in schools without libraries. The study, conducted in 271 schools in 13 states, found that the test scores of students in schools with centralized libraries managed by qualified librarians were higher than those of students in schools without libraries or qualified librarians. However, the volume of data generated by this study was difficult to calculate with the technology of the day. By the 1980s computers had made massive calculation possible, as demonstrated by SchoolMatch, a national commercial database of school statistics. In a National Public Radio interview, SchoolMatch executive William Bainbridge reported that spending on school libraries was the single factor with the greatest influence on students' school performance.

Inspired by the SchoolMatch results, Keith Curry Lance and his colleagues (2001) at the Colorado State Library conducted extensive, large-scale, statewide studies throughout the 1990s based on the study design developed by Gaver (1963), using schools rather than students as the unit of analysis. By 2005 the Colorado study model had been replicated and elaborated upon in more than a dozen states. Collectively these studies have examined the impact of libraries in approximately 8,700 schools with enrollments totaling more than 2.6 million students. The studies elaborated on the original Colorado study model by identifying specific activities of school staff that constituted playing an instructional role.

The Lance teams found that "across states and grade levels, test scores correlated positively and statistically significantly with library staff and collection size; library staff activities related to learning and teaching, information access and delivery, and program administration; and the availability of networked computers, both in the library and elsewhere in the school, that provide access to library catalogs, databases, and the World Wide Web." The cause-and-effect claim associated with these correlations was strengthened by the reliability of the relationships between key library variables (i.e., staffing, collection size, spending) and test scores when other school and community conditions were taken into account.

These studies revealed that the “two most consistent predictors of test scores, when all potential predictors were considered, were the prevalence of students from poor households and the level of development of the school library” (Lance and Callison, 2005). It is clear from these studies that learning in high-quality school libraries is of considerable benefit to students. Lance stressed the need to move beyond studies of correlation with standardized test scores to research that reveals ways to assess, intervene in, and improve student learning in school libraries. The Lance studies continue to build evidence that documents the significant impact of school libraries on student achievement (Lance et al., 2011, 2012, 2013).

A review of some of the major research on the impact of school libraries on student learning indicates the value of engaging students in inquiry learning. In the 1990s the DeWitt Wallace Reader’s Digest Fund initiated a 10-year program of funding school libraries in 19 communities, each of which received a three-year grant of \$1.2 million. Each community developed its own plan for improving its school library program and determined the way in which the school library would improve students’ performance. The University of Wisconsin evaluated and reported on the results (Hopkins and Zweizog, 1999). Case studies engaged in description and analysis of activities in participating schools revealed evidence of transition toward inquiry-based learning in three schools that showed significant impact on student learning. “In all three schools, case researchers observed students using the library media center to seek information. In these schools, teachers, principals, and librarians worked together to engage children in learning—encouraging them to be inquirers, helping them to internalize the information-seeking process, and sustaining the sense of wonder that children bring to school” (Donham et al., 2001).

The Center for International Scholarship in School Libraries (CISSL) has conducted a series of studies on the impact of school libraries on student learning (Todd, Kuhlthau, and Heinstrom, 2005; Todd, Gordon, and Lu, 2011; Todd, 2012). This research finds that an inquiry approach in the school library is a significant factor in student learning.

Information Literacy Concepts That Transfer to College and Work

As students move on to college and work, they encounter many variables in libraries and information systems. General lack of transfer of library and research skills has been a concern of many librarians and teachers (Donham, 2014). It is not possible or practical to teach all of the detailed procedures and nuances of every library, information system, and technology. But it is possible and essential for students to learn the major concepts of locating, evaluating, and using information that *do* transfer to other libraries and a variety of situations that require research. The concepts learned over the course of elementary and secondary education build habits of mind and skills for action in a changing technological environment.

Guided Inquiry incorporates transferable information literacy concepts into the inquiry process. Students engage in interesting ideas and questions that motivate them to want to learn, without too much emphasis on the requirements of the end product and the mechanics of searching at the beginning of inquiry, which can be distracting and discouraging (Donham, 2010; Kuhlthau, 2004b). Guided Inquiry develops lasting information literacy concepts that can be recalled and applied as needed.

The next chapter describes a comprehensive information literacy curriculum developed specifically for Guided Inquiry. Understanding these basic information literacy concepts

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provides students with the foundation for independent inquiry that transfers broadly. The concepts are introduced, reinforced, developed, and applied throughout students' school years in an environment of inquiry learning. Guided Inquiry integrates these information literacy concepts into inquiry units in the same way that subject area curriculum standards and learning goals are met through inquiry learning.

Reflection

How has the concept of information literacy evolved over time? What role does information literacy play in creating the kind of effective schools that were dreamed of in the 1980s and are becoming a reality today? What are the skills and knowledge that you think are most essential to becoming a lifelong learner? What skills and knowledge do you use frequently in your life to help locate, evaluate, and use information that is important to you?