The goal of developing information literacy skills in students is not merely to fulfill a checklist of behaviors that students should exhibit. Many teacher librarians are asked by classroom teachers to provide initial instruction for students on evaluating websites, and this instruction often occurs in isolation rather than in context. Yet teachers often assume, based on this experience, that students have acquired all the necessary knowledge to evaluate websites, and, as a result, the teacher librarian may not interact with the students again. Furthermore, some educators mistakenly assume that information literacy only pertains to online information searches, when it actually encompasses a much broader mindset. This approach to information literacy does not align with expectations for students in state and national standards.

**STANDARDS FOR INFORMATION LITERACY**

Students are often required to demonstrate knowledge of information literacy. The Common Core State Standards (2010) uses the terminology “research and media skills” to describe students’ “need to conduct research and to produce and consume media.” Specifically, students should “gather, comprehend, evaluate, synthesize, and report on information and ideas, conduct original research in order to answer questions or solve problems, and analyze and create a high volume and extensive range of print and nonprint texts in media forms old and new.” These skills “are embedded throughout the Standards rather than treated in a separate section.” Needless to say, these requirements can overwhelm educators and students.

The School of Library and Information Science at the University of South Carolina (USC; College of Information and Communications, 2017) describes information literacy as students’ abilities “to locate, correctly evaluate, successfully use and clearly communicate information in its various formats.” The College of Information and Communications (2017) published a “recommended list of top ten information literacy skills for high school students entering USC.” Number nine on the list is “Information Literacy: Students must be able to collect, manage, and evaluate information using technology, and communicate findings.” This document can help guide high school instruction, as it clearly articulates the skills that are expected of students as they begin postsecondary education.

According to the newly published standards from the American Association of School Librarians (2018), school libraries should use “a systematic instructional-development and information-search process” to embed “the inquiry process within grade bands and within disciplines” (p. 69). Learners should follow a “process that includes using evidence to investigate questions; devising and implementing a plan to fill knowledge gaps; generating products that illustrate learning” (p. 34). Educators are tasked with...
providing learning opportunities for students to experience the information search and usage processes as a cycle and to use a system or framework for finding and using information effectively and ethically.

INQUIRY FRAMEWORK

Guided Inquiry Design (Kuhlthau, Maniotes, & Caspari, 2015) establishes such a framework grounded in research to accomplish these tasks. Students move through the information search process recursively, adjusting their focus and information searches depending on the identified information need. This information need arises after much time spent exploring resources and topics, activating the Third Space—that is, merging “students’ personal and cultural out-of-school experience and knowledge and ways of being” with “official curricular knowledge and school ways of knowing and being” (Kuhlthau et al., 2015, pp. 25-26). When students choose their own learning contexts, they can “construct new worldviews rather than having to take on the teacher’s perspective or those mandated by the curriculum or textbook” (Kuhlthau et al., 2015, p. 27).

How do information literacy skills fit into this inquiry framework? As Kuhlthau (2013) states, “An inquiry approach provides an environment for encouraging original research to answer questions and solve problems, while developing the ability to gather, comprehend, evaluate, synthesize, and report on information and ideas” (p. 8). In fact, if students are to adopt an inquiry stance, they will need information literacy skills in each discipline throughout each stage of the inquiry process. These skills are most effectively acquired by students when teachers embed instruction and practice into units of study rather than treating them as separate, disjointed lessons (see Figure 1). Embedding instruction “helps students transfer their knowledge to a wide range of information-seeking situations” (Kuhlthau et al., 2015, p. 69). How will they identify their information needs? How will they search for that information? And finally, how will they use it? These questions provide an overall context for defining information literacy skills and illustrating how they can apply to any academic discipline.

EXAMPLES OF INQUIRY ACROSS DISCIPLINES

The following examples are a result of collaboration between my colleague Karen Hill, classroom teachers, and me at our public high school in Duncan, South Carolina. They illustrate various information literacy skills, behaviors, or dispositions implemented in high school academic disciplines, a result of embedding instruction into state content standards while also attempting to foster an inquiry approach to learning.

TEACHER CADET COURSE

Many high schools offer a teacher cadet course for students who are interested in careers in the education field. I collaborated with our teacher cadet instructor to give these students opportunities not only to analyze their own information literacy skills but also to discover ways to embed them into instruction for their own future students (Gregory, 2018). I used the keyword log introduced by Maniotes and Cellucci (2017) for the students to discover more effective information search strategies (see Figure 2).

Guiding question: How can I discover terms I need to know related to my topic in order to find the information I need in various resources?

The students each chose a unit that they would be developing with their cooperating teachers. Next they con-
ducted a web search for information pertaining to their chosen unit as they would normally have done on their own. We discussed and documented in the reflection column of the keyword log the strengths and weaknesses of their initial search strategies. Then I demonstrated more effective strategies that they then implemented in their next search. This type of embedded instruction worked more effectively than if I had given a general lesson on using Boolean search terms, for example, with no specific purpose in mind. These students were all seniors, and several reflected that they had not previously received this type of information-search instruction. As these students plan to become teachers, they were able to discuss how they themselves could use the log with their own students on any grade level and in any discipline.

**SCIENCE**

Science classes provide many rich opportunities for embedding information literacy skills instruction. The following standard is included in South Carolina’s High School biology standards (South Carolina Department of Education, 2014): “Construct scientific arguments to support the pros and cons of biotechnological applications of stem cells using examples from both plants and animals.” I collaborated with one biology class to practice analyzing sources of information using this prescribed topic. The standard touches on a sensitive topic, so some information students found on the open web was biased or not authoritative (e.g., blog and social media posts). I created a LiveBinder to collect various sources and alerted students to government publications they were not aware of that provided important information (see Figure 3).

As a class, we viewed the different resources curated under each category: unbiased, pros, and cons. After this scaffolding, students conducted their own information searches, paying attention to biased versus factual information.

During this process, I also identified a need for a mini-lesson on fact versus opinion. Differentiating among facts and opinions becomes more difficult in higher-level courses or subjects. This skill is crucial for students to successfully select information sources and interpret their validity. Using a pre-selected statement from an ebook on stem cell research, the class discussed
whether it was fact or opinion (see Figure 4).

Students may not be accustomed to writing argumentative essays in science classes. When faced with the standard listed above, many students commented that they did not know exactly what they should be doing. We worked on creating research questions, and they viewed the writing assignment as a way to search for possible answers (see Figure 5).

This type of activity helps students focus their information need and guide their information searches. It also makes them aware of possible areas of exploration either for this assignment or in the future, encouraging an inquiry mindset.

**ENGLISH**

English classes often provide conditions where it is easiest to embed information literacy skills instruction. For example, each year the American Bar Association sponsors a Law Day essay contest, and one of our school’s English teachers works with students to participate. This year’s prompt asked students to explain the importance of the separation of powers in our federal government. Our library intern created a Hyperdoc of links to helpful websites, articles, and videos, which helped students identify their information need, explore ideas, and consult potential sources. We then introduced the English students to ProQuest’s Government Reporter database. They learned how to use the advanced search features and suggestions for subject terms based on their chosen topics, which proved to be a new and important part of locating reliable information. They presented their findings in an essay to an authentic audience of lawyers, which allowed them to consider how audience would influence their writing. The assignment blended an inquiry learning stance with embedded information literacy skills instruction.

**SOCIAL STUDIES**

For the past 2 years, we have collaborated with a social studies teacher to embed information literacy skills into a unit on the rise of labor unions at the beginning of the 20th century. Students visited activity stations organized by guiding questions. They were encouraged to write down their own questions as they completed the activity in order to identify areas for further inquiry and to promote curiosity. We offered traditional resources such as encyclopedia entries and photographs but also included song lyrics, documentary clips, and eyewitness accounts. Students evaluated the information gleaned from each source, noting how information presented in an encyclopedia entry differed from that of a song or diary entry. We also curated a Department of Labor website for information on the status of labor unions in America today. Examining how a historical event still influences society today through various viewpoints engages students in evaluating information, its sources, and its impact.

**SOCIAL JUSTICE**

We are fortunate to offer an elective course, Media Center Service Learning, for students interested in working in the library. We have successfully
implemented a unit requiring students to select a current topic related to social justice. The unit culminates in a written letter to an organization, newspaper, or elected official calling for action. In our experience, most students are unsure how to define and select social justice issues and identify their information needs, which illustrates the importance of the first phases of Guided Inquiry Design: Open, Immerse, and Explore (Kuhlthau, et al., 2015). As Kuhlthau (2013) states, “Students get into difficulty when they skip the Exploration and Formulation stages and try to move into the Collection stage too early in the research process” (p. 7). Our students view short documentaries on the New York Times op-docs website, recording their reactions on a shared Google Doc (see Figure 6). Next, they complete a social justice gallery walk featuring 13 stations, making lists of questions generated while reading or viewing resources (see Figure 7). At this stage, the information literacy skills emphasize browsing, skimming, and scanning “to get an overview of what’s there and to dip into a few sources for ideas on formulating a focused personal question” (Kuhlthau, 2013, p. 7). Figure 8 shows how a research plan can guide students to discover sources of information to meet that need. This type of research plan can be implemented in any discipline and promotes metacognitive skills.

MATH

Math poses challenges for embedding information literacy skills, because instruction is traditionally content specific. However, I assisted a teacher in finding peer-reviewed research articles in the state virtual library, Discus (Dig-
ital Information for SC USers). In this way, students learn how to search for full-text, peer-reviewed articles featuring action research in a particular field. In a probability and statistics course, students can review the methodology used in such an article and analyze the results and conclusion of the researchers. As an extension, students can then design their own experiments and possibly modify those of the article they analyzed. In this example, inquiry and information literacy function simultaneously with math content by recognizing which problem the researchers identified and how they attempted to find a solution and asking, “Was it valid?”

**REFLECTION AND SELF-ASSESSMENT**

It is important to embed reflection and self-assessment in each phase of the inquiry process in all disciplines. Meta-cognitive skills gained during Guided Inquiry “reveal [students’] own learning process to them [so they] are able to plan for future situations of learning from information” (Kuhlthau et al., 2015). Students can reflect on the progression of their own skills during a course as they consider using inquiry journals, exit slips, Google Forms, or checklists. In searching for information to meet their chosen needs and through reflection, students become more aware of their strengths and weaknesses, taking ownership of their learning methods across all academic disciplines.

**SUMMARY**

As these examples illustrate, information literacy is not merely about online searching or evaluating websites. Rather, information literacy encompasses an entire mindset of discovering, meeting, and sharing information needs. This is also why adopting Guided Inquiry Design provides an effective framework for teaching information literacy. These examples also reveal a more important concept: collaboration between classroom teachers and school librarians yields the optimal basis for creating information literate students and citizens.

**REFERENCES**


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