The Process of Learning from Information

Library Media in the Information Age

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The Process of Learning from Information

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This article presents the process of learning from information as the key concept for the library media center in the information age school. The Information Search Process Approach, based on Kuhlthau's research, is described as a model for developing information skills that are fundamental to information literacy. Some basic abilities for using information that even the youngest children can learn are recommended along with strategies for implementing this approach.

Information Age School Library

The major challenge for the information age school is to educate children for living and learning in an information-rich environment. An understanding of the process of learning is one of the most important abilities for students to acquire in order to function in that information-rich environment. A sense of process enables students to draw on the wide range of skills that they learn throughout their years of schooling for application in everyday living. Without a sense of process, students have difficulty in recognizing the similarities in disparate disciplines necessary for transferring skills from one situation to another. Library media programs need to be restructured to serve the information age school. The central goal underlying this restructuring is to instill in students a sense of the process of learning from a variety of sources of information.

Over the years, school librarianship has been particularly attuned to the needs of the local community and the society at large. A well-established pattern of responding to these changing needs during the past 30 years places us in an excellent position to address the challenges of the information age. Although these challenges are undoubtedly the most difficult we have yet had to face, we must act without delay and with great resolve and competence.

It may be helpful at this point to take stock of what has been accomplished in school librarianship over the past 30 years in forming the basic concepts on which to build for the future. In the 1960s, the foundational concepts of school libraries were established. These concepts incorporated a specialized facility, staff, and collection to accommodate the learning objectives of the school. The school library was identified as different from the public library in that the collection reflected the curriculum, and the professional staff were trained as teachers as well as librarians. In the 1970s, the media concept was developed, which fostered integration of a variety of

media across the curriculum. During this time the concept of a library media program emerged encompassing reading incentives and library skills instruction. In the 1980s, the library media program was expanded to incorporate the concepts of instructional design, resource-based learning, and levels of integration with the curriculum. By the mid-1980s, the computer was commonplace. The computer brought major new concepts including automating the collection and various other applications. These innovations demanded considerable attention and time, and we are still in the midst of this transition. However, it is imperative that these demands do not distract us from the task of promoting student learning in the information age.

The 1990s have brought important new concepts to school librarianship. The concept of a self-contained collection is giving way to the concept of connection to an extensive information network and the concept of the virtual library. Application of the computer has opened access to a wide variety of resources, creating an information-rich environment. As the application of computer technologies provides vast amounts of accessible information, attention turns to using information. The problem of information overload has become common, and devising ways of seeking meaning becomes essential.

The concept of information literacy and information skills is an expansion of library skills. Library skills prepare students to locate materials in a library. Information skills prepare students to learn in an information-rich environment. The concept of information literacy encompasses lifelong learning and the application of information skills to everyday living.

These important changes in the basic concepts underlying school librarianship are profoundly changing school library media programs. The process of learning from information is the key concept for the school library media center in the information age school. Yet in many instances, it may be neglected by library media specialists who are too firmly tied to the past or are distracted by the demands of getting the technology up and running. Neglect of process leaves students without the essential holistic concepts for transferring learning to real-life situations. A concept of process is an essential component in restructuring library media programs for the information age school.

Process Learning

Author David Macaulay, in his acceptance speech as winner of the 1991 Caldecott Medal, made a plea for exposing children to process. He explained the importance of process in his life work and described how his parents were always making things and involving him in the process of creating. He expressed grave concern for today's children who confront most things fully constructed and have little opportunity to experience process. "It is now possible for almost any child to get through childhood without any knowledge whatsoever of the P-word (process) and without suffering the slightest

case of curiosity" (Macaulay, 1991, pp. 340-347). His speech, published in the *Journal of Youth Services*, makes provocative and entertaining reading.

In a series of studies of the student's perspective of the information search process (ISP), I discovered a similar problem in library research (Kuhlthau, 1989). Students commonly approach their own library research as if there were only one right answer and one perfect project. They often are not engaged in a process of using information to construct their own learning. My studies show that an understanding of the constructive process through guided self-awareness substantially increases students' confidence and competence in learning from information. The following case of one of the students studied illustrates the importance of understanding the process of library research (Kuhlthau, 1988).

The subject of case study was a high school student for whom English was a second language. Although he was not underprivileged or disadvantaged in any sense of the word, he felt disadvantaged academically and was looking for a way to succeed. He was determined to find ways to compete successfully in an academic environment. He volunteered for case study in the first in the series of studies I conducted of the ISP. He explained that he thought he might learn something about library research that would help him in college. When interviewed after completion of four years of undergraduate work, he explained the impact of his understanding of process in this way.

> I had more exposure to research papers than most high school students. By working with you I learned not to panic if it doesn't all fall in together the first day you walk into the library. I had a lot of friends in college who were panicked at doing a research paper. I'll welcome a research paper any day regardless of the subject. To tell you the truth I haven't come across any of my peers who think like that, not a one. When my roommate's research paper was due last semester, I helped him with it. He doesn't even know what he is afraid of; afraid of not finding the one article that is going to make his paper? I'll worry about a paper because things don't fall into place but it's not the kind of thing I lose sleep over. I've learned to accept that this is the way it works. Tomorrow I'll read this over and some parts will fall into place and some still won't. If not, I'll talk to the professor. The mind doesn't take everything and put it into order automatically and that's it. Understanding that is the biggest help. (Kuhlthau, 1988, p. 282)

This student had learned to anticipate the learning process inherent in library research and had developed strategies for coping with the uncertainty and confusion he encountered. What is unfortunate is the difficulty he observed other students having who had not been exposed to their own process of learning in library research assignments in prior schooling. When interviewed again four years later he was employed by a stock analysis firm to compile reports on various corporations. He explained that he can never have too much information because he seeks a thread or theme as a focus to provide a story or narrative in the information he gathers. In this way he had

developed a strategy for addressing information overload. Process gave him a way to work through masses of information. The concept of focus gave him a frame for seeking meaning and making sense. He understood that his main task was to construct meaning from the information he gathered, and he was confident that he could do this. In other words, he was information literate.

The Information Search Process

My studies show the importance of teaching the ISP rather than assuming that students will acquire an understanding of the process on their own without any formal instruction. By formal instruction I mean creating an environment where students can experience the ISP and interact in situations where they can reflect and become aware of their own process. Through reflection on their own experience, students internalize the process for transference to other situations of information use.

A model of the ISP, developed from the findings of five studies, serves as a guide for designing instructional programs. Full description of the studies and the model have been made in prior publications. In brief, the ISP may be thought of as occurring in six stages: Initiation, Selection, Exploration, Formulation, Collection, and Presentation. The stages are named for the primary task at each point in the process. Thoughts, actions, and feelings commonly experienced in the six stages of the process are described in the model (see Figure 1). Initiation marks the beginning of the process when the assignment is first introduced. Students are frequently puzzled by the task and uncertain as to how to proceed. Thoughts are commonly centered externally on "What does the teacher want?" and not internally on "What do I know?" and "What do I want to know and learn?"

The second stage, Selection, is a time for identifying a general area for investigation that is accompanied by a sense of optimism at accomplishing the task at hand. Some students may take more time than others in this task. Those who do not select quickly can become anxious at being behind the group. Pace of the ISP varies greatly from person to person and from problem to problem. The only time a whole group of students will be together is at Initiation and Presentation. Otherwise, pace will vary individually. It is helpful to point this out to students because this it is not the norm for school learning but is for learning in real world settings.

The third stage, Exploration, is unexpectedly the most difficult of the entire process. After the general topic has been selected, students expect to be able to move on to collecting information and preparing to present. However, Exploration, as the name indicates, requires a more varied and complex task. At this point, their task is to explore information to form a focus for their research. They need to read and reflect in order to learn enough about the general topic or problem to form a personal perspective or focus for their work. Confidence can be expected to drop sharply during this stage before increasing gradually. As students encounter inconsistent, incompatible in-

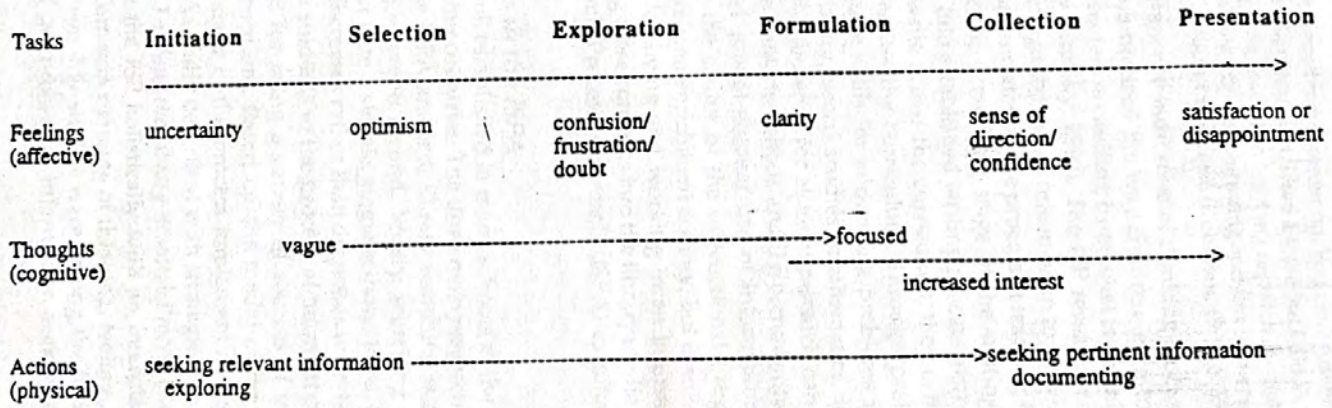

Figure 1. Model of the information search process.

formation that does not match their expectations, they commonly begin to doubt the appropriateness of the topic, the adequacy of the information sources, and their own ability to accomplish the assignment. This is to be expected, and they need to attend to the task of exploring information to form a focus for their research rather than collecting information to support a thesis. One of the most common mistakes in library research is to confuse the stages of exploration and collection and therefore to apply collection strategies in the Exploration stage. Completely different strategies are called for during Exploration than are used in the Collection stage. When these two stages are confused, students run into all kinds of problems in the Presentation Stage, including writing blocks because they have not formed a personal perspective to write about, or plagiarism because they have copied word for word with little sense of meaning.

The fourth stage, Formulation, is conceptually the most important in the ISP. During this stage the central cognitive task of the process is accomplished. A personal perspective or sense of meaning of the information encountered is formed. At this time the student begins to move from uncertainty to understanding. The focus provides a guiding idea, a theme, or a thread, on which to base the collection of information. The focus provides the frame for constructing a story or narrative using the information that is gathered. The concept of focus formulation gives the student a strategy for choosing information from an information-rich environment and is the underlying concept in using information rather than merely locating it. During Formulation students are actively engaged in using information to create meaning that involves thinking, reflecting, interpreting, connecting, and extending.

In the fifth stage, Collection, the task is to gather information that defines and supports the focus formed in the prior stage. The focus is further shaped and clarified during this stage as connections and extensions are made from the information gathered. The narrative begins to take shape. Many of the strategies used in traditional library searching are helpful at this point and may be adapted to the technological environment, such as subject searching and detailed notetaking.

In the sixth stage, Presentation, the task is to complete the narrative describing the focused perspective of the topic and to prepare to present the new learning to the intended audience. This can be a difficult stage if little formulation has taken place during the ISP. One student who had not done sufficient formulation during the process described a serious writing block.

> I had a general idea not a specific focus, but an idea. As I was writing, I didn't know what my focus was. When I was finished, I didn't know what my focus was. My teacher says she doesn't know what my focus was. I don't think I ever acquired a focus. It was an impossible paper to write. I would just sit there and say, "I'm stuck." There was no outline because there was no focus and there was nothing to complete. If I learned anything from that paper it is, you have to have

> a focus. You have to have something to center on. You can't just have a topic. You should have an idea when you start. I had a topic but I didn't know what I wanted to do with it. I figured that when I did my research it would focus in. But I didn't let it. I kept saying "this is interesting and this is interesting and I'll just smush it altogether." It didn't work out. (Kuhlthau, 1994, p. 55)

Writing blocks are commonly indicative of thinking blocks. The writing process research has revolutionized the way children learn to write. However, the writing process centers on writing from what is already known and in the long-term memory (Stotsky, 1990). The ISP research addresses how constructs are formed through the use of information to provide something to write about. The ISP concentrates on the process of learning from information prior to and during the prewriting stage of the writing process and needs to be incorporated into established writing process instruction.

As students learn to write across the curriculum, they can learn how to learn from information across the curriculum. Through problem-initiated instruction they can acquire skills for addressing problems in the various disciplines of science, history, social studies, mathematics, literature, and language. In addition, the audience for student research can be expanded beyond the teacher to the class, the school, and the community.

In an information age school student use of information for learning needs to be brought to the center of the instructional program. Student research is no longer merely an enrichment activity, but is an important way to learn in preparation for living and working in an information-rich environment. Incorporating these concepts into the library media program calls for an Information Search Process Approach (ISPA) to information skills instruction.

Underlying Concepts in the ISPA

The ISPA has become well established in many schools in the United States, Canada, Sweden, and other countries. The three main research findings from the basic concepts in the ISPA are first, library searching is a process over time rather than a single event; second, library searching is a complex, holistic experience rather than a simple, single activity; third, library searching commonly initially increases rather than decreases uncertainty.

The ISPA introduces students to the process of information seeking and strives to develop skills for using a variety of sources of information for learning across the curriculum. Based on the model of the ISP, it guides students through each stage in the process implementing useful strategies along the way. The ISPA is fully described with strategies recommended for each of the six stages in *Teaching the Library Research Process* (Kuhlthau, 1994).

Students experience the ISP holistically with an interplay of thoughts, feelings, and actions. Common patterns of thinking, feeling, and acting are characteristic in each stage. My studies were among the first to investigate the affective aspects of the process of information seeking and use, along

with the cognitive and physical aspects. One of the most surprising findings was the discovery of a sharp increase in uncertainty and decrease in confidence after a search had been initiated during the Exploration stage.

The concept of uncertainty is a basic underlying principle of the ISPA. An Uncertainty Principle drawn from the findings of these studies is presented in my recent book *Seeking Meaning: A Process Approach to Library and Information Services* (Kuhlthau, 1993a). Uncertainty is not only to be tolerated in the ISP but to be expected as a normal condition. Students need to clearly understand that "the mind doesn't take everything and put it into order automatically and that's it." They need to develop strategies for using information for thinking and formulating in order to seek meaning in the ISP.

Of course, the developmental level of the students is an important consideration when adopting an ISPA. All elementary and secondary school children can learn from a variety of sources of information. However, the level of abstraction that they are equipped to handle will depend on their experience and will develop as they mature (Kuhlthau, 1981). The program for younger children should center around concrete information and straightforward research topics and problems. Older children can work with more abstract ideas, formulating their own focused perspective of the information they gather. It is a serious error to require one research assignment for children of all ages. A transition threshold seems to occur around 11 or 12 years of age, although this may vary somewhat individually or culturally. The important concept is that there is a difference in the information use of younger and older children that needs to be taken into account when planning an ISPA.

Abilities for Learning from a Variety of Sources of Information

There are some basic abilities for using information that young children can learn and that older children find extremely useful. When children practice these abilities at an early age, they build a solid foundation for using information as they mature and grow. Four basic abilities of information use are recalling, summarizing, paraphrasing and extending.

Recall is thinking back over what has been gathered and read to remember certain parts and features that stand out in the mind. Memory plays a critical role in information use and is an important function to apply to thinking about information at an early age. Recalling can be highly selective, differing from one child to another. When asking a child to recall, there should be room for more than one answer for all. What is recalled depends to a large extent on the experience of the child and the former constructs that the child holds.

Summarizing is encapsulating information to draw out salient points. It involves organizing ideas and placing them in a meaningful sequence. The task of summarizing is to choose not everything, but enough to convey meaning; not anything, but what is important, pertinent, and significant

from an individual view. Young children are being asked to summarize when they are directed to identify the main points of a passage. Rather than all being required to name the same ideas, they can be encouraged to identify what seems important, interesting, or surprising to them. In this way, they are learning to use information for thinking about ideas in a creative, personal way.

Paraphrasing is retelling in one's own words what has been encountered in resources. The use of language fosters formulation and prepares information for application. The concept behind paraphrasing is that the child's words are as acceptable as the author's and more appropriate under certain circumstances. The child is encouraged to break away from the text to tell the story in his or her own way. When paraphrasing is not valued, copying and plagiarism frequently result. From the earliest age, children's retelling or paraphrasing needs to be valued and encouraged. Assignments should arise from problems to be solved that require paraphrasing ideas rather than a contrived directive that prompts copying word for word from a text.

Extending is taking ideas from sources and fitting them in with what one already knows. Extending also involves making connections between ideas within information and with information from other sources. In this way, the child's thoughts about a topic or problem are extended. Extending also encompasses interpreting information and applying it to a problem in the creative process of using information.

These four abilities are interconnected and not separate entities. Recalling is closely related to summarizing. Paraphrasing is telling what is recalled and summarized. Paraphrasing may be used to enable recall as one point cues another while the telling occurs. Similarly, paraphrasing may enable summarizing as the story unfolds in the act of telling. In fact, all four abilities may be thought of as interwoven in the active process of seeking meaning.

Strategies for the ISPA

Students can learn to apply the following strategies in the ISPA: collaborating, continuing, conversing, composing, and charting.

Collaborating. A team approach to library research more closely matches real-world information seeking tasks. Collaborative strategies such as brainstorming, delegating, networking, and integrating are productive activities for information seeking and develop abilities valued in the workplace. Instruction that promotes collaboration in the process of information seeking and use builds skills and understandings that transfer to other situations of information need.

Continuing. Continuing addresses evolving information problems rather than questions that can be answered in a single incident with one source. The process of information seeking involves construction in which the student actively pursues understanding and meaning from the information encountered over a period of time. Continuing responds to students' complex

dynamic learning process. Instruction that continues throughout the full duration of the ISP not only guides students in one specific research assignment, but also establishes transferable process skills. Students are led to view information seeking as a constructive process and to know that exploration and formulation are essential tasks for bringing order to uncertainty through personal understanding. Continuing also addresses the concept of enough. An important understanding for addressing continuing complex problems is a notion of what is enough information for closure and presentation. What is enough was a relatively simple notion when a person could gather all there was to know on a topic. The concept of enough is quite a different matter in the present-day information environment. Understanding what is enough is essential for making sense of information around us. Enough relates to seeking meaning in a quantity of information by determining what one needs to know and by formulating a perspective on which to build. The ISP treats the concept of enough as what is enough to make sense for oneself.

The concept of enough may be applied to the tasks in each of the stages of the ISP. Continuing strategies enable students to decide what is enough to recognize an information need, to explore a general topic, to formulate a specific focus, to gather information pertaining to the specific focus, to prepare to share what has been learned, or to solve a problem. Continuing strategies support students throughout the ISP and guide them in using information for learning through each stage of the process.

Conversing. Conversing encourages students to discuss the ISP from their own particular perspective. Library media specialists may encourage dialogue by drawing from the student's dynamic process through invitational, exploratory questioning: What ideas seem important to you? What questions do you have? What problems are emerging? What is the focus of your thinking? What are the guiding ideas for your search? What are the gaps in your thinking? What inconsistencies do you notice in the information you have encountered?

Conversing gives the library media specialist an opportunity to listen to the student and to recommend appropriate strategies for working through the stage in the process that the student is experiencing. Diagnosis of the student's stage is important because formulation of a focused perspective is the turning point in the search. The library media specialist recommends different strategies before and after the formulation of a focus. Prior to formulation, a more invitational approach to searching is recommended; there might be exploratory reading and reflecting in order to better understand the problem. Following formulation, a more focused approach of documenting and organizing in order to solve the problem is recommended.

Charting. The timeline of the ISP developed in the studies may be adopted as an instrument for illustrating the process to students. The diagram enables students to visualize a sequence of stages in information seeking. The chart may be used as a basis for determining the stage that the student is experi-

encing and to describe the overall process to the student. The timeline can be simply drawn on a piece of paper or prepared as a formal handout. The objective is for students to understand the process and to analyze and decide at what stage they would place themselves in the sequence.

Timelines and flowcharts may be adapted for guiding students in charting their own searches. These instruments are most effective for reviewing a recently completed search with a student and reflecting on what went well and what might be improved. They may also be used as planning instruments.

Composing. Composing promotes thinking, and journal writing is an excellent strategy for advancing formulation in the ISP. Library media specialists may recommend that students keep a research journal where they record ideas, questions, and connections as they progress through their search. Writing in a research journal is much more comprehensive than jotting notes on notecards or in a notebook. The journal is started when the project is first initiated, but the purpose changes as the search progresses. Students are instructed to set aside a minimum of 10 or 15 minutes each day or every few days to write about their problem or topic. The main objective is to serve as a tool for formulating thoughts and developing constructs.

Enablers and Inhibitors of ISPA

Some library media specialists have had great success in implementing an ISPA and others have not been as productive. In a study conducted over a period of three years I investigated why this is so (Kuhlthau, 1993b). The study revealed some primary inhibitors and basic enablers in implementation of a process approach. Not all schools are organized to accommodate the constructive process of students. Some were better prepared for implementation than others. Participants in faltering programs cited three primary inhibitors: lack of time, confusion of roles, and poorly designed research assignments.

The four basic enablers identified in libraries reporting successful implementation of a process approach were: a team approach to library services, a mutually held constructivist view of information seeking, a shared commitment to instructing and guiding in skills for lifelong learning, and competence in designing process strategies. A process approach to information skills was revealed as a team effort. The team was committed to improving information use. The notion of assisting and counseling students in the constructive process of information seeking provided a solid theoretical basis for building library services and for developing a process approach.

Conclusion

The information age school library prepares children for productive living in an information-rich environment. Library media programs need to be restructured to serve the information age school. Our mission is for every child to have the opportunity to become information literate. The central goal

of the restructured library media program is to develop ability in the process of learning from a variety of sources of information in each subject in the curriculum.

In many efforts to restructure education of the 21st century, this is the essential piece of the puzzle that is missing. Failing to prepare students for learning in an information-rich environment is failing to meet the challenge of education today. The school library as the information center of the information age school is the laboratory for learning essential abilities for living in the information society. It is time for school librarians worldwide to play a central role in creating information age schools for their local communities.

References

Kuhlthau, C.C. (1981). *School librarian's grade-by-grade activities program: A complete sequential skills plan for grades K-8.* West Nyack, NY: Center for Applied Research in Education.

Kuhlthau, C.C. (1988). Longitudinal case studies of the information search process of users in libraries. *Library and Information Science Research, 10,* 257-304.

Kuhlthau, C.C. (1989). Information search process: A summary of research and implications for school library media programs. *School Library Media Quarterly, 18*(5), 19-25.

Kuhlthau, C.C. (1993a). *Seeking meaning: A process approach to library and information services.* Norwood, NJ: Ablex.

Kuhlthau, C.C. (1993b). Implementing a process approach to information skills: A study identifying indicators of success in library media programs. *School Library Media Quarterly, 21*(1), 11-18.

Kuhlthau, C.C. (1994). *Teaching the library research process.* (2nd ed.). Metuchen, NJ: Scarecrow.

Macaulay, D. (1991) Caldecott acceptance speech. *Journal of Youth Service in Libraries, 4,* 340-347.

Stotsky, S. (1990). On planning and writing plans. *College and Composition and Communication, 41*(1), 37-57.