Information and Thinking Skills and Processes to Prepare Young Adults for the Information Age

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WHENEVER MAJOR UPHEAVALS or developments occur in a society, the education of its citizens becomes a focal point for criticism. Cries of outrage and demands for change are heard. The latest round of recommendations for educational reform and recent developments in educational research provide an opportunity for library media specialists to change instruction in traditional library or research skills to instruction in information skills and higher-order thinking processes.

Over the past ten years new lists of requirements have been published which recommend what the young should learn during their formal schooling and how professional educators should be prepared to teach. Even before the publication of *A Nation at Risk* (National Commission on Excellence in Education 1983), various associations or organizations with missions related to education were calling for reform or change in the nation's schools and defining what those reforms and changes should be.

In a publication of the National Council for the Social Studies, the authors proposed that higher-level thought processes, useful knowledge, and clear values were needed by today's students to function effectively in tomorrow's society (Cassidy and Kurfman 1977, p. 3). Higher-order mental processes of logical reasoning, information processing, and decision-making were considered basic to the application of mathematics in the workplace by the National Council of Teachers of Mathematics (1980, p. 8). "The ability to analyze, classify, compare, formulate hypotheses, make inferences, and draw conclusions ("Essentials of English" 1983, p. 53)" was deemed essential in helping students to learn within the school setting and in later life.

The impact of the criticisms of current schooling in *A Nation at Risk* on national associations and society in general led to responses

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which agreed with the criticisms and with the report's recommenda-
tions for reform. One response from the library world was a series of
seminars in 1984 sponsored by the Center for Libraries and Education
Improvement of the U.S. Department of Education. The papers repre-
sented the views of school, public, and academic librarians (*Libraries
and the Learning Society* 1984). Many national and state library associa-
tions published responses to the report as well. Almost without excep-
tion, the published responses from the library field pointed out that
libraries and their role in a "learning society" were barely mentioned.

One common element in all of the reports which preceded or
followed *A Nation at Risk*—as well as the report itself—was an empha-
sis on information. Although the terminology varied considerably,
rationales and recommended skills, competencies, or attitudes featured
information in a central role in society. All of us by now have heard or
read that we are living in an "information society" instead of an "indus-
trial society" so the emphasis on information should be no surprise.
What is surprising is a general lack of acknowledgment that informa-
tion has always been important to an "informed citizenry," a basic tenet
of a democratic society. Perhaps the failure to identify the essential
elements of terminology, such as "the learning process" or "educated
people," has led to the lack of understanding of the central role of
information.

The exponential growth in the quantity of information and the
variety of technological devices which can be used to access it add to the
emphasis on information. Individuals or companies can no longer
ignore information as a valuable resource in their daily lives since so
much information that they need to know about, understand, and use is
now available. The oft-repeated axiom that "what you don't know can't
hurt you" is no longer true; indeed, the opposite may be closer to reality.

If young adults are to become contributing participants in society
as adults, they need to be aware of basic information-related require-
ments for jobs or careers now and in the future. Various business and
industry groups have issued their lists of expectations for employee
skills and competencies. A task force on education for economic growth
identified the "basic skills and competencies for productive employ-
ment (Task Force on Education for Economic Growth 1983, pp. 47-
50)." Interestingly, most revolved around the manipulation, under-
standing, and use of information instead of the how-to-do-it physical
skills or competencies.

Before proceeding to specific recommended skills and competen-
cies offered by professional associations, businesses, educators, and
librarians, some comments about terminology are necessary. First, the
definition of *information* as used in this article includes all the data
taken in through the five senses, their internalization, and their restruc-
turing or use by the individual (Dervin 1977). When one uses this
definition the relationship between information and thinking becomes

apparent. Thinking, or higher-order thinking and mental processes which are listed as essential in most of the recommendations, uses sensory input that is manipulated in some way over time to produce thoughts, reasons, or knowledge (Presseisen 1985).

Presseisen offers a useful model of the processes that various authors use to describe thinking and, by the aforementioned definition, information skills. Basic or essential processes of thinking—classification, qualifications, relationships, causation, and transformations—are used in the complex processes of thinking—problem-solving, decision-making, critical thinking, and creative thinking. Each of the basic processes, based upon the work of Bloom and Guilford, is emphasized in one or more of the complex processes, as suggested by Cohen, according to the Presseisen model (Presseisen 1985; Bloom et al. 1956; Guilford 1967; Cohen 1971).

No single, agreed-upon taxonomy of thinking or information skills was offered in any of the reports and articles by the various groups. Indeed, a mixture of individual skills, basic processes, and one or more of the complex processes was the norm. Perhaps the adoption of one taxonomy is impractical given the diverse ways that youth learn about their world; however, those responsible for teaching or helping youth to learn must have a clear understanding of thinking or information skills and competencies. Reaching that clear understanding is hampered by an impingement of one basic process on another as well as on the more complex processes (Raths 1986, p. 86). For example, the basic process of evaluating information involves analyzing and criticizing that information. Critical thinking, problem-solving, and decision-making all require evaluation of information.

The basic thinking process of classification, as suggested by Presseisen, encompasses the skills of identifying similarities and differences, of grouping and sorting, or finding common qualities in information. Finding unique characteristics of information—the qualifications process—requires skills of identifying facts, recognizing problems, and forming definitions. Discovering sequences and orders, analyzing and synthesizing, and making logical deductions comprise the basic process of relationships. The causation process includes the skills of establishing cause and effect, making predictions or judgments, drawing inferences, and evaluating. Transformations, the fifth basic thinking process, relates to skills of creating meanings such as using analogies, metaphors, or logical inductions (Presseisen 1985, p. 45).

Each of the skills comprising the five basic processes are essential in one or more of the complex or higher-order thinking processes. The complex processes use the basic skills for a particular purpose; for example, finding solutions to a known or defined difficulty and judging the best response to a given situation are the purposes for problem-solving and decision-making, respectively. Generating logical reasons or theory underlying specified propositions is a purpose of critical

thinking, and developing new or aesthetic ideas and products are results of the critical thinking process (Cohen 1971, p. 26). The suggested purposes for which complex thinking processes are used are also the reasons that library media specialists use to justify the development of an information skills and processes curriculum.

In addition to the earlier mentioned skills and processes, metacognition—"thinking about thinking"—has been suggested as an important part or even the focus of an information or thinking skills curriculum (Bertland 1986; Mancall et al. 1986; Kulleseid 1986). When one understands the various thinking skills and processes and can select, consciously use, and evaluate them in appropriate situations, one becomes a more autonomous thinker as well as a life-long learner. If the "Learning Society" proposed in *A Nation at Risk* is to become a reality, metacognitive theory should be a foundation for teaching and learning at all levels of education.

In reference to the complaint from librarians in their responses to criticisms of current education endeavors—i.e., the inadequate mention of the role of libraries—partial blame may be attributed to librarians themselves. In our promotions of library use and library or media skills, the public's impression is one of, "that is well and good, but how do they relate to my life and work?" Although people pay lip service to the value of libraries and library or research skills, not many people understand their value. Too many published library skills curriculums emphasize "materials" and "use of libraries" rather than "information" and "use of information resources" wherever they may be physically located. In many instances, skills are taught in isolation from the rest of the curriculum and thereby reinforce the public's doubts about these skills. Young adults know that very valuable and useful information can be obtained from nonlibrary sources and librarians serving this age group should also be aware of this. Librarians can teach and counsel young adults about the broader scope of information and information skills.

Current writing about the role of librarians in the teaching and learning experience of children and young adults emphasizes the broader scope of information and thinking. The main title of the new national guidelines for school library media programs is *Information Power* (ALA 1988). In order to emphasize the need for a change to an information skills and processes curriculum, three activities or actions are proposed:

1. Provide in-service and preservice opportunities for librarians to learn about the newer models and theories of thinking and information. Of course, any reorientation or exposure to new ideas must include an exposition, and perhaps a demonstration, of why the "new" is more productive than the "old," or at least is related to and can be incorporated to make the "old" better. Faculty in library education programs should reevaluate their curriculum to make sure that

future librarians know and understand current models and theories of information and thinking. Some library education faculty may also need the same continuing education experiences suggested for practitioners.

2. Develop an information skills and processes curriculum that better prepares young adults to live in an "information age." Integrate that curriculum with the total instructional program and emphasize how the skills and processes, if learned, contribute to other learning experiences or to life after school. Develop a scope and sequence that starts with basic information skills and builds toward complex thinking processes.

What elements should be included in a revised or new information skills and processes curriculum? Three basic elements, in addition to specific skills and processes, are essential—the cognitive level of the learners, the mode of presentation, and the subject content to which it is related. Learning theory contributes to our understanding and incorporation of learner cognitive stages; theories and characteristics of communication channels do the same for mode of presentation. A knowledge of how higher-order thinking processes relate to each subject or discipline provides the background for integrating the new curriculum and thereby demonstrates the contribution of a library program to its publics.

Specific information skills, processes, and attitudes incorporated should be selected according to what educators and society in general want young adults to be able to do as adults. Several published recommendations of specific content or entire programs are available to serve as guides (Costa 1985, pp. 183-243). Whether the curriculum is adopted or adapted from one or more of the published versions or is developed from scratch, it should be a cooperative development effort among library media specialists, teachers, and administrators. Information skills and processes are not unique to the role of library programs although librarians may serve as a stimulus for curriculum development and implementation (Markuson 1986).

3. Modeling and reinforcing information skills and processes in our day-to-day work with young adults is a way we can share our methods of solving a problem or creating a new product through the use of basic and complex processes. Describing the steps in a search strategy and evaluating the results while working with individuals or groups provides an opportunity to "see the skills in action."

While working with individuals and groups, librarians can reinforce the learning and use of information skills and processes by recognizing what skills or processes are being or are not being employed. When students find, analyze, or use information appropriate to a given situation, librarians can compliment them or share in their success. Suggestions for the use of a different skill or process can be made when nonproductive ones are observed. This modeling and

reinforcement of behavior must become a conscious behavior of librarians if young adults are expected to learn and use relevant skills and processes.

Library professionals in all types of libraries can make contributions to the learning of information skills and processes by young adults. A change or reevaluation of attitudes and expectations is needed in the field of librarianship. Too many professionals do not believe that young adults need the same wide variety of information and resources as do adults. Some barriers were created because information systems which young adults are expected to use efficiently may have been developed for the expert in a discipline instead of the novice. What relationship and vocabulary context problems are created for the novice? Subject-specific information system language may not be a part of the vocabulary of young adults. Can transition information systems be developed to better fit their level of cognitive development?

Researchers can contribute by investigating the information behaviors of young adults. Assumptions based upon results of studies of information use behavior by adults may be valid when applied to young adults, but few studies have been conducted to test those assumptions (Liesener 1984, p. 66). If information behavior of young adults differs from that of adults, how and why does it differ? Empirical evidence to support the answers to this broadly stated question would help librarians serving young adults to develop better information skills curriculums tailored to the needs of youth.

Calls for action to improve the education of youth and a plethora of recommendations to accomplish that improvement involve the skills and processes related to thinking and information. Librarians working with young adults have an opportunity to take the initiative in developing their role in the improvement of education. If they do not, others without the expertise and experience in the information field will assume or usurp their role.

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