

1997

## Information Literacy: Its Implications for Education

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## Information Literacy: Its Implications for Education

### Abstract

This paper explores the concept of information literacy and its implications for education. Discussion begins with a look at the shift in America's economy toward information services. The skills necessary to function productively in this Information Age are examined to demonstrate the critical nature of information literacy. In the context of information literacy, educational reform such as resource-based learning and a process approach to information skills instruction are discussed. This discussion leads to recommendations for best preparing students for the 21st century.

Information Literacy: Its Implications for Education

A Graduate Review

Submitted to the

Division of Educational Technology

Department of Curriculum and Instruction

in Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

by

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July 1997

This Research Paper by: Lisabeth Underhill

Titled: Information Literacy: Its Implications for Education

has been approved as meeting the research requirement for the  
Degree of Master of Arts in Education.

August 1, 1997  
Date Approved

8-1-97  
Date Approved

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## **ABSTRACT**

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## CHAPTER ONE

### Introduction

In "The Rock", T. S. Eliot asks the following questions:

Where is the life we have lost in living?

Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information? (p.7)

These questions seem especially poignant with the advent of the Information Age; ..."when so much information comes our way each day that we risk being overwhelmed by the mass of it" (Lenox & Walker, 1994, p.57).

Due to the fluidity of information, it is no longer possible to acquire a body of "right information" once and for all as expected in the past. Hade (1982) suggested that, "Possession of information and knowledge is an idea that has little usefulness in an information society" (p.8). To function productively in this information-rich environment, one must become information literate. This means replacing "possession" with the verb, "access". Due to the development of electronic media, one needs to learn how to access information from a variety of sources. However, just being able to access information is not enough. As Boorstin, former Librarian of Congress, stated, "Information, like entertainment, is something someone else provides us. It really is a service! We expect to be entertained, and also to be informed. But we cannot be knowledgeable! Each of us must acquire knowledge for ourself" (cited in Hade, 1982, p.7).

Thus not only does one need the skills to access this wealth of information, but also the skills to process it. The act of processing information requires analyzing, interpreting, evaluating, and integrating ---- while also

drawing inferences and conclusions (Lenox & Walker, 1994). It is through this activity that one becomes knowledgeable. It is this activity that forms the concept of information literacy. "Just being able to read and write may not mean one is functionally literate in an information society" (Hade, 1982, p.9). Hade goes on to suggest that in today's overly rich information environment one must also be aurally literate, visually literate, and computer literate. Thus information literacy becomes holistic and inclusive of all other literacies.

The American Library Association in its final report to the Presidential Committee on Information Literacy, emphasized the importance of and critical need for information literacy:

To respond effectively to an ever-changing environment, people need more than just a knowledge base, they also need techniques for exploring it, connecting it to other knowledge bases, and making practical use of it. In other words, the landscape upon which we used to stand has been transformed, and we are being forced to establish a new foundation called information literacy. Now knowledge ---- not minerals or agricultural products or manufactured goods ---- is this country's most precious commodity, and people who are information literate ---- who know how to acquire knowledge and use it ---- are America's most valuable resource (cited in Breivik, 1991, p.3).

### Purpose

Thus the purpose of this paper is to discuss the concept of information literacy and its implications for education. Through the discussion, the obsolescence of



traditional education will be illustrated. The paper will conclude with recommendations for education to assure that the next generation of students becomes information literate.

## CHAPTER TWO

### Review of Literature

In a 1982 article, Hade observed, "Society is evolutionary and revolutionary" (p.7). Once society was based on the gathering of food. With the development of systematic agriculture, society ceased to be migratory. The Industrial Revolution brought another change in society. Agriculture was no longer the dominant part of society ---- giving way to industry and the production of goods. Only two centuries after the beginning of the Industrial Revolution, American society has shifted again ---- from an economy based on goods produced by industry to an economy based on services produced by information.

This economic shift prompted the Secretary's Commission on Achieving Necessary Skills (SCANS) Report, "What Work Requires of Schools", in 1991. This report outlined the foundation skills and practical competencies that were felt to be necessary for all individuals entering the workforce of the Information Age. SCANS recommended a three-part skills foundation that included:

1. basic skills, such as communication and understanding in reading, writing, and speaking;
2. thinking skills, such as problem-solving, knowing how to learn, the generation of new ideas, setting goals, and choosing best alternatives; and
3. personal qualities, such as responsibility, self esteem, sociability, self-management, integrity, and honesty.

In addition, five practical competencies were recommended as outcome measures:

1. identifies, organizes, plans, and allocates resources
2. works with others
3. acquires and uses information
4. understands complex inter-relationships; and
5. works with a variety of technologies (cited in Doyle, 1994, p.16).

These foundation skills and practical competencies as outlined in the SCANS Report suggest an extensive reform program for education from a business perspective. The federal government has also outlined an educational reform agenda in the legislative passing of Goals 2000 in 1994. The aim of Goals 2000 was expressed as “individually, to promote higher levels of individual student achievement, and collectively, to build a globally competitive American workforce” (U.S. Dept. of Education, 1991, p.2). Broadly, the six goals cover issues ranging from the education of preschool-aged children to adult literacy. The underlying theme is the importance of lifelong learning with particular emphasis on the schooling and preparation of students (Doyle, 1994).

Together the SCANS Report and Goals 2000 have provided a framework to demonstrate the critical nature of information literacy. Information literacy is thus a thematic synthesis of the skills that individuals will need to live in the Information Age (Doyle, 1994). To illustrate this synthesis, consider the following definition of an information literate person as described in its final report to the Presidential Committee on Information Literacy by The American Library Association (1989):

To be information literate an individual must recognize when information is needed and have the ability to locate, evaluate and

use effectively the information needed...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 in such a way that others can learn from them (p.1).

This description has since been expanded to focus on the attributes of an information literate person. An information literate person is one who:

- recognizes the need for information,
- recognizes that accurate and complete information is the basis for intelligent decision making,
- formulates questions based on information needs,
- identifies potential sources of information,
- develops successful search strategies,
- accesses sources of information including computer-based and other technologies,
- evaluates information,
- organizes information for practical application,
- integrates new information into an existing body of knowledge, and
- uses information in critical thinking and problem solving (Doyle, 1993, p.138).

These attributes have been sequentially arranged to highlight that information literacy is a process. This idea of process is just one educational implication that will be discussed further in this paper. Additional implications will be discussed to demonstrate that there needs to be a corresponding shift in education to match the economic shift in American society.

### Resource-based learning

This section of the discussion will focus on Goal 3 of Goals 2000 in the context of information literacy. It will explore in greater depth the implementations current educators must make to assure attainment of this national goal.

In her monograph, Doyle (1994) paraphrased Goal 3 as having... “ a critical focus on students learning how to use their minds well ---- knowing how to learn to make informed decisions. During the years of general education, (K-12), all students need to learn how to process information as they apply problem-solving and critical thinking skills to their school and personal lives” (p.23). Traditionally, schools have not encouraged these skills. The emphasis of education has been on content, acquiring a body of “right” information. The traditional teacher imparts this content utilizing a transmission model in which teaching is talking and learning is listening. The traditional students are passive recipients of information and learning is viewed as a product or destination (Todd, Lamb & McNicholas, 1992).

Clearly, Goal 3 of Goals 2000 calls for a shift in the traditional instructional emphasis and educational process. In the context of information literacy what is called for is not a new information studies curriculum, but rather a restructuring of the learning process.

The current heavy reliance on packaged information and teacher-directed instruction must give way to learning that prepares young people for lifelong learning in an ever-changing environment that is information rich. Throughout all levels of learning, the emphasis must be placed upon resource-based learning ---- learning that is

based on the information resources of the real world and learning that is active and integrated, not passive and fragmented (Breivik, 1991, p.5).

What is meant by resource-based learning? Resource-based learning is not a way of teaching. It is a way of facilitating learning. Often the term resource-based learning is used synonymously with the term resource-based teaching. However they are not the same thing. In resource-based teaching, teachers are using a variety of resources such as newspapers, library books, video, and computer software to facilitate their teaching. The focus is on what the teacher is doing with those resources; making the teacher the center of the learning environment. In resource-based learning, students may access the same resources but the focus is on what the students are doing with these resources to facilitate their own learning (Haycock, 1991). In resource-based learning, the students select the resources they think will best meet their needs for information. Learning becomes an active, student-directed process (Doyle, 1994). The students become the center of the learning environment.

The above description of resource-based learning requires restructuring. According to Haycock (1991), what must be restructured is the learning process, the learning environment encompassing that process, and the relationship between the student and the teacher which is central to that process.

In its 1989 report, the American Library Association's Presidential Committee on Information Literacy described this restructured learning process:

...Such a ...learning process would actively involve students in the process of knowing when they have a need for information, identifying information needed to address a given problem or

issue, finding needed information, evaluating the information, organizing the information, and using the information effectively to address the problem or issue at hand. Such a restructuring of the learning process will not only enhance the critical thinking skills of students but will also empower them for lifelong learning and the effective performance of professional and civic responsibilities (cited in Lenox & Walker, 1993, p.316).

Implied in this description is an ever-changing environment that is information rich. The walls of the classroom are pushed back to encompass the resources of not only the school library media center but also the community and the world as well (Breivik, 1991). According to Hancock (1993):

Teachers trying to create an information literate environment for their students have given up on the view that teaching is telling, that learning is absorbing and that knowledge is static. Teachers involve students in complex tasks that have purposes beyond the limits of the classroom and the teacher's critical evaluation. They are familiar with a variety of learning tools, both print-based and electronic, and they encourage their students to move beyond the textbook when seeking information and solving problems. They also create collaborative situations to develop students' social skills and problem-solving skills. They engage in collaborative activities that enrich their own professional development and their students' learning experiences. They seek the expertise of their school library media specialists as partners in the curriculum planning process (p.1).

The school library media center plays a key role in the restructured learning environment. Once the site of brief, mandatory weekly visits for book exchanges, library skills instruction, study hall, or a place to do research, the school library media center must now function as “a learning laboratory”, and an extension of the classroom in which student-centered, resource-based learning takes place (California Media and Library Educators Association, 1994).

Supporting resource-based learning will also mean creating a situation in the school wherein students have the opportunity to use the media center when the need arises, and not according to a pre-arranged, lock-step schedule. Teachers should accompany their classes to the media center in order to fully engage in the integration of library and classroom (Thompson, 1991). The value of collaborative partnerships between classroom teacher and the library media specialist is in having two teachers functioning as facilitators of learning, increasing the contact time with individual students, and in modeling collaboration strategies (California Media and Library Educators Association, 1994).

As evident in the restructuring of the learning process and the learning environment, “the role of the teacher in the student-centered, resource-based learning environment is paramount” (Haycock, 1991, p.22). The teacher is no longer the omniscient expert, but is required to function as a facilitator of learning.



When a teacher functions as a facilitator of learning, he/she does three basic things:

- structures the learning environment
- guides student learning
- tracks and assesses student learning

(California Media and Library Educators Association, 1994).

For this paper it is not possible to go into depth with each of these basics.

However Figure 1 provides a brief summary.

Some elements of resource-based learning provide difficult challenges for the current traditional educational setting. This paper will next discuss two of these elements.

The first challenging element is the provision of access to an information-rich environment which is inherent in resource-based learning. This implies equal access for all students to a wide variety of print/non-print resources. It is critical that along with the call for restructuring, "...corresponding attention be given to equitable access to the information products and services of the future" (Lenox & Walker, 1993, p.320). In this same article, Lenox and Walker put the element of equal access in an alarming perspective:

In a world in which the price of information is spiraling, is being "privatized," and is being priced at "what the market will bear" rather than for the public good, access to information is rapidly being defined not by the need to know but rather by the ability to pay. These convergent market forces are creating a widening gap between those who can and cannot afford to pay for information at a time when information has become indispensable to everyday life in an interdependent world (p.321-322).

Figure 1. Resource-Based Learning: What Does It Look Like?<sup>1</sup>

## Resource-Based Learning: What Does It Look Like?

### Learning Resources

#### *Technology*

Video/ITV  
Filmstrips  
Audio  
Computers  
Videodiscs  
CD ROM  
Telecommunications  
Other

#### *Print*

Books  
Magazines  
Newspapers  
Textbooks  
Pamphlets  
Maps  
Other

#### *Places*

Universities  
Schools  
Libraries  
Museums  
Zoos  
Communities  
Other

#### *People*

Classroom teachers  
Library media specialists  
Parents  
Experts  
Resource people  
Other

### Resource-Based Learning



Student at center

*Uses resources to broaden learning base*

**Classroom teachers and library media specialists function as facilitators of learning:**

#### *Structure learning environment...*

- Establish learning objectives
- Select/preview resources to ensure suitability for learning/learners
- Design learning experiences
- Set task-oriented assignments
- Create engaging problems

#### *Facilitate student learning...*

- Question to stimulate thinking
- Guide students to identify their own information needs
- Prompt to facilitate understanding
- Assist to ensure that students receive help with learning when/where necessary

#### *Track and assess student learning...*

- Record student's level of cognitive processing
- Record development of information literacy skills
- Evaluate how students use learning resources
- Evaluate student achievement of learning objectives
- Evaluate products

<sup>1</sup> California Media and Library Educators Association Staff. (1993). *From Library Skills to Information Literacy: A Handbook for the 21st Century*. Englewood, CO: Libraries Unlimited, Inc., p.32.

In 1992, a national panel of experts from the organizational membership comprising the National Forum for Information Literacy, collaborated in a Delphi study that looked at Goals 2000. One objective of this panel was to specify the outcome measures of information literacy that could be correlated with the means of achieving selected Goals. In their final report to the National Forum on Information Literacy, the following recommendation was proposed:

“National/state governments will ensure that all students have equal and regular access to information by assuring that there are adequate resources at every site” (cited in California Media and Library Educators Association, 1994, p.133). It is hoped that these entities will heed this recommendation and establish information policies that will guarantee equitable access, rather than penalizing those who cannot pay for opportunities to be knowledgeable.

A second element that will provide a considerable challenge to supporting resource-based learning is the teacher. It has already been discussed how teachers are the most critical key to student attainment of information literacy. To function in the role of facilitator implies that one is information literate herself/himself. However, teachers traditionally teach as they were taught. This means that teachers themselves have been schooled in an environment in which the emphasis of education has been on content, acquiring a body of “right” information; in which teaching is talking and learning is listening; where students are passive recipients of information and learning is viewed as a product or destination.

According to Haycock (1991), "If we are serious about...resource-based learning and information literacy pervading our curricula and classrooms, teachers need opportunities for inservice training in:

- Facilitating learning
- Developing information literacy
- Collaboration" (p.21).

Haycock recommended that staff development programs be planned to integrate each of these as facets of resource-based learning, rather than focusing on each need as a separate entity. Furthermore, these programs need to be developed to extend over a period of years to allow for change. In addition, these programs need to be developed to support change by providing opportunities for teachers to master the implementation of resource-based learning through practice and feedback. The Delphi panel also recognized the importance of staff development and in its final report to the National Forum on Information Literacy, proposed the following recommendation: "State Department of Education/local school systems will develop and implement a curriculum that stresses a resource-based approach with ongoing inservices conducted to ensure that teachers have the skills necessary to facilitate resource-based learning" (cited in California Media and Library Educators Association, 1994, p.133).

When Congress passed Goals 2000 as federal legislation in 1994, they indicated a commitment to strengthening the public education system nationwide. According to Thompson (1991), "Resource-based learning can serve as the force and the source for instructional improvement needed in our schools today" (p. 27). In embracing a resource-based learning environment,

education will foster information literacy. This will replace the information dependency created by traditional schooling, where students must rely on the teacher to dispense information. Instead students will take more control of their learning, learning how to use their minds well -- knowing how to make informed decisions and thus attain Goal 3 of Goals 2000.

#### A process approach to information skills instruction

The previous section focused on the restructuring education needed to undergo in order for "... all students to learn how to process information as they apply problem solving and critical thinking skills to their school and personal lives" (Doyle, 1994, p.23). Upon restructuring..."the process of gathering and using information assumes the same importance as reading, writing, or calculating" (Pappas & Tepe, 1994, p.1). This section will focus on the key word, "process", as it examines three models that have been developed for information skills instruction.

Traditionally, information skills have been thought of as "library-dependent" skills, focusing on locating, accessing, and using sources in the library. These skills were taught out of subject context, without any formal, articulated curricular framework.

In a 1992 article, Eisenberg and Brown observed that a new approach to skills instruction had emerged, one that centered on a process approach to library and information skills. This approach is not dependent on any particular source or library. The emphasis is on developing transferable cognitive skills that should increase students' effective use of information in general as well as their use of specific libraries and resources (p.104).

Eisenberg and Berkowitz (1992) have developed one such process approach called the Big Six Skills. “The Big Six is an information literacy curriculum, an information problem-solving process, and a set of skills which provides a strategy for effectively and efficiently meeting information needs” (cited in Eisenberg & Johnson, 1996, p.7). A fundamental aspect of the Big Six Skills approach is its top-down structure. This top-down structure consists of three levels in which the concepts and skills are organized from broad to specific. “The hierarchy of skills, or levels of specificity, helps students establish an information problem-solving pattern” (Eisenberg & Berkowitz, 1992, p.28).

Level 1 is the broadest possible level at which to consider information problems. Students working at this level recognize that it is appropriate to use a general problem-solving process to solve all information problems (Eisenberg & Berkowitz, 1992).

The second level is the general information problem-solving strategy comprised of the following six skills:

- Task Definition
- Information Seeking Strategies
- Location and Access
- Use of Information
- Synthesis
- Evaluation

“Students engage Level 2 when they recognize that they have an information problem and then apply the Big Six Skills to solve it” (Eisenberg & Berkowitz, 1992, p.28).

Level 3 consists of two specific components under each of the six skills in the strategy. These components represent unique abilities that contribute to a

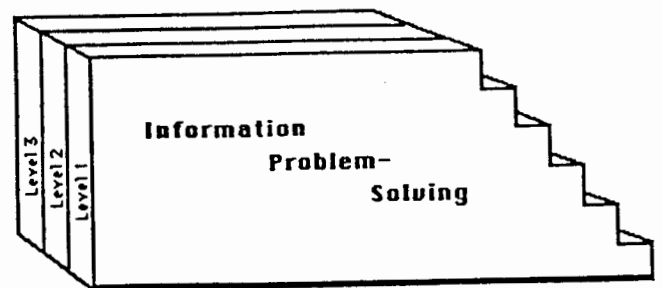
student's overall effectiveness in information problem-solving. Figure 2 illustrates the three levels of the Big Six Skills model.

According to Eisenberg and Berkowitz (1992), the top-down structure of this ... "approach is unique in that it is comprised of the skills necessary to solve all information-centered problems, and make information-centered decisions" (p.27). "When students gain competency with this set of skills, they attain the capacity to become effective lifelong users of information and, in turn, acquire the capacity for lifelong learning" (p.42).

A second model which uses a process approach is Follett's Information Skills Model. This model was co-developed by Pappas and Tepe in 1994 because they felt that two critical elements tended to be missing from the variety of existing information skills process models. Many of these models seemed to suggest all searchers follow the same pathway when in reality, for many searchers, the process is nonlinear. Also, the electronic resources available today require searching skills that differ from those used with print resources. Thus, "the Information Skills Model has been developed to provide searchers with an array of information-gathering processes and suggests they may select those which best meet their needs and use them with a sequence which differs from one searcher to another" (Pappas & Tepe, 1994, p.1).

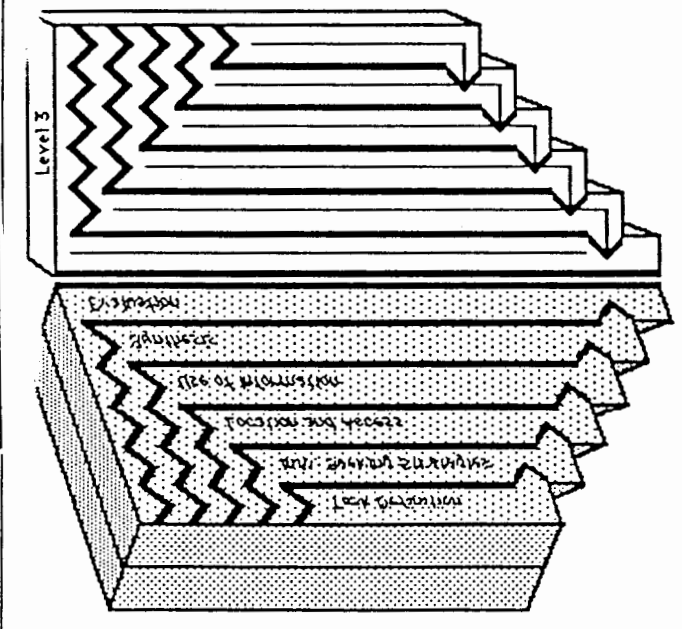
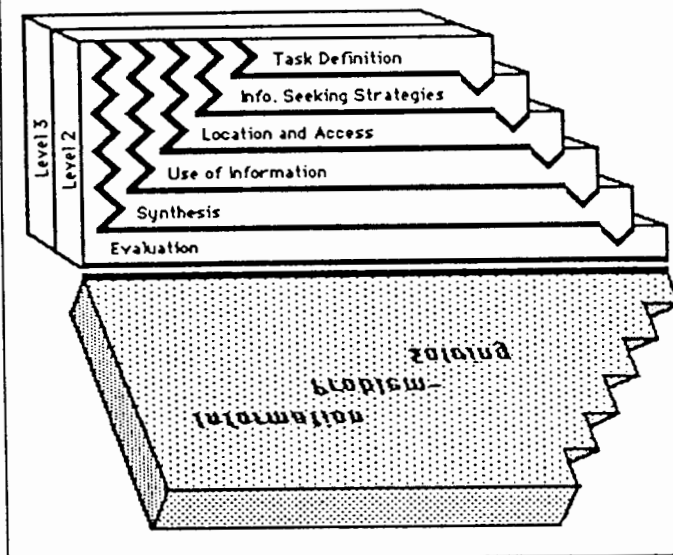
Figure 3 is a graphic format of this model which best illustrates its nonlinear approach.

Whenever students are faced with an Information problem (or with making a decision that is based on information), they can use a systematic, problem-solving process.



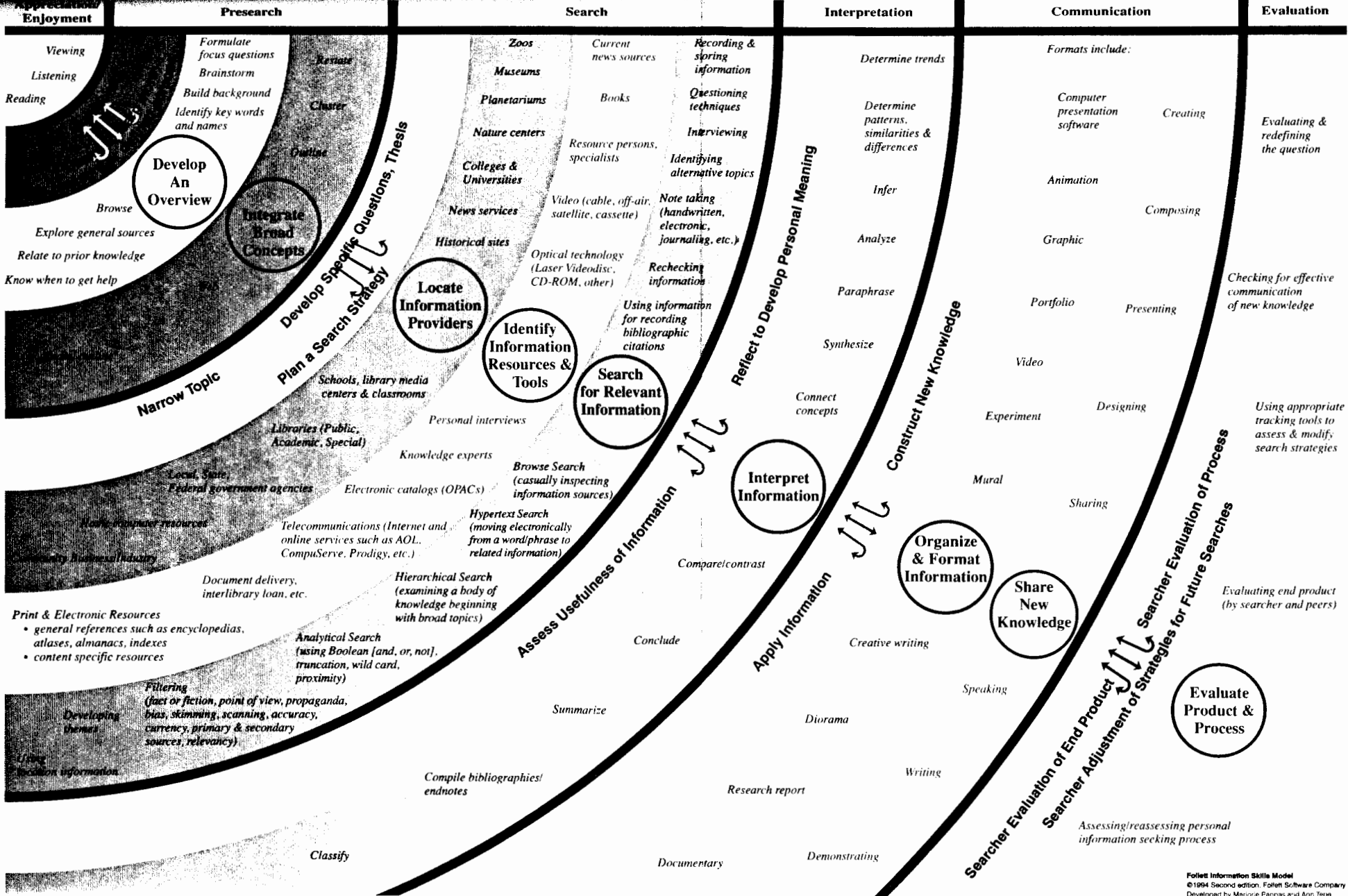
1. Task Definition: determining the purpose and need for information
2. Information Seeking Strategies: examining alternative approaches to acquiring the appropriate information to meet defined tasks
3. Location and Access: locating information sources and information within sources
4. Use of Information: using a source to gain information
5. Synthesis: Integrating information drawn from a range of sources
6. Evaluation: making judgments based on a set of criteria

1. Task Definition:
  - 1.1 Define the problem.
  - 1.2 Identify the information requirements of the problem.
2. Information Seeking Strategies:
  - 2.1 Determine the range of possible sources.
  - 2.2 Evaluate the different possible sources to determine priorities.
3. Location and Access:
  - 3.1 Locate sources (intellectually and physically).
  - 3.2 Find information within sources.
4. Use of Information:
  - 4.1 Engage (e.g., read, hear, view) the information in a source.
  - 4.2 Extract information from a source.
5. Synthesis:
  - 5.1 Organize information from multiple sources.
  - 5.2 Present information.
6. Evaluation:
  - 6.1 Judge the product (effectiveness).
  - 6.2 Judge the information problem-solving process (efficiency).



<sup>2</sup> Eisenberg, M.B. & Berkowitz, R.E. (1992). Information Problem-Solving: The Big Six Skills Approach. *School Library Media Activities Monthly*, 8, pp.28-29.





As illustrated, this model is similar to the Big Six Skills model in that it is composed of six major elements:

- Appreciation and Enjoyment
- Presearch
- Search
- Interpretation
- Communication
- Evaluation

In addition to its nonlinear approach, another major difference between the two models is the Presearch element. According to Pappas (1995), “Presearch is an important part of the information-gathering process. In presearch, students can develop an overview of a search topic, which provides them with opportunities to explore the big picture and make connections with previous knowledge” (p.35): “Presearch processes may also be useful to searchers at various stages of their search process, whenever they have a need to modify their focus” (Pappas & Tepe, 1994, p.1).

This Information Skills Model has been described ...“as a fluid and evolving process” (Pappas & Tepe, 1994, p.1). Its intent is to be used as a springboard for searchers to develop an information-gathering model reflecting their own unique searching process. Dr. Pappas (personal communication, March 6, 1997) summarized,

Many school curricula are based on the notion we can define a body of knowledge, teach it, then test students on their knowledge of that content. That is no longer possible. We are shooting at a moving target. I believe information literacy has become a critical skill in today’s curriculum... Much of our curriculum focuses on

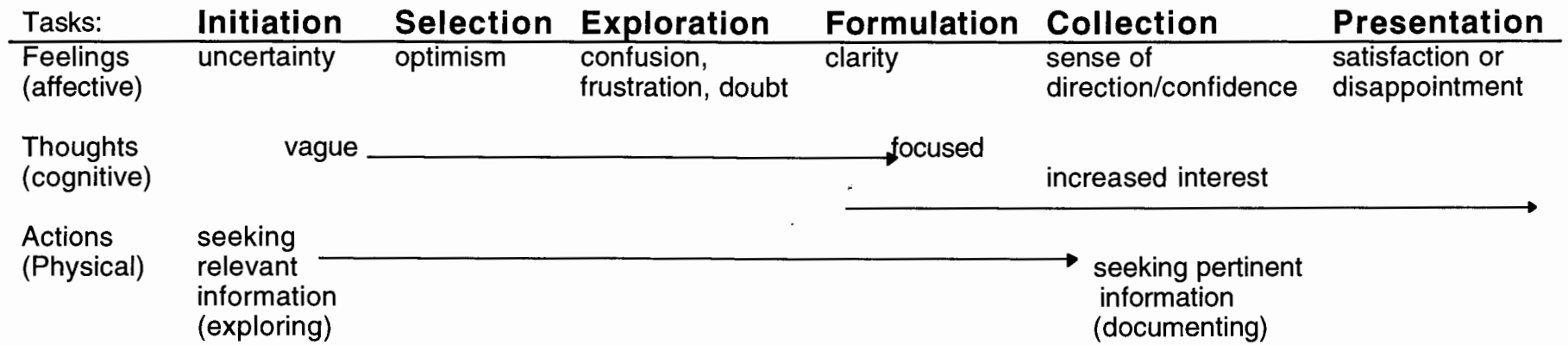
“pouring” information into students rather than requiring them to learn a process for gathering and using information to construct knowledge. The information skills model...is one example of a process approach to teaching learners the skills they require to be successful navigators in an information-rich environment, today and in their future.

Information Search Process Approach (ISPA) is the third model to be discussed. This model was developed in 1985 from the findings of five studies by Kulthau. According to Kulthau (1995), “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” (p.1). Her studies illustrated that an understanding of this constructivist process through guided, integrated activities substantially increased students’ confidence and competence in learning from information.

ISPA also consists of six stages: Initiation, Selection, Exploration, Formulation, Collection, and Presentation. The stages are named for the primary task at each point in the process. However, ISPA differs from the previous models in its inclusion of the thoughts, actions, and feelings commonly experienced in these six stages. Figure 4 illustrates these differences.

Kulthau’s studies (1995) were the first to investigate the affective aspects of the information search process along with the cognitive and physical aspects. The third stage of the process, Exploration, was found to be unexpectedly the most difficult. During this stage students experienced a sharp increase in uncertainty and a decrease in confidence.

**Figure 4. Model of the Information Search Process <sup>4</sup>**



<sup>4</sup> Kulthau, C.C. (1995). The Process of Learning from Information. School Libraries Worldwide, 1, p. 5.

As Kulthau described in a 1995 article,

The concept of uncertainty is a basic underlying principle of the ISPA. ...Uncertainty is not only to be tolerated 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 Information Search Process (p.8).

An important consideration when discussing these three models, is to examine them from a research perspective. If educators are to restructure the learning environment in order to meet Goal 3 of Goals 2000, they need to ... "be able to draw upon documented conclusions about those skills that are most important and the approaches most likely to result in success" (Eisenberg & Brown, 1992, p.103). In reviewing research on information skills instruction, Eisenberg and Brown (1992) found that, excepting Kulthau's model, the other process models have been developed without any formal research. The authors conclude that although Kulthau's findings do support a process approach, more formal research is needed to confirm or refute this initial verification.

Kulthau (1995) continued to research the process approach to information skills and its related themes. In a 1993 article, she discussed the findings of a two-year research study seeking to identify the problems or inhibitors encountered when implementing a process approach to information skills.

Those implementations that became stalled during the study cited three primary inhibitors:

1. Lack of time both for students to work through the process approach and for instructors to plan and develop team instruction.
2. Basic confusion of roles due to lack of planning time. Because there was not enough time for instructors to identify new roles, teachers and library media specialists tended to assume their traditional roles.
3. Poorly designed assignments which did not encourage the process approach. Many assignments were “added-on” rather than being an essential, integral part of the subject-area curriculum. Kulthau (1993) found that: “Even the most enlightened teachers seemed to regard library assignments as enrichment activities rather than as ways of learning essential concepts and for developing basic skills for addressing emerging questions” (p.14).

The study also sought to identify the enablers or elements of success.

These turned out to be more difficult to identify. A longitudinal case study was conducted by Kulthau (1993) to further investigate those basic characteristics of a successful implementation and the following four enablers emerged:

1. A team approach to teaching with administrators, teachers, and library media specialists playing essential roles in the instructional team.
2. A mutually held constructivist view of learning compatible with the process approach that provided the foundation for actively engaging students in problem-driven inquiry.

3. A shared commitment to teaching skills for lifelong learning and for motivating students to take responsibility for their own learning.
4. Competence in designing activities and strategies to improve student learning. (p.16)

Kulthau (1993) concluded that enablers are not the opposite of inhibitors. To simply remove the inhibitors does not guarantee successful implementation. Educators need to address both the enablers and the inhibitors to implementation of a process approach to information skills instruction. By doing so, restructured programs will likely experience success.

## CHAPTER THREE

### Conclusions and Recommendations

Information, rather than the production of goods, is now the dominant force of society. To function productively in this Information Age requires skills that go beyond traditional print literacy. One must now have the ability to access, evaluate, and use information from a variety of sources. To respond effectively to this ever-changing, information-rich environment, one must be information literate.

Schools must respond to this change in society and the changing needs of students. "Schools must seek ways to empower children with the knowledge, skills, and attitudes to exercise personal control over information acquisition" (Foster, 1995, p.174). No longer can the emphasis of education be on content, acquiring facts, concepts, terms, symbols, and formulas. Learning can no longer be viewed as an end product. The role of the teacher as a transmitter of information and the students' role as passive recipients are no longer feasible. These traditional educational strategies and teacher/student roles, which were first conceived in the early part of the twentieth century during America's industrial period, are felt to be antiquated.

What is needed is a restructuring of the learning process, the learning environment encompassing that process, and the relationship between the student and the teacher which is central to that process (Haycock, 1991). In this way, American education becomes aligned with the new information landscape. This restructuring recognizes the fluidity of information and thus shifts the instructional emphasis from acquisition of a product to execution of a dynamic



process (Lenox & Walker, 1994). Learning and teaching become integrated, active, and interactive (not passive, fragmented). Teachers and library media specialists form collaborative partnerships to function as facilitators of lifelong learning, rather than keepers of an arsenal of scarce information (Rader, 1996). Education becomes resource-based rather than content-based.

To assess whether one's school is operating with an information literacy perspective, it is recommended that one complete the audit found in Appendix A (Adams & Bailey, 1993). If one answers no to five or more questions, then one needs to seriously look at restructuring. The Information Literacy Standards (American Library Association, 1996) found in Appendix B and the Information Literacy Curriculum Guidelines (Independent School District #77, 1996) found in Appendix C are suggested frameworks to assist in the restructuring process. If one answers yes to eight or more questions, then one's school is well on its way to helping students become information literate.

It is further recommended that continuing research be conducted in the area of information skills. More formal research is needed to assess the full effectiveness and impact of the process approaches described in this paper. It is recommended that this research be helpful to the educators in the field by providing more than just statistics and data manipulations. Researchers should help bridge the gap between research and practice by stating directly and succinctly what the research does and does not show and what the implications are for day-to-day instruction of information skills (Eisenberg & Brown, 1992).

The focus of this paper has been on the concept of information literacy and its implications for education. The discussion has purposely been kept broad rather than specific to provide the motivation for and opportunity to

seriously reconsider the goals and structure of education. It is recommended that further discussion examine in detail the structural components of restructuring. It would also do well to explore where education presently is with respect to the desired outcomes of restructuring. It is felt that continuing discussion in these areas will lead to a successful transition from traditional education practices to pedagogical techniques and organizational realignments that give full access to all the challenges and wonders of the Information Age.

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## APPENDIX A

### Information Age Teaching-Learning Audit:

#### The Emerging Technologies \*

- |                          |     |                          |    |   |
|--------------------------|-----|--------------------------|----|---|
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 1. Our students are active participants in their own learning (i.e., student-centered learning).  |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 2. Our students' educational experiences mirror daily life, reality, or the world of work (i.e., authentic learning).                                       |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 3. Our students display enjoyment and enthusiasm in their learning experiences.   |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 4. Our students are learning from technology-driven curriculum materials that provide current, diverse, and rich information.                               |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 5. Our students access information using a wide variety of emerging technologies (e.g., computer, modem, CD-ROM, interactive videodisc, television, etc).   |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 6. Our teachers and students are co-learners in the process of lifelong learning.   |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 7. Our teachers use performance-based assessment to measure and record student achievement (e.g., learning product creations, electronic portfolios, etc.). |
| <input type="checkbox"/> | Yes | <input type="checkbox"/> | No | 8. Our teachers use multiple technology-based learning models to facilitate learning (e.g., electronic  |

cooperative learning, electronic collaborative learning, electronic simulation, multimedia learning, etc.).

Yes     No    9. Our teachers and students believe and model a mentor-apprentice relationship that places learning in a context of anyone learning anything, anytime, anyplace, and anywhere.

Yes     No    10. Our teachers and students believe in information literacy curriculum that focuses on accessing, analyzing, applying, and creating information using electronic or technology-based learning models.

Yes     No    11. Our teachers and students understand, appreciate, embrace nonlinear learning.

\* Emerging technologies are defined as tools that include microcomputers, laptops, mainframe, networking, on-line databases, facsimile transmission, distance learning, satellite, cable TV, microwave, modems, videodisc, CD-ROM, electronic card catalog, computerized circulation, etc.

## **APPENDIX B**

### **Information Literacy Standards for Student Learning**

Prepared by the AASL/AECT National Guidelines Vision Committee

Draft #5

October 7, 1996

Today's student lives and learns in a world that has been radically altered by the ready availability of vast stores of information in a variety of formats. The learning process and the information search process mirror each other: students actively seek to construct meaning from the sources they encounter and to create products that shape and communicate that meaning effectively. Developing expertise in accessing, evaluating, and using information is in fact the authentic learning that modern education seeks to promote.

AASL and AECT are partnering to develop new guidelines for school library media programs and professionals that will contain information literacy standards for student learning. The standards are the litmus test by which school library media programs and professionals can define their roles and responsibilities to the learning community, and are the first component of the committee's work to reach final draft form.

The work of the Vision committee on these standards has involved research to define these concepts and exploration of other national association standards to correlate learning concepts. Multiple reviews by both Boards, committee members, and a large expert panel from the greater educational



community have also taken place. You, a member of AASL and a professional, are now asked to review this draft carefully, and to send the committee your thoughts.

Please read these standards carefully and respond with the attached questionnaire. We welcome your comments. ---- Betty Marcoux, chair

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The following three categories, nine standards, and twenty-nine indicators describe the content and processes related to information that students must master to be considered well educated. The items related to information literacy describe the core learning outcomes that are most obviously related to the services provided by school library media programs. The items related to the other two other areas ---- independent learning and social responsibility ---- are grounded in information literacy and describe more general aspects of student learning to which school library media programs also make important contributions.

The latter two categories build upon the first so that, taken together and pursued to the highest levels, the standards and indicators present a profile of the information literate high-school graduate: one who has the ability to use information to acquire both core and advanced knowledge and to become an independent, lifelong learner who contributes responsibly and productively to the learning community. The standards and indicators themselves are written at a level of generality that assumes that individual states, districts, sites, and school personnel must provide the level of detail necessary to apply them across multiple sources and formats of information and to the developmental, cultural, and learning needs of all the students they serve.

## **Category I: Information Literacy**

The student who is information literate:

Standard 1: Accesses information efficiently and effectively, as described by the

following indicators:

1. recognizes the need for information;
2. recognizes that accurate and comprehensive information is the basis for intelligent decision making;
3. formulates questions based on information needs;
4. identifies a variety of potential sources of information;
5. develops and uses successful strategies for locating information.

Standard 2: Evaluates information critically and competently, as described by

the following indicators:

1. determines accuracy, relevance, and comprehensiveness;
2. distinguishes among facts, point of view, and opinion;
3. identifies inaccurate and misleading information;
4. selects information appropriate to the problem or question at hand.

Standard 3: Uses information effectively and creatively, as described by the

following indicators:

1. organizes information for practical application;
2. integrates new information into one's own knowledge;
3. applies information in critical thinking and problem solving;
4. produces and communicates information and ideas in appropriate formats.

## **Category II: Independent Learning**

The student who is an independent learner is information literate and:

Standard 4: Pursues information related to personal interests, as described by the following indicators:

1. seeks information related to various dimensions of personal well-being, such as career interests, community involvement, health matters, and recreational pursuits;
2. designs, develops, and evaluates information products and solutions related to personal interests.

Standard 5: Appreciates and enjoys literature and other creative expressions of information, as described by the following indicators:

1. is a competent and self-motivated reader;
2. derives meaning from information presented creatively in a variety of formats;
3. develops creative products in a variety of formats.

Standard 6: Strives for excellence in information seeking and knowledge generation, as described by the following indicators:

1. assesses the quality of the process and products of one's own information seeking;
2. devises strategies for revising, improving, and updating self-generated knowledge.

## **Category III: Social Responsibility**

The student who contributes positively to the learning community and to society is information literate and:

Standard 7: Recognizes the importance of information to a democratic society,  
as described by the following indicators:

1. seeks information from diverse sources, contexts, disciplines, and cultures;
2. respects the principle of equitable access to information.

Standard 8: Practices ethical behavior in regard to information and information  
technology, as described by the following indicators:

1. respects the principles of intellectual freedom;
2. respects intellectual property rights;
3. uses information technology responsibly.

Standard 9: Participates effectively in groups to pursue and generate  
information, as described by the following indicators:

1. shares knowledge and information with others;
2. respects others' ideas and backgrounds and acknowledges their contributions;
3. collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions;
4. collaborates with others, both in person and through technologies, to design, develop, and evaluate information products and solutions.

### **Thoughts about the Standards**

- What do you particularly like about these student centered standards?
- What other comments do you have regarding these student centered standards?

- What materials/staff development opportunities will help you implement these standards?
- Any additional comments?

Send your responses to: AASL/AECT Vision Committee

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## **APPENDIX C**

### **Mankato Schools Information Literacy Curriculum Guidelines**

These guidelines have been developed to help insure that all graduates of Mankato schools will have a variety of experiences using information and technology. These experiences will allow students to demonstrate mastery of a comprehensive group of specific skills.

Teaching information skills is the joint responsibility of the building library media specialist and the classroom teacher. Information and technology skills are most meaningful when taught within a subject area, within an interdisciplinary unit, or within a unit which addresses an authentic, real-life need or problem. Careful planning and cooperation among all teachers and media specialists are essential.

The information skills curriculum is centered around large projects at each grade level during each school year. These projects:

- use a version of the Big Six (Eisenberg and Berkowitz) information processing model,
- have clearly stated objectives from I.S.D. 77 Information Skills curriculum, which in turn support Elements Five and Nine of the State Graduation Rule
- Standard Five for Grades 3, 5 and 8
- Standard Five for Grades 9-12
- are assessed in a complete and objective manner, (sample assessment)
- use technologies and identified productivity software

- and build cumulatively on skills learned the previous year.

An individual learning profile for each student will be maintained by the media specialist and classroom teacher to document which skills have been attained and how that attainment was demonstrated.

The objectives which follow are to be mastered by all I.S.D. 77 students. Potential employers of Mankato public school graduates should be confident that their new employees will know how to identify information needs, locate relevant information in an efficient manner, understand and evaluate information, and use the information to solve a problem, complete a task, or be able to communicate that information clearly to others. Graduates will be able to use technology effectively in the information problem solving process.

Numbers in brackets below correspond with the Minnesota High Standards . Items preceded by an S are from the 9-12 Standards.

Standard Five for Grades 3, 5 and 8

Standard Five for Grades 9-12

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## **1. Task Definition**

[5.G3.1] [5.G5.1 - 2a] [5.G8.2 - 1a] [S5.3.1-P1] [S5.4.1-P1] [S5.5.1-P1] [S5.5.2-P1] [S5.12.1-P1a]

### **1.1 Define the task (the information problem)**

1.1.1 Learners will develop the question or problem to be explored

1.1.2 Learners will analyze their information needs in terms of the question or problem to be explored.

### **1.2 Identify information needed to complete the task**

## **2. Information Seeking Strategies**

[5.G8.2 -1e] [S5.1.1-S1] [S5.1.1-D1] [S5.3.1-P2] [S5.4.1-P2, P3] [S5.7.1-P2]

### **2.1 Brainstorm possible sources**

2.1.1 Learners will assess the value of various types of resources for data gathering. These resources may be indexes to information, communication tools, community information resources, and/or technological information systems such as on-line data banks.

- resources in the school media center
- resources in other libraries
- human resources
- electronic resources
- original research

### **2.2 Select the best sources**

2.2.1 Learners will recognize various resources and select those appropriate to meet individual needs.

2.2.2 Learners will distinguish which resources are relevant to their task.

2.2.3 Learners will select factual materials which are:

- accurate
- authoritative
- current
- multi-culturally sensitive
- gender fair
- understandable
- age/ability level appropriate



- format and hardware appropriate

2.2.4 Learners will recognize and use many genres and forms of literature including autobiography, biography, comedy, easy/picture book fiction, mystery, detective, historical fiction, romantic fiction, fantasy, science fiction, Western fiction, social/personal fiction, mythology, folk tale/fairy tale/legend, interactive fiction, drama, short story, novella, novel, poem, satire, parody, critical essay, documentary, editorial, news story, feature story, and travelogues.

2.2.5 Learners will distinguish between relevant and irrelevant resources.

2.2.6 Learners will distinguish between reliable and unreliable resources.

### **3. Location and Access**

[5G3.1-1a] [5G5.1-2b] [5G8.2-1b] [S5.3.1-P3] [S5.5.1-P2]

#### **3.1 Locate sources**

3.1.1 Learners will locate the appropriate resources and technologies.

within the school library media center, and understand their function and organization, e.g., fiction, non-fiction,

- reference, periodicals, newspapers, microfiche, computers, filmstrips, audio-recordings, films, videotape, easy/picture book, professional materials, equipment
- outside the school library media center

3.1.2 Learners will choose the appropriate activity area to complete a task: e.g., reading, researching, listening and viewing, producing, hearing stories, circulating materials and equipment, conferring in small or large groups, computing, and teleconferencing.

3.1.3 Learners will know the roles and expertise of the people working in the school media center and other places where they might obtain information.

3.1.4 Learners will recognize the limits of available information/materials at a specific location.

3.1.5 Learners will identify the arrangement of a wide variety of cataloging and organizational systems and use them to locate information, e.g., electronic catalogs, periodical and newspaper indexes, vertical file, Internet search tools, electronic databases, etc.

3.1.6 Learners will know and be able to use basic reference materials, print, non-print and on-line, including

- encyclopedias
- general and specialized dictionaries
- biographic reference
- maps, atlases, and globes
- thesauri
- almanacs and fact books

## **3.2 Find information within the resource**

3.2.1 Learners use a systematic approach to get information that is relevant to a particular topic.

3.2.2 Learners will know that most resources have an organizational system which allows them to find both specific and general information. These systems include indexes, tables of contents, user's instructions, legends, boldface and italics, graphic clues, cross references, time lines, thesauri indexes, hypertext links, knowledge trees, etc.

3.2.3 Learners will know and use parts of books, electronic documents, spreadsheets, databases, etc.

#### **4. Use of Information**

[1G3.2] [1G5.1-1,2,4] [1G5.2-1,2] [S5.3.1-P4] [S5.4.1-D1, P5, P6] [S5.5.1-P3, P4]

##### **4.1 Engage in the source (read, hear, view, touch)**

4.1.1 Learners will attend to live and recorded presentations.

4.1.2 Learners will operate the technology needed to access the information including computer operating systems, video players, tape players, etc.

4.1.3 Learners will recognize and interpret media messages, including the persuasive methods inherent in some media messages.

4.1.4 Learners will distinguish between statements of inference, fact, and opinion

4.1.5 Learners will identify biases and value judgments

4.1.6 Learners will identify points of view in primary and secondary sources

4.1.7 Learners will recognize inadequacies or omission in information

4.1.8 Learners will recognize logical errors

##### **4.2 Extract relevant information**

4.2.1 Learners will identify central elements

4.2.2 Learners will classify information through techniques such as grouping and labeling

4.2.3 Learners will make inferences from data

4.2.4. Learners will identify cause and effect relationships

4.2.5. Learners will differentiate between causation and correlation

4.2.6 Learners will identify stated and unstated assumptions

4.2.7 Learners will summarize information

4.2.8 Learners will record the source of information

## **5. Synthesis and presentation**

### **5.1 Organize information from multiple sources**

[5.G3.1-2,3,4;] [5.G5.2-1c, 1d, 1e] [5.G8.2-1c,1d,1f] [S5.3.1-P4] [S5.4.1-P7]

5.1.1 Learners will efficiently organize and process information using these applications:

- note taking and outlining by hand
- note taking and outlining with a word processor
- construction of original databases
- construction of original spreadsheets
- computer generation of graphs and charts

5.1.2 Learners will use summarized information to:

- answer questions
- test hypotheses
- draw conclusions from specific examples
- offer solutions to problems
- clarify issues
- make predictions
- ask for actions

### **5.2 Present the information**

[2.G3.1] [2.G5.1] [2.G8.1-3] [S5.2.1-P2e] [S5.3.1-P5] [S5.5.1-P5]

5.2.1 Learners will create an original production/presentation/report that:

- is effectively organized
- uses the correct production techniques

- is multi-cultural and gender-fair
- is appropriate for the intended audience
- is aesthetic and creative in its design
- has proper documentation of sources cited

5.2.2 Learners will work cooperatively with other students in creating a production by recognizing and completing specific tasks a part of the team effort.

5.2.3. Learners will be able to effectively use these items to share or present information: [9.G3.1] [9.G5.1] [9.G8.4]

- word processing
- desktop publishing
- computerized presentation programs
- charts and poster creations
- hypermedia and multimedia production
- video and audio production
- hand and computer-generated graphics and art
- hand and computer generated graphs and charts
- telecommunications and telecomputing products including e-mail messages, downloadable files and html pages

## **6. Evaluation** [S5.4.1-P8]

### **6.1 Judge the process (efficiency)**

### **6.2 Judge the product (effectiveness)**

6.2.1 Learners will evaluate the effectiveness of the communication efforts by using predetermined criteria.

6.2.2 Learners will analyze the evaluation results to improve their communications through developing evaluation criteria and doing self and peer evaluations

### **6.3 Judge the ethical use of information**

6.3.1 Learners will voluntarily apply legal principles and ethical conduct related to information technology such as:

- copyright
- plagiarism
- telecomputing etiquette
- acceptable use of resources

## **7. Basic Skills**

7.1. Learners will know basic operations, terminology, and proper care procedures for a variety of information technologies.

7.2 Learners will successfully transfer previously learned information technology concepts, applications, and skills to new, modified, or related information technology and other curriculum areas.

7.2.1. applying common concepts of all computer operations regardless of platform or computer brand.

7.2.2. applying common concepts of all productivity tools regardless of software title or platform.

7.2.3. connecting and operating the components of any audio, video, or personal computer system, such as the monitor, video tape recorder, compact disc player, and audio receiver of a home entertainment center

7.2.4. applying productivity applications to complete a task in any school subject, work task, or personal need.

**7.3. Learners will know the policies and procedures of the school, library and community which pertain to information and technology resources**

7.3.1 Learners will understand and practice the circulation and borrowing procedures for print, non-print and equipment.

7.3.2 Learners will identify and demonstrate actions which allow all users learning opportunities and will generalize that when media centers provide for many users, everyone must operate under established policy and operating procedures.

**7.4 Learners will recognize the impact of technology on daily life and work.**

**7.5 Learners will develop life-long reading habits and positive attitudes toward reading**

7.5.1 Learners will choose suitable materials to their reading ability, cognitive ability, and personal interests

7.5.1 Learners will know that literature and software awards are given for recognized quality including:

- Caldecott Award
- Lovelace Award
- Newberry Award

7.5.2 Learners will have the opportunity to participate in reading contests and promotions.