A Proposed Model for Diagnosing Information Needs

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Promoting information literacy is central to the mission of the school library media program and to the three roles of the school library media specialist identified in Information Power: information specialist, teacher, and instructional consultant. In each of these roles, the library media specialist attempts to fulfill the mission of the library media program: “To ensure that students and staff are effective users of ideas and information.

To that end, the library media specialist must engage a fundamental professional skill—diagnosis of information need—before suggesting a course of action. This paper explores the concept of diagnosis, suggests implications for practitioners and researchers, and prepares a theoretical model for studying diagnosis.

The Role of the Professional

A professional applies knowledge and specialized information that results in a specific service. The role of any professional—whether it be physician, librarian, teacher, or financial planner—is that of diagnosing needs, prescribing a service that meets those needs, implementing that service, and evaluating the outcome of this interaction. In most professions, this process is accomplished at two levels: with individuals and with groups, as indicated in the table below.

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This process, as it applies to an information professional, is based on the medical model for diagnosis. The reader is urged not to dwell on the different terms used to distinguish the diagnostic processes for individuals and groups; this terminology is used merely to emphasize the distinction between individual and group services.
**Diagnosis/Analysis**

The professional must be able to assess the information needs of clientele at two levels: first, by analyzing the characteristics of the community served; and second, by analyzing the needs of specific individuals when and where they seek information from the library media center.

The purpose of community analysis—the first level of analysis—is to provide the professional, as manager, with specific data about the community and its residents. The knowledge acquired through a systematic process of data collection and analysis will enable the library media specialist to understand the environment in which the library media center operates. The school, too, is a community that must be analyzed to determine the needs of the various groups. An understanding of the community and the school will provide a conceptual framework for customizing collections, services, and space allocations. This level of analysis is a critical first step in customizing library media service for individuals and groups within the school, and much literature exists on the assessment of user needs from the group perspective. For more detail on needs assessment consult Greer and Hale.

The second level of analysis is the one-on-one interaction with a user at the point when he or she has decided to seek information. The professional must diagnose the user’s information needs as the first step in the professional/client interaction. At this point, the professional initiates a diagnostic process with the client and accepts responsibility for the outcome. This interaction must begin with the broad questions of “what, why, how, when, and where” and then narrow to match the professional’s perceptions of such client characteristics as level of literacy, cognitive style, and social construction of reality. Once this level of needs assessment is completed, the professional proceeds to the next stage of the service cycle: prescribing or recommending the source or sources from which the appropriate information may be acquired.

**Prescription/Recommendation**

The professional, in a one-on-one relationship with a client, will prescribe appropriate information sources to satisfy the diagnosed need. On the other hand, the professional as manager approaches the diagnosis/prescription process from an organization perspective—intending to serve not the needs of a single person, but rather the entire population within the library service area. The needs assessment is an analysis of aggregate data about the population of the service area, and it is used to create an organization customized in its design, collections, and services to fit the characteristics, behaviors, and idiosyncrasies of that specific population. Conclusions from this analysis can lead to information decisions about such specifics as the size and scope of collections and services or the number and type of video- and audiocassettes in the collection.

**Treatment/Implementation**

The treatment or implementation is the organization and application of the service that has been prescribed. At the individual level of service, the treatment brings the client and the needed information together. This requires a knowledge of various information sources and services that
are available within the system, as well as those located elsewhere. With the advancement of more complex and sophisticated technology, the library media professional must be aware of

- the array of information sources available; the “best use” of a particular information package for meeting client needs;
- the preferred formats of the client; and
- the information needs of the client.

This phase of professional service relies heavily on the diagnosis in order to determine client preferences and information needs. As a manager, the library and information professional organizes a service that addresses the information needs of a group, employing knowledge of the group’s characteristics to provide the information, staff, and facilities to offer the service.

**Evaluation**

After the information service has been implemented, the outcome must be evaluated in terms of clientele satisfaction. An unsatisfactory resolution of the original need should trigger a repetition of the entire cycle. The second cycle may amend a part of the sequence or may require an entirely new approach. In a reference situation, for example, the library media specialist would observe and query the client after presenting information to assess its appropriateness. Likewise, a service should be evaluated and modified according to the findings of an evaluative process. Similarly, allocation of organization resources for specific purposes should be evaluated after implementation. Methods for collecting and analyzing data for purposes of evaluation can range from simple verbal inquiries to sophisticated quantitative and qualitative analyses, depending on the circumstances.

Whether applying this process of prescription/analysis, diagnosis/recommendation, treatment/implementation, and evaluation to an individual or group, a critical component is the diagnosis of the individual’s need, preferences, and cognitive style. This aspect of the professional’s role is extremely important, yet how is this role treated in professional literature?

**The Diagnostic Process**

Diagnosis of information need typically occurs through a communication process with the individual information user. Usually called “the reference interview,” this meeting enables the professional to identify the library user’s needs and to recommend a source, or sources, of information. According to Katz’s Introduction to Reference Work, the standard text on the subject:

The primary purpose of the reference interview, whether it be brief or long, is to help the librarian answer some questions. Answers to the questions clarify the problem(s) of the user and bring to the user the type and amount of information needed.

Katz also identifies what “the librarian wants to learn.”

1. What kind of information is needed?
2. How much is needed—a simple fact, a book, or a mass of materials?
3. How is the information going to be used—for a talk, to answer an idle question, as a beginning for research?
4. What degree of sophistication is required—a beginning article or an advanced monograph?
5. How much time does the user wish to spend finding and then using the information?
6. When is the information needed?

This view of the reference interview provides a good beginning to the process of diagnosing information needs; however, it concentrates on the sources of information with regard only to a user’s perception of need (questions 1 and 2), use (question 3), level of sophistication (question 4), and time constraints (questions 5 and 6). While Katz provides a systematic approach, his reference interview technique does not take into account the individual differences of clients, such as cognitive style and preferences for format, nor does it provide enough data for a thorough diagnosis by the information professional. The client is expected to provide most of the data required by the diagnosis.

The reference interview usually has not been viewed from the perspective of the user. As noted recently by Kuhlthau, information systems typically have been guided by the bibliographic paradigm, which views information use from the perspective of the system. The reference interview has been the subject of numerous studies by researchers in library and information science. Bunge’s review of literature provides a historical perspective, and Dervin, noted below, has applied communication theory to the question negotiation process.

The issues to be explored are:

• How can this interview process be improved?
• How can the library media specialist better address the unique information requirements of the individual client?
• Can information literacy be promoted with individuals by diagnosing information needs more effectively and using results of that diagnosis for recommending information sources?

The reference interview as described can be converted into a diagnosis of information need used with a thoughtful approach that employs knowledge of human behavior in the individual’s use of information. Diagnosis may occur at various points in a client’s search and use of information. The client’s perspective and proposed use of information must be analyzed carefully in order to discern better what the client considers “the right answer” to questions or needs. The communication process is more than the verbal exchange already described. Because much communication is nonverbal, methods of involving nonverbal communication in the process must also be explored.

An Overview of Information Psychology

Professional knowledge enables the library media specialist to diagnose information needs, recommend information sources and services, implement those recommendations, and evaluate them. The specialized knowledge required of information professionals has been articulated by
Greer as a conceptual framework for the discipline of information science, which is multidisciplinary. Several fields of study encompassed by the discipline of information science address the various roles of information professionals:

- Information psychology—how individuals seek, acquire, organize, process, utilize, and store information;
- Sociology of information—how society and groups within society create, produce, disseminate, organize, diffuse, utilize, preserve, and discard information;
- Information organization management—how to create and manage an organization designed to support and enhance the information transfer process; and
- Information engineering—how to design databases of library collections and other information systems customized to meet the needs of a client population.

Although each of these fields is distinctive enough to be considered separately, interrelationships among them are profound, and no single field can be understood without consideration of the impact of the other fields upon it. Of special interest in the consideration of information literacy is information psychology. This study of human behavior draws heavily upon the behavioral sciences, similar to the way in which educational psychology applies behavioral theory to the learning environment.

**Diagnosing Information User Behaviors**

The model for information-nation user behaviors is found in the framework for information psychology already noted. The library media specialist may be called upon to diagnose information need at any of the following points in the client’s acquisition of information:

- Awareness of need: A client determines a need for information that may be for educational, recreational, decision-making, or research purposes. The first stage in the information use behavioral process is becoming aware of a need for information.
- Action decision: After becoming aware of a need, a client may elect to act by seeking to satisfy that need.
- Strategies for search: Once they decide to search for information, clients employ their own unique strategies for locating that information. A plan of action is formulated, usually very informally.
- Behaviors in search: Search strategies are enacted by the client. These behaviors might include perusing indexes, consulting with a librarian, asking a friend, etc.
- Evaluation: Results of the search are evaluated by the client to determine if the search should be modified, continued, or terminated.
- Assimilation: If the results of the search are deemed satisfactory, the information may be assimilated into the client’s information system e.g., notes may be taken, or the information may be copied or input into a word processor.
- Memory: If the information is pertinent, the client may memorize it; the information thereby becomes a part of the individual’s knowledge.
- Utilization: If learned, the information may result in behavioral changes that cause the client to use the information.
At any of these stages, the client may consult with a library media specialist for help in seeking information. The library media specialist must identify the stage of information seeking as part of the diagnostic process, using knowledge based on the following theories in order to complete the diagnosis.

**Theory Base for Diagnosis**

Information psychology applies theories of human behavior to the information transfer process. Cognitive development theories, particularly those of Piaget, have application to the diagnostic process. Knowing the stages of cognitive development (such as concrete operations at about ages seven to twelve, or formal operations at about ages eleven to fifteen) would enable the professional to suggest different levels of information sources. The age of an individual is an indicator of cognitive development, but Piaget points out that individuals can progress through the cognitive stages at vastly different rates. While Piaget’s work is useful for understanding the cognitive development of children and young adults, knowledge of the developmental stages of adults is helpful for understanding their interests and life stages. The work of Levinson and Sheehy, for example, suggest patterns of development experienced by adults. Research and theory on learning styles can contribute to the understanding of information needs and information-nation processing for students in school library media centers. For example, the work of Titus, Bergandi, and Shryock suggests that learning styles of adolescents differ from those of adults.

Brain research, especially the study of brain hemisphericity, has application to understanding cognitive styles. Dominance of one side of the brain can suggest learning preferences (e.g., linear/holistic, symbolic/concrete, sequential/random, logical/intuitive, verbal/nonverbal), along with implications for preferred types of learning modes-visual, auditory, or experiential. Application of cognitive theory is explored in the work of Edwards and Vitale.

Psychological type is also related to information processing preferences. Based on Carl Jung’s theory of personality types, the Myers-Briggs Type Indicator (M-BTI) has been developed to indicate four basic psychological dimensions:

- **Energizing**—how and where a person gets energy.
- **Attending**—what a person pays attention to when gathering information.
- **Deciding**—what system a person uses to decide.
- **Living**—what type of life a person adopts.

Each of these dimensions has two possible choices:

- **Energizing**—introversion and extroversion. Introversion relates to drawing energy from a person’s inner world of emotions, impressions, and ideas. Extroversion relates to drawing energy from outside oneself in the world of people, activities, and things.
- **Attending**—sensing and intuition. Sensing is the preference for paying attention to information that is derived from the five senses. Intuition refers to the preference for paying attention to an intuitive “sixth sense” and noting what could be, rather than what is.
• Deciding—thinking and feeling. Thinking relates to a preference for organizing information to make decisions in a logical, objective manner. This preference is similar to left brain-dominant preferences. Feeling is related to organizing information in a personal, values-oriented manner, similar to the behavior of a right brain-dominant person.

• Living—judgment and perception. The judgment preference suggests a person who lives in a planned, organized way. Perception suggests a preference for flexibility and spontaneity.

Life-types theory suggests tendencies toward behavior. People may consciously alter their preferences but tend to rely on their natural inclinations. Type preferences can be determined by using the M-BTI, which is easily administered and scored. A person’s preferences can be used to suggest search strategies, sources of information, and planning of information service. Grindler and Stratton have applied type indicator research to teaching and learning styles as an example of application for diagnosis.

Role theory also provides a theoretical base for understanding information needs in the process of diagnosis. The key concept in role theory is that roles suggest certain patterns of expected behavior. Each person assumes many roles but exhibits certain behaviors accompanying each role. Biddle gives examples:

Children are constantly enjoined to act in a more grown-up fashion; new recruits into the armed services must team roles of deference and deportment; the young lady who is to make her debut will adopt the style and manners of the event; predictable patterns of behavior appear within the school, the factory, the office, the sports arena... the summercamp. Some of us, in fact, spend a good deal of time talking about roles. Parents, teachers, psychiatrists, social workers may sometimes feel as if there are no other topics of conversation at the end of their working days.

Another attribute of role is its limited context. No single role is always exhibited by an individual, whether at work or at home. A role such as teacher, parent, friend, golfer, spouse, etc., may be dictated by a variety of environmental factors. Role, then, produces expectations for behavior, and there is danger of stereotyping an individual into a specific role. Stereotype may be defined, in terms of role theory, as “... the degree to which an expectation is based on hearsay rather than evidence.” Consequently, the application of role theory requires an awareness of behaviors that have been observed and associated with role—not merely those behaviors that are believed to be associated with it.
Expressed another way, role suggests behavior that is considered acceptable for membership in a certain social group. Membership in that group requires learned behaviors, knowledge, and attitudes. If a person is known to be a member of a particular group, that person can be expected to possess certain knowledge and have the ability to perform certain tasks. For example, membership in the school library media profession assumes certain knowledge, attitudes, and skills for all who assume that role. Therefore, by identifying an individual by role, one can make certain assumptions about that individual’s information needs in that role.

While role theory may be applied to people who are members of various groups, the individual still possesses a unique perspective. Symbolic interactionists have studied the constant interface between the individual and the group. The individual information user represents a confluence of individual preferences and abilities for information processing, combined with a set of roles. Therein lies the challenge in diagnosing information need: to determine not only what information is needed but also what information package can be prescribed that addresses the preferred information processing style of the individual.

Information theory has been developed for library and information professionals. Among the theories with implications for the diagnostic process are those of Kuhlthau and Dervin. Kuhlthau’s research on the search process contributes both to the development of theory in information psychology and to diagnosis. She has defined the search process as:

a complex learning process involving thoughts, actions, and feelings that takes place over an extended period of time, that involves developing a topic from information in a variety of sources, and that culminates in a presentation of the individual’s new perspective of the topic.
Kuhlthau’s findings regarding the feelings, thoughts, and actions of students during the search process can be very helpful to library media specialists in more effectively diagnosing information-nation needs and strategies, depending on the student’s progress in the search.

Dervin’s use of communication theory has resulted in the application of “neutral questioning” to the reference interview. Dervin’s perspective is “. . . that information does not have an independent existence but is rather a construct of the user.” Dervin proposes open-ended questions to aid in understanding both the purpose and use of the information requested by the client and how the user will “make sense” of the information.

**Implications for Practitioners**

Library media specialists work as teachers, information specialists, and instructional consultants with individual students. In order to diagnose information need and recommend appropriate information sources or services, the practitioner must be able to apply relevant behavioral theories to the diagnostic process. Theories that can be applied include cognitive theory, learning theory, brain hemisphericity theory, life-types theory, role theory, and information theory.

As discussed previously, the diagnosis typically occurs during the reference interview between the library media specialist and the client. This communication process might be considered data gathering in order to expand the concept, just as a physician gathers data on a patient before diagnosing treatment for an illness. For example, while a physician questions a patient regarding symptoms (“How are you feeling? When did you first notice this problem? Have you ever experienced this condition before?”), he or she also observes the patient (condition of skin, eyes, throat) and may routinely administer appropriate tests (blood pressure, X-rays, etc.).

Likewise, a library media specialist might employ other data-gathering mechanisms to enhance diagnosis. Questions might be expanded to elicit more information about the individual’s information processing style. Observation of age and information use patterns based on past experience might be applied in determining preferred information style. As an example, Vitale applied results of brain research to indicators of hemispheric dominance, which can be observed or determined through interviews with children. Indicators include eye and hand dominance, hand position, muscle testing, body symmetry, and eye movements. For example, the left side of the brain controls the right side of the body, and the right side of the brain controls the left side of the body; a left-handed child is usually right-brain dominant, but a right-handed child may be either left- or right-brain dominant. Vitale reports a method of determining dominance through observation:

If a right-handed child holds his pencil in a straight position with the wrist straight and the pencil aimed toward the shoulder, the left hemisphere is probably dominant. If a right-hander rotates his hand or aims the pencil at a right angle to the body, he is probably right-hemispheric.

Vitale provides numerous additional observational tests for determining hemispheric dominance and learning styles, and suggests questions to explore learning preferences.
Question: I want you to see your favorite ice-cream cone in your head. Where do you see it? (Be sure children are familiar with objects you ask them to visualize.) Interpretation: If the child points between the eyes or a little to the right, I have found it indicates he is a visual learner. If he points to the top of his head or puts his whole hand on his head, he probably is a haptic learner. Both of these responses indicate a right-hemispheric learning style.

In addition to interviews and observations, tests might be administered in a school setting to determine life type. The M-BTI can be administered in twenty to thirty minutes to older children and adults, and it can be easily scored. When the results are explained, clients may better understand their psychological type and information processing styles. Library media specialists might use results in their diagnosis, clarifying the information needs and preferences of users and nonusers of the library media center. Test results might be kept on file with other tests administered by the school.

Implications for Research

The diagnostic process, as noted, relies upon knowledge from several disciplines in the behavioral sciences (learning theory, cognitive theory, life-type theory, brain theory, information theory, and role theory) to determine information need. These fields are but a beginning. Further investigation might focus on various fields of psychology and sociology, social psychology, linguistics, physiology, cultural anthropology, ethnography, and cybernetics.

Research in the area of diagnosis also must examine the influence of environmental and policy context, including the following:

- Culture—language, philosophical and moral values, history, and all those characteristics that influence the individual’s information processing style;
- Geography—climate, physical setting, and other environmental aspects that can influence information processing;
- Political structure of society—the system for governance and underlying values regarding the role of government in the society served by the information-nation agency; in a school library media center, the school’s governance system as it influences the flow of information to individuals;
- Legislation and regulations issued by government agencies that control individual access to information, e.g., copyright, intellectual freedom;
- The economic system under which the individual functions;
- Technology as it is utilized by the client and as it influences information transfer,
- Information policy—policies regarding secrecy, censorship, privacy, the public’s right to know, government responsibility to inform, and others that influence the transfer of information to individuals.

Research is needed in all these areas as they influence diagnosis, and this research can be conducted by applying theories from the disciplines noted. For example, learning theory and information psychology (theory base) can be applied to the search process (behavioral process) in a secondary school that employs an electronic database (environmental context). Similarly,
The model represented in figure I can facilitate investigation of the diagnostic process. This model is a first attempt to define the diagnostic process and to suggest ways to study and refine this fundamental professional task. By exploring and applying behavioral and social theory, library media specialists can enhance their roles in promoting information literacy.