

Reflections on the Development of the Model of the Information Search Process (ISP): Excerpts from the Lazerow Lecture, University of Kentucky, April 2, 2007

by Carol Collier Kuhlthau

The development of the information search process (ISP) as a conceptual framework is the result of more than two decades of research that began with a qualitative study of secondary school students and the emergence of an initial model that was verified and refined through quantitative and longitudinal methods with diverse library users and further developed in case studies of people in the workplace. From these findings a principle of uncertainty for information seeking emerged that states that information commonly increases uncertainty in the early stages of the search process. Increased uncertainty creates a zone of intervention for intermediaries and system designers. I have charted the progression and development of the ISP citing selected research reports from 1985 to 2006 with a short description of the significance of each piece, shown in [Figure 1](#). In addition, three of my books are noted in this article that summarize my research and incorporate applications for practice.

As I look back on my work on the ISP I reflect on some important decisions along the way that sustained my research agenda and resulted in the development of a useful model of information-seeking behavior. Of course these were not readily apparent at the start. Rather they evolved and unfolded as part of an intriguing research journey. There are six approaches that I have taken in this work beginning with the first study in 1983 and continuing today:

- Start with a real problem
- Stay with the problem to verify and test the findings in variety of contexts
- Develop concepts from the findings
- Apply the framework of LIS
- Design applications for implementation
- Look to the future

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Start with a Real Problem

My research into the user's perspective of the process of information seeking began in the early 1980s with my experience with students as a secondary school librarian. I noticed a recurring problem. No matter how well students were oriented to the library and its resources or how bright they seemed, there was a common pattern of behavior when they came to the library for the first few days of their research. Students almost invariably became confused and anxious in the early stages of a research project, often expressing annoyance at the assignment, the library and themselves. This led to research that grounded the initial model of the ISP as a process of construction.

In my doctoral studies I was introduced to George Kelly's personal construct theory in which he analyzes the experience of constructing meaning from new information. Information is assimilated in a series of phases, beginning with confusion. Confusion increases as inconsistencies and incompatibilities are confronted between the new information and the constructs the person already holds. As confusion mounts, it frequently causes doubt. The disruption caused by the new ideas may become so threatening that the new information is discarded and construction of new meaning is abandoned. At this point, Kelly proposes an alternative to move the process of construction along. The person may form a tentative hypothesis to move toward incorporating the new construct into the existing system of personally held constructs. I wondered whether from the user's perspective information seeking is a process of construction as described in Kelly's personal construct theory and whether what I was observing with my students was a natural phase in this process. This speculation was the research problem that got me started on my journey and is a problem that still fascinates me today.

In that initial study I found that students' information seeking did indeed involve construction that was experienced as a series of stages with thoughts that >

shifted from vague to clearer and feelings that changed from anxious to more confident as the search progressed. I charted the thoughts, actions and feelings in each stage. One of my data collection methods was a timeline in which students describe their thoughts, actions and feelings during a search. I adopted the timeline to display three layers of

experience in each stage and to capture the sense of process. The stages were named for the main task undertaken to move on to the next stage: task initiation, topic selection, focus exploration, focus formulation, information collection and search closure. The model incorporated thoughts, actions and feelings common to each stage. >

FIGURE 1. Progression and Development of Kuhlthau's Information Search Process

Date	Title of Selected Research Reports	Significance
1985	A Process Approach to Library Skills Instruction. <i>School Library Media Quarterly</i> , 13 (1), 35-40.	First study of the ISP with 25 HS students
1985	An Emerging Theory of Library Instruction. <i>School Library Media Quarterly</i> , 16 (1), 23-28.	Process is important in teaching research
1988	Perceptions of the Information Search Process in Libraries: A Study of Changes from High School Through College. <i>Information Processing & Management</i> , 24 (4), 419-427.	Transference of skills from high school to college: a survey study
1988	Longitudinal Case Studies of the Information Search Process of Users in Libraries. <i>Library and Information Science Research</i> , 10 (3), 257-304.	In depth case study of six students from high school through college
1988	Meeting the Information Needs of Children and Young Adults: Basing Library Media Programs on Developmental States. <i>Journal of Youth Services in Libraries</i> , 2 (1), 51-57.	Connecting cognitive-developmental stages to learning in libraries
1989	The Information Search Process of High-, Middle-, and Low-Achieving High School Seniors. <i>School Library Media Quarterly</i> , 17 (4), 224-228.	Large scale examination of the ISP high school seniors
1989	Information Search Process: A Summary of Research and Implications for School Library Media Programs. <i>School Library Media Quarterly</i> , 18 (5), 19-25.	Practical application using the model of the ISP in schools
1990	Validating A Model of the Search Process: A Comparison of Academic, Public, and School Library Users. <i>Library and Information Science Research</i> , 12 (1), 5-32.	Confirmation of the ISP in various types of libraries With Turock, George and Belvin
1991	Inside the Search Process: Information Seeking from the User's Perspective. <i>Journal of the American Society for Information Science</i> , 42 (5), 361-371.	Highly cited article on cognitive and affective aspect of information seeking
1993	Implementing a Process Approach to Information Skills: A Study Identifying Indicators of Success in Library Media Programs. <i>School Library Media Quarterly</i> , 22 (1), 11-18.	Identified inhibitors and enablers of implementing the ISP in K-12 contexts
1993	A Principle of Uncertainty for Information Seeking. <i>Journal of Documentation</i> , 49 (4), 339-355.	Explanation of the impact of emotion on the ISP
1994	Students and the Information Search Process: Zones of Intervention for Librarians. In <i>Advances in Librarianship</i> , Academic Press, 57-72.	Introduction of critical moments where students need assistance and guidance
1996	The Concept of a Zone of Intervention for Identifying the Role of Intermediaries in the Information Search Process. <i>Proceedings of the American Society for Information Science Annual Meeting</i> , 367-376.	Develops notion of a "Zone of Intervention" for library and information services
1997	Learning in Digital Libraries: An Information Search Process Approach. <i>Library Trends</i> , 45 (4), 707-723.	Information technology and the ISP, the problem of seeking meaning from abundance of information
1999	Student Learning in the Library: What Library Power Librarians Say. <i>School Libraries Worldwide</i> , 5 (2), 80-96.	Using library for inquiry learning
1999	Accommodating the User's Information Search Process: Challenges for Information Retrieval System Designers. <i>Bulletin of the American Society for Information Science</i> , 25 (3), 12-16.	Implication of ISP for information system design
1999	The Role of Experience in the Information Search Process of an Early Career Information Worker: Perceptions of Uncertainty, Complexity, Construction and Sources. <i>Journal American Society for Information Science</i> , 50 (5), 399-412.	Comparison of novice/expert use of ISP in the workplace
2001	Information Seeking for Learning: A Study of Librarians Perceptions of Learning in School Libraries. <i>New Review of Information Behaviour Research</i> , 2, 31-46.	ISP of students in science projects With McNally
2001	Information Search Process of Lawyers: A Call For 'Just For Me' Information Services. <i>Journal of Documentation</i> , 57 (1), 31-46.	Evidence of ISP in the workplace and need for creating meaning. With Tama.
2001	The Information Search Process (ISP) A Search for Meaning Rather than Answers. <i>Doshisha Journal of Library and Information Science</i> , 1 (6), 31-46.	Uncovers problem of seeking meaning from information
2001	Rethinking Libraries for the Information Age School: Vital Roles in Inquiry Learning. <i>Proceedings of the International Association of School Librarianship Annual Meeting</i> , Auckland, New Zealand.	Consideration of changes in schools to prepare students for ISP in workplace
2004	Meeting the Challenge of Intellectual Access: Vital roles for librarians. Margaret Mann Lecture, School of Information, University of Michigan.	ISP in the context of education and the workplace that indicate new roles for librarians
2006	Information Literacy through Guided Inquiry: Preparing Students for the 21st Century. <i>Proceedings of the International Association of School Librarians Annual Conference</i> , Lisbon, Portugal.	Guided Inquiry for preparing students for information environment

Stay with the Problem to Verify and Test in a Variety of Contexts

After I joined the Rutgers faculty I had many opportunities to look at a whole range of interesting research areas. But this problem kept coming back to my attention. Had my study uncovered a unique situation of construction in information seeking or was the experience more pervasive? Would I find similar patterns in the experience of other students and other library users? At that time I made what proved to be a good decision, to stay with the problem to investigate it further. While some people have questioned my decision to work on one idea, I felt that I was on to something, and I wanted to see it through to verify developing findings and to test in other contexts. At the time I had no idea it would take me so far in my understanding of information-seeking behavior.

By staying with the problem I was able to verify and refine the model in various contexts. The model was verified in longitudinal case studies and large-scale studies of diverse samples of library users. Further studies have examined the implementation of a process approach in education contexts and investigated the ISP in the workplace.

I used a combination of methods to gather data from users regarding their perspective of the process of information seeking. Longitudinal methods enabled me to view changes in the process. Each of my studies had a longitudinal component of data being gathered at more than one point in time. I carried this a bit far perhaps – with one case study that extended over 15 years. However, this approach provided comparative evidence that was critical for understanding change in the process of information seeking over time. I also used a combination of qualitative and quantitative methods that proved to be an important component of the research. Initially, I had used qualitative methods to open the process for examination. But when quantitative methods enabled verification of the initial model in a large sample of diverse users, I realized the power of using a combination of methodologies. I clearly remember the excitement of discovery when I first looked at the statistical report that showed similar patterns to those I had found earlier in the initial qualitative study. A combination of qualitative and quantitative methods has been an important aspect of this research further amplified by incorporating longitudinal components within it.

After this extensive research I was able to refine the model and expand it as a more general model of information-seeking behavior known as the information

search process (ISP). The ISP presents a holistic view of information seeking from the user's perspective in six stages: initiation, selection, exploration, formulation, collection and presentation. The six-stage model of the ISP incorporates three realms of experience: the affective (feelings), the cognitive (thoughts) and the physical (actions) common to each stage. The model of the ISP describes users' experience in the process of information seeking as a series of thoughts, feelings and actions. Thoughts that begin as uncertain, vague and ambiguous become clearer, more focused and specific as the search progresses. Feelings of anxiety and doubt become more confident and certain. Through their actions people seek information relevant to the general topic in the beginning stages of the ISP and pertinent to the focused topic toward closure. Affective aspects such as uncertainty and confusion can influence relevance judgments as much as cognitive aspects, such as personal knowledge and information content.

Formulation of a focus or a personal perspective of the topic is the pivotal point in the ISP. At that point, feelings shift from uncertain to confident; thoughts change from vague to clear and interest increases. The ISP describes common experiences in the process of information seeking for a complex task that has a discrete beginning and ending and that requires construction and learning to be accomplished. The model reveals a process in which a person is seeking meaning in the course of seeking information. From the user's perspective the primary objective of information seeking is to accomplish the task that initiated the search, not merely the collection of information as an end in itself. The ISP describes a type of seeking information aimed at accomplishing a complex task within a period of time.

Model of the ISP

As I have said, the model of the ISP is articulated in a holistic view of information seeking from the user's perspective in six stages. They are defined as follows:

- *Initiation*, when a person first becomes aware of a lack of knowledge or understanding and feelings of uncertainty and apprehension are common.
- *Selection*, when a general area, topic or problem is identified and initial uncertainty often gives way to a brief sense of optimism and a readiness to begin the search.
- *Exploration*, when inconsistent, incompatible information is encountered and uncertainty, confusion and doubt frequently increase and people find themselves "in the dip" of confidence.

FIGURE 2. Model of the Information Search Process

	Initiation	Selection	Exploration	Formulation	Collection	Presentation	Assessment
Feelings (Affective)	Uncertainty	Optimism	Confusion Frustration Doubt	Clarity	Sense of direction/ Confidence	Satisfaction or Disappointment	Sense of accomplishment
Thoughts (Cognitive)	vague			focused		Increased Interest	Increased self-awareness
Actions (Physical)	Seeking	relevant Exploring	information	seeking	pertinent Documenting	information	

(Kuhlthau, *Seeking Meaning*, Libraries Unlimited 2004, p. 82.)

- *Formulation*, when a focused perspective is formed and uncertainty diminishes as confidence begins to increase.
- *Collection*, when information pertinent to the focused perspective is gathered and uncertainty subsides as interest and involvement deepen.
- *Presentation*, when the search is completed with a new understanding enabling the person to explain his or her learning to others or in some way put the learning to use.

This model of the ISP is shown in [Figure 2](#).

Develop Concepts from the Findings

The next important decision that I made on this research journey was to draw out the main ideas in the research and to develop concepts from the findings. This meant extending the research agenda further into an area of conceptual theory development but continuing with an eye on what it would mean for the practice of librarianship.

My studies were among the first to investigate the affective aspects or feelings in the process of information seeking along with the cognitive and physical aspects. Prior to the introduction of the ISP the affective dimension of information seeking had not been fully recognized in library and information services and systems. One of the important findings of this research was the discovery of a sharp increase in uncertainty and decrease in confidence after a search had been initiated. A person “in the dip” commonly experienced uncertainty, confusion and anxiety until a focus or a personal perspective had been formed. I have come to understand that this point, when librarians frequently first encounter students (and other library users as well), is the most difficult stage of the search process.

Central to the model of the ISP is the concept of uncertainty. Uncertainty was not a new concept in

information science, but affective uncertainty had not been extensively studied or developed as an important attribute of the concept. The axiom that information reduces uncertainty is not the user’s experience in information seeking. In some situations new information actually increases uncertainty. Prior to the formulation stage users are likely to experience heightened anxiety and uncertainty in the face of incompatible, inconsistent information since it requires thought, construction and interpretation. It seems helpful for people to learn that uncertainty increases during the exploration stage of the ISP rather than thinking that increased uncertainty is a symptom that something has gone wrong. Uncertainty from the user’s perspective is a natural part of the search process. If unexpected, the presence of uncertainty and particularly any increase in uncertainty can heighten anxiety and frustration, perhaps to the point of quitting.

Kelly’s personal construct theory provided the example of a way to present a conceptual framework with a central principle and a number of explanatory corollaries. I thought it would be useful, and perhaps a bit amusing, to state uncertainty as a principle for library and information science. The principle of uncertainty for information seeking is as follows:

Uncertainty is a cognitive state that commonly causes affective symptoms of anxiety and lack of confidence. Uncertainty and anxiety can be expected in the early stages of the ISP. The affective symptoms of uncertainty, confusion and frustration are associated with vague, unclear thought about a topic or question. As knowledge states shift to more clearly focused thoughts, a parallel shift occurs in feelings of increased confidence. Uncertainty due to a lack of understanding, a gap in meaning or a limited construct initiates the process of information seeking.

The principle of uncertainty is further elaborated by six corollaries: process corollary, formulation corollary, >

redundancy corollary, mood corollary, prediction corollary and interest corollary. Each corollary is an important related concept drawn from the findings of the studies of the ISP.

Apply the Framework of LIS

From the beginning of my work on the ISP, I have been influenced by other researchers in the field of information science and in other related fields as well. I have found this field to be a rich dynamic environment for creative innovative work. My work on the ISP did not occur in a vacuum. It evolved and developed within the fruitful field of library and information science. During more than 20 years of study of this area I have read, listened to, discussed and thought about many more LIS scholars' ideas than I can possibly credit here.

I have also listened to many bright, experienced librarians who have kept this work grounded in the practice of librarianship, in the basic services of reference and instruction that enable people to seek meaning in complex information environments and continue to learn throughout their lives.

Design Applications for Implementation

Most research reports include a section on implications of the work. In the practice-oriented field of LIS, this is especially important. However, I decided early on that I needed to go further than merely listing implications. I had to develop ways to apply the work into the practice of librarianship, an important decision that I have continued to follow throughout the development of the ISP.

Based on the model of the ISP and the principle of uncertainty for information seeking, I developed the concept of a zone of intervention for applying a process approach in LIS practice and system design. The central idea in the zone of intervention is that increased uncertainty indicates a need for assistance and accommodation. The zone of intervention is a concept modeled on Vygotsky's notion of a zone of proximal development that provides a way of understanding intervention in the constructive process of another person. The zone of intervention in information seeking may be thought of in a similar way.

The zone of intervention is that area in which an information user can do with advice and assistance what he or she cannot do alone or can do only with difficulty. Intervention within this zone enables individuals to progress in the accomplishment of their task. Intervention outside this zone is inefficient and unnecessary,

experienced by users as intrusive on the one hand or overwhelming on the other.

Application for implementation of the ISP can be tracked in the chart of my selected publications in [Figure 1](#) and is particularly obvious in the books I have written. The findings of the initial study and application with middle and secondary school students were developed in my book *Teaching the Library Research Process* first published in 1985 with the 2nd edition still in print. My book, *Seeking Meaning: A Process Approach to Library and Information Services* (first edition in 1993 and second in 2004), was aimed at summarizing the research underlying the ISP and proposing a theoretical basis for implementation in practice. My latest book, *Guided Inquiry: Learning in the 21st Century*, written with my daughters Leslie Maniotes and Ann Caspari, is a foundational text for guiding student learning through inquiry in k-12 schools based on the ISP model.

Look to the Future

These studies were among the first to investigate the affective aspects or the feelings of a person in the process of information seeking along with the cognitive and physical aspects. Rather than a steady increase in confidence from the beginning of a search to the conclusion, as might be expected, a dip in confidence is commonly experienced once an individual has initiated a search and begins to encounter conflicting and inconsistent information. A person "in the dip" is increasingly uncertain and confused until a focus is formed to provide a path for seeking meaning and criteria for judging relevance. Advances in information technology that open access to a vast assortment of sources have not helped the user's dilemma and may have intensified the sense of confusion and uncertainty. Information systems may intensify the problem, particularly in the early stages of the ISP, by overwhelming the user with everything all at once or limiting them to a few most used sources. Increased uncertainty indicates a zone of intervention in the process of information seeking for information intermediaries.

The model remains a dynamic description of the information user's experience and dilemma in seeking meaning. Occasionally, the ISP has been referred to as a linear model. I would argue that it is a sequential model rather than a linear model. The ISP is experienced as a sequence of one thing after another in a period of time. This is the way life is lived and experienced. Of course there may be some planning within each stage for the >

stages to follow and reflection in what went on before. Still one event follows another in a sequence even though recursion and planning may be evident within each of the stages. The naïve observation of linearity overlooks the depth of the holistic experience captured in the model. The model rings true for many people who are in the process of constructing meaning from a variety of sources of information because it is able to capture the sequential holistic experience of the process.

Recent developments in brain science have confirmed

the close relation between emotion and cognition. The future holds interesting prospects for research into the user's experience in information seeking and use. The work on the ISP has opened paths to understanding learning and creativity in rich information environments, but it is only the beginning of our research journey into the challenging field of library and information science in the 21st century. I have found these approaches to be important for developing the ISP and I recommend them to others in the pursuit of a fruitful sustained research agenda.

Desa Informasi: The Role of Digital Libraries in the Preservation and Dissemination of Indigenous Knowledge*

by Liauw Toong Tjeka (Aditya Nugraha)

Indigenous knowledge (IK) has for quite some time been forgotten in the globalization of modern science and technology. However, the paradox of globalization – which increases the value of local information resources as the world becomes more global – has created renewed interest in IK. The interest has so far mostly been generated in the Western world toward the IK of developing countries. Although the above statements remain open for debate, it is commonly known that IK is often still poorly documented let alone disseminated by most developing countries.

Indonesia as a developing country suffers the same condition of poor documentation and dissemination of its IK. Some IK is already documented, although not very well. Most is undocumented. Dissemination is even worse. This condition is exacerbated by the fact that Indonesia is an archipelagic country and situated on one of the most volcanic- and tectonic-active regions in the world. Any volcanic or tectonic activity can cause tremendous damage in local communities, including putting their IK heritage at risk. The December 2004

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tsunami in Aceh and Nias was a shocking example of such forces of nature. Undocumented IK would surely vanish, while documented IK would still vanish if not disseminated or replicated elsewhere. In this case preservation of IK entails documentation and dissemination efforts.

The root cause of the poor condition above is believed to be the fact that Indonesian culture – as with most Asian culture – does not really have written tradition. Another factor is the “inferiority syndrome” of the Indonesian people, including its librarians and other information workers, which holds that knowledge generated by the West is superior to their IK. These conditions have contributed to the low appreciation of local information resources, which in the end impedes the development of such resources. Most people do not think that IK is valuable and that anyone would want to know and learn from it. Intensive effort is needed to change this denigrating perception, to encourage local communities to start documenting and disseminating their IK.

The rapid development of information technology, especially in the area of digitization and digital libraries, could be the answer to improve the condition in Indonesia and other developing countries. The author has observed that digitizing documented IK and putting it on a digital >