Longitudinal Evidence of the Influence of the ISP on Information Workers

Carol Collier Kuhlthau
Professor Emerita
Rutgers, the State University of New Jersey
kuhlthat@rutgers.edu

"Hello Dr. Kuhlthau, I'm doing research papers for a living. I thought you might like to talk with me." This call came as a complete surprise. I hadn't heard from this study participant in five years since, what I considered, the conclusion of the longitudinal studies of the research process of a cohort of high school students' through completion of their undergraduate education (Kuhlthau, 1988). This was the beginning of a valuable five-year investigation into the information search process (ISP) of an early career information worker moving from novice to recognized expert in an important specialized area of his field (Kuhlthau, 1999b). Nearly 20 years later, in December 2017, I received an unexpected email from the same person that read "I hope you are well. I was curious how you are doing and if you had a few minutes to catch up and chat. I have a research question for you." I quickly responded "Great to hear from you! I'd love to catch up and chat. As you know, I'm always ready for a research question." This began an insightful conversation of the impact of early understanding the information search process (ISP) on the long-term career of highly successful information workers. When we met a few weeks later he began the conversation with, "I wouldn't have my career if it weren't for learning the research process from you in high school." He had brought his daughter and son along and asked me to explain the "research process" to them.

Following our conversation, he wrote "In 1980 I was recruited to be part of a study on how to help high school students gain comfort and aptitude in producing research papers by understanding the research process. It is uncanny how all of the students involved became successful researchers in legal, medical, finance and other fields. Nearly all went on to graduate schools and built higher income careers in sharp contrast to peers that did not participate. I recently reconnected for a follow up interview on this study as they are now looking at late career development of the subjects and was surprised to learn that this project gave genesis to an entire department (center) at Rutgers. The application for the insights gleaned by these academics has expanded and become more valuable in our data driven economy. This project did more for my academic and career success than anything else I did in high school. I am happy to talk about it."

He added, "I have seen my teenage daughter and son struggle still with the feelings (frustration, overwhelmed or at the other extreme sometimes overconfidence), thoughts (how do I move forward now or how will I ever get a thesis out of all this information) of the research process though they both do very well with the actual writing phase. Learning the entire process is key to being an effective researcher" (Kuhlthau, 2017).

In an earlier study the participant described, the difficulty many (financial) analysts have in writing reports and suggested that it would be helpful for them to become aware of the process involved in research. He indicated that "it is this process that information workers need help with and that they are being tripped up by the process… One way to help might be to make research directors aware of the process of doing research." He recommended that courses on writing in business schools should address the thought process and the emotional process that one goes through in getting out a research paper or getting out written material and how to deal with it" (Kuhlthau, 1999b, 2004). In our recent conversation he explained that, over the years he

had introduced the ISP, what he calls the research process, to many of his colleagues and young people working for him (Kuhlthau, 2017).

Information Search Process

Longitudinal studies of the process of using a variety of sources of information revealed a dynamic holistic process of construction, as described in the ISP. Tracking emotions along with thoughts and actions found formulation of a focus important to accomplish more complex tasks. Increased uncertainty and anxiety were evident prior to forming a focus and decreased uncertainty and increased interest after a focus. Uncertainty, complexity, construction are key components of creativity in information seeking. (Kuhlthau, 1988, 1999b, 2004, 2008). Information seeking is commonly seen as simply gathering and using information and not related to creativity. Unfortunately for the most part, we have inherited a step-by-step logical induction explanation of creativity that ignores the person's actual holistic experience in the process of discovery and innovation. Common misconceptions of how creativity and discovery actually happen tend to close down the process for many people and inhibit progress.

Two Common Misconceptions

Stories of discovery often neglect the experience of uncertainty in the early stages and attribute creativity to either "genius" or a "eureka moment" or both. The "genius," assumes that discovery results from a small number of uniquely gifted individuals working on their own. The "eureka moment" assumes that discoveries happen without warning or preparation in a sudden, blazing instant of revelation and synthesis. (Hoskins, 1980). These misconceptions imply that innovation is available only on rare occasion through a few exception people.

How did these misconceptions take root? Descriptions of discovery frequently leave out the uncertainty and extensive struggle for understanding that actually takes place in the creative process. These misconceptions of discovery were established long ago. The great discoveries of the late 18th and early 19th centuries that led to the scientific age of the 20th century are engagingly described in The Age of Wonder (Holmes, 2008). Influential inventors of the time described their discoveries quite differently than the way they had actually experienced them during the creative process. Their journals and letters during the process of discovery reveal, repeated trial and error, extensive reflection and deep conversations with colleagues sometimes over a lifetime, in other words a complex process of construction. However, their later depictions leave out this uncertainty in their work. These revisionist stories of discovery have fostered a genius and eureka misconception of creativity and innovation that continues into the present information age. Two examples drawn from Holmes illustrate the problem.

The first example significantly changed theoretical conception of the universe. William Herschel, an amateur astronomer, built a large powerful telescope that he used to "sweep" the sky night after night for many years. "Most current ideas about the cosmos were small-scale…The universe was small, closely connected, largely unchanging (except for comets), and almost intimate" (Holmes, 2008, p.91). "During the nights around the spring equinox Herschel…was ranging more freely than usual, or possibly he was testing his ability to 'site read' the sky. Tuesday, 13 March 1781, slightly before midnight, Herschel spotted a new and unidentified disc-like object moving through the constellation of Gemini" (Holmes,2008, p.96-97). What he had observed was the seventh planet in the solar system, the first new planet to be discovered for over a thousand years. His observation journal records that, at first, he thought he found a new comet. There are no further notes for some time and no expression of excitement or

anticipation over what he had discovered. During this time Herschel may have been reflecting and conferring with colleagues over the uncertainty of what he had sighted. However, over the years he refined the story and compressed his discovery into "a single wondrous night, the inspired work of a glorious few hours. The effect of this account was to present an engagingly romantic image of science at work: the solitary man of genius pursuing the mysterious moment of revelation" (Holmes, 2008, p.104).

The second example drawn from Holmes is a practical invention that saved countless lives and vastly improved an industry. At the time, mining was extremely dangerous with the frequent occurrence of disastrous gas fires from miners' lamps. "Davy Safety Lamp, the greatest public achievement of Humphrey Davy's career, was widely used all over Britain and Europe" (Holmes, 2008, p.368). Davy had many other discoveries, but the miners' lamp brought him the most acclaim and financial compensation. He went through many iterations of the lamp during which time his letters and journals reveal uncertainty, frustration and disappointment before his success. However, in his published papers, he "insisted on the Baconian method of stage-by-stage, logical scientific induction, while tacitly admitting the existence of 'complicated' versions of the lamp which he had tried and rejected" (Holmes, 2008, p.83-84).

The genius, eureka moment and logical induction explanation of creativity that neglects the uncertainty in the process of construction doesn't fit in the present age. A better fit, views humans as creative people where everyone is a potential creator and innovator. In the 21st century, creativity is open and available to all and is a necessary driving force for living and working in today's world.

Creative Workspaces

Creative workspaces and communal labs are emerging in cities and businesses across the U.S. and around the world. The study participant's description of the impact of the ISP on his career. clearly shows the need for workspaces that support the research process in the workplace. Understanding the research process, as described in the ISP, enabled him to create and innovate at each stage of his career. Creative workspaces also are being developed in academic libraries. The ISP research and related concepts "can inform information behavior studies that guide the development of creative work spaces in academic libraries specifically, with reference to phases of creation, information seeking and searches, thoughts, feelings, the zones of intervention, third space" (Meyer and Fourie, 2017).

Guided Inquiry is responding to the need for creative learning spaces for k-12 education and for information literacy. My coauthor, Leslie Maniotes, notes that "Many schools are seeking to innovate using an instructional design model (Ideo/Stanford/designthinking). Places that are catching on and have flashy appeal, like 'high tech high' in Silicon Valley. But they have no librarian and no one with research process expertise in the school. These schools don't address research for learning or help students to do the kinds of research workers have found so valuable. Guided Inquiry is a design framework, based the ISP research, for teachers and librarians to guide inquiry learning. The research process in Guided Inquiry Design has great potential for designing creative learning and workspaces (Kuhlthau, Maniotes, and Caspari, 2012, 2015).

A thematic analysis of my publications Meyer and Fourie found potential for designing creative workspaces incorporating "acknowledgement of uncertainty, complexity of tasks, the need for sense-making, and affective and cognitive experiences throughout information searching and seeking activities. The design of creative workspaces is associated with tools, expertise, guidance, innovation and constructivist learning" (Meyer and Fourie, 2017).

Implications for Information Behavior Research

Studies of information behavior are necessary for fully understanding creativity in the information age. The importance of information seeking and searching is missing from most descriptions of creativity. Extensive search for information builds background knowledge, leads to important questions, and opens possibilities to pursue. It is easy to overlook the information seeking component of creativity and think that you just go make something. The research process of using a variety of sources of information is integral to a depth of understanding in innovation and discovery.

Correspondence from the study participant mentioned that he had a research question for me. His question is "What are the behaviors of the next generation of leaders?" (Kuhlthau, 2017). It is significant that he posed this broad overarching question to an information behavior researcher. To be more specific we might ask, what are the information behaviors of the next generation of leaders? This question has both theoretical and practical implications for future information behavior research. The contributions of Herschel and Davy in their day changed the way people looked at things and provided practical applications that improved lives. Information behavior research has the opportunity and the obligation to step up to the important questions of our day to address the information component of creativity for big ideas and practical living that is critical for the next generation of leaders.

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