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Reflect back and recall how you learned to do effective library research. It was likely a long process occurring in your student years, and possibly beyond. It entailed doing many assignments from various teachers and professors, each experience building on the previous ones. As you learned how to comprehend scholarly literature, you also learned how to find more of it, as it related to each academic need you encountered. Sometimes you stumbled upon sources that caught your attention and governed the direction of your research in an unexpected direction that may have become more interesting than the direction in which you'd set out. Each research adventure had its rewards in terms of what you learned from it. Each subsequent time you attempted a research topic, whether academic or personal, you became more adept at grappling with the library and the literature.

How that protracted experience actually happens is difficult to analyze precisely. Quantitative library use and user research studies examine and present a general model of information retrieval, information seeking behavior and information use. Pedagogy takes learning styles into account as different teaching approaches and media are used to address information skill learning. The literature of Library and Information Science contains an abundance of such studies. Of interest to librarians who teach information literacy is what is learned and what students seem not to learn at certain points in their acquisition of information literacy skills. Instruction librarians continue to teach patrons who struggle and don't quite grasp good information literacy skills.

Another way to look at learning information literacy is from the learners' perspective. Library patrons are often frustrated navigating complicated, seemingly unintuitive means of finding what they seek. Trying to understand the learning experience from the patron perspective requires different research methodology but offers insight into how learners appropriate information literacy skills and how their learning process builds and grows. Qualitative research in this area is a more discrete portion of the literature that seeks to uncover the experiences and understandings of library users from their own point of view. It provides additional insight on how students and other library patrons learn information literacy skills and their understanding of their experience as they learn to do effective research. It connects information seeking with learning outcomes and shows variation in learning and information seeking. Rather than showing a final achievement of information literacy objectives, qualitative studies reveal a continuum of research skills learned as part of a process of experienced reality that is ongoing.

Interviews are an essential method used in qualitative research, but can be used somewhat differently with varying other methods. Studies of two types of information seeking and learning will be considered, each using different qualitative research methodology: intentional information seeking to solve a research need, and serendipitous discovery of information. Each is studied in the literature using different qualitative inquiry methodology. Intentional information seeking has been more widely studied and many of the studies have been conducted using phenomenography as a research method. Accidental discovery or opportunistic discovery of information is more difficult to study and has been studied successfully using surveys or diary and journal techniques of qualitative inquiry combined with interviews. Each of these are useful methods of qualitative research inquiry widely recognized as reliable means to explore how individuals see and experience new phenomena and capture their thoughts, feelings and interpretations of meaning and process (Given, 2008, p. xxix).

Phenomenography research "has as its aim the finding and systematizing of forms of thought in terms of which people interpret significant aspects of reality" (Marton, 1981, p. 177). The focus is on the perception of reality and the research is oriented towards people's ideas about the world and their different experience, thoughts and understanding of it. Such research "aims at description, analysis, and understanding of experiences" and "would refer to anything that can be said about how people perceive, experience and conceptualize" aspects of reality, or phenomena (Marton, 1981, p. 180, 181). Phenomenography deals with the experiential and conceptual, what are culturally learned and individually developed ways of relating to the world around us. Although research is done with individuals' ideas, thoughts and personal experiences about particular phenomena, the analysis of the combined data of study cohorts leads to categories of description of the collective mind of the cohort rather than individuals. The phenomenon of learning information literacy has been described in the literature of Library and Information Science. Qualitative inquiry compliments other findings found in quantitative studies, adding the actual perception of the experience of learning information literacy from the patrons' perspective.

Intentional information seeking is learned by children in school in response to assignments given by teachers. This pattern continues through higher education and has been studied at all levels of education. Studies of younger children in latter elementary school grades indicate that the way children learn to approach assignments can be seen later in their education as well.

> Those notions and experiences that the students developed through their assignments mean that research is to choose a topic, to find one of several sources, to read, to write and to present… There are few indications that new technology, in itself, supports students' learning or enhancement of knowledge… One must be able to reformulate different kinds of information obtained from different sources into usable knowledge for specific practices. This process is normally absent in the students… Seeking meaning in terms of learning is experienced as *doing right* during the information search process (Alexandersson and Limberg, 2003, p. 23, 28).

How younger students construct meaning is a gradual process that changes continuously as the learning proceeds. The process continues in secondary school. Students encountered problems less related to a lack of specific skills and abilities than to difficulties encountered making connections between those skills and information literacy as a means of building a knowledge base of both the subject and its information content. Looking at 5 studies of middle and high school students, Kuhlthau found that a series of stages of changes in feelings, thoughts and mood occurred during the phenomenon of researching as information needs and levels of specificity changed. As high school and middle school students moved from general and vague at initiation to specific, more narrowed and focused, their discomfort, uncertainty, frustration, anxiety and confusion changed to confidence and relief. This increased confidence corresponded with an increase in clarity and focus and provided evidence of sense-making, but did not correspond with the quality or variety of their sources (Kuhlthau, 1991, pp.363-365).

Phenomenography studies of high school students that build on previous user studies, contribute a better understanding of why information seeking is a complex process. Students experience and conceptualize the phenomenon of learning to do research differently. In a study that focused on what students experienced and how they thought about the phenomena, students were given a research assignment by their teacher. Their information seeking was intentional in order to complete the assignment. They were interviewed before, during and after the completed the assignment. Learning was viewed in terms of a change of ways of understanding the phenomena of experiencing their research process. Analysis showed that

students experienced 3 conceptions of information seeking and use: fact-finding, balancing information in order to choose right, or scrutinizing and analyzing. How these students handled bias and relevance of resources distinguished the difference in outcomes. Students that conceptualized information seeking as fact-finding used fewer sources, and experienced their research as finding correct answers to discrete questions. Easy access was important to them as well as cognitive authority judged on the basis of status or expertise, but bias was dismissed as faulty. Only small changes occurred in these students' ways of reasoning about the subject matter of the assignment and they knew only discrete bits about the subject. Those students who balanced information in order to choose right sought only enough information to form a personal standpoint that covered the direct and indirect questions of their research topic. Their conceptions of the subject changed from a vague to a clear idea and from uncertainty to a taking a stance. They judged cognitive authority of sources on the basis of status or expertise and handled bias by choosing sides. These students used more sources than the fact-finding students and experienced a dynamic process as they focused their topic. These students experienced anxiety initially which grew to self-confidence by the end of the process. Students who scrutinized and analyzed were the smallest group but their focus was broadest. They experienced information seeking as using information to understand their topic and treated it critically, evaluating and analyzing information sources. They placed their topic in a wider context, did not restrict relevant judgments, and understood scrutinizing as trying to reveal and structure underlying motives and values in information sources. They assessed cognitive authority according to status and expertise, and also content of sources. These students' understanding changed from discrete bits to critical assessment of information grounded in deep understanding and evaluation of the subject matter. (Limberg, October 1999, pp. 16-17; Limberg, 1999, pp. 122-123, 126-127). The variation in information seeking and use of information interacts closely with the students' conceptions, understanding and experience of information content as evidenced by the different descriptions of learning outcomes. "Differences between students' understanding of subject content influenced how they searched for and used information. Differences in students' experience of information seeking and use influenced both how they searched for, and used, information and what they learned about content" (Limberg, 2000, p. 199).

Information and communication technologies, while viewed by most students as most important for their information seeking behavior, did not improve students' information literacy abilities. "Technological tools were found to strengthen the orientation toward procedure rather than encouraging or supporting understanding of complex issues" (Limberg, Alexandersson, Lantz-Andersson, and Folkesson, 2008, p. 85). Information literacy means learning to use different strategies and sources in different media formats. If students are able to master digital technology, the ability to critically evaluate different sources contributes to meaningful information based learning. Studies show that many students do not master technology well. One such study concludes that 75% of the participants approached information seeking as random catches they happened to come across through browsing the Internet and others sources. Their research was guided by what they came across, not by what they searched for, and their knowledge formation was poor. They compiled facts and transferred text from sources to their own research writing. Their goal was to complete their assignment swiftly and their abilities with technology were limited, which they often blamed on the technology. 25% systematically explored and investigated topics, guided by clear awareness of the meaning of their research and their involvement with the content. These students were more reflective in their approach to their assignment. The quality of their information seeking closely interacted with their learning outcomes (Limberg, Alexandersson, and Lantz-Andersson, 2008, p 256).

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Studies of undergraduate college students in the Library and Information Science literature

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reveal evidence that students do not necessarily learn or retain information literacy instruction. Qualitative inquiry is a window into the students' perceptions of this phenomenon to help understand "research that indicates many students leave higher education without ever attaining much-needed information literacy skills" (Gross and Latham, 2009, p. 336). College freshman are at a juncture in their education when warm, friendly people can intervene to help students perceive the library as a place with fascinating information rather than as a scary place. 75-85% of students in a study "described their initial response to library research in terms of fear…their own library-use skills are inadequate…the inadequacy is shameful and should be hidden, and…would be revealed by asking questions" (Mellon, 1986, p. 160). In addition to this anxiety, vagueness and confusion frequently accompany first-year students' initial attempts to locate information in a library (Seamans, 2002, p. 123). But information literacy skills can improve and grow and become a foundation for knowledge acquisition. After extensive information literacy instruction within a discipline, students in a study were asked to reflect on the phenomenon. "For some students, it was a revelation… many of them had not reflected on how or why they gathered (or failed to gather) information… some students were enthusiastic in identifying specific ways in which the new awareness of this process had made them more efficient and effective" (Webber and Johnson, 2000, p. 393).

Several studies indicated that college and university students' approaches to research were not substantially different than what studies revealed about the approaches of high school students. As with the high school student, the awareness of college students was, for some, focused on fact-finding, gathering sources, determining their credibility, with the content viewed objectively separate and distinct from the user (Maybee, 2006, p. 82). Finding information was conceptualized through focused use of technology or located in information sources, but was only focused on finding the information, not its use (Maybee, 2007, pp. 456-458). Students experienced information literacy as "seeking evidence to back up an existing argument" (Lupton, 2008, p. 404). Their task was their assignment and learning about the topic was not a focus. For other students, their conception was on initiating and carrying out a process to use information. It involved learning by doing, by trial and error, and by interacting with other people (Diehm and Lupton, 2012, pp. 220-221). Students learned about their process as well as about the information. The information was still viewed as separate and distinct from the user by these students. Other students learned about their topic, changed their standpoint, or rethought their argument as they discovered more information. The assignment was a secondary focus as they "searched for information for their own interest" (Lupton, 2008, p. 407). While some students developed a personal knowledge base, others applied that knowledge to a broader context or to problems, such as social issues. The focus for these students is on how the knowledge is used, decision making and problem solving, sharing information and creating new knowledge (Maybee, 2007, p. 459).

Undergraduate students' general view of information literacy is focused on product rather than process, a perception of achieving skills on their own, a preference for people over other information sources, and an emphasis on personal interest. Research in the domain of competency theory, indicates that those who are less competent overestimate their performance as tested on skills tests. They are nonetheless quite confident of their abilities, having an inflated self-view of their skills and lack the metacognitive ability to make more realistic estimates of their performance or the expertise of others. "When people gain skills in a domain, they are better able to assess their own skill level, recognize the abilities of others, and make better estimations of their own performance" " (Gross and Latham, 2009, p. 336-337). Some students do improve their information literacy skills while many do not improve them appreciably, leaving higher education without ever attaining information literacy skills.

The association of information literacy with independent and lifelong learning is evident as those who experience it go through an information seeking and use process to acquire new meaning and understanding. Some students experienced assignments as merely an end in itself, others experienced assignments as learning, while others internalized the experience as seeking meaning, understanding and relating it to problems of social responsibility. Some experienced surface learning approaches while others experienced deep learning experiences (Lupton, 2004, pp. 86-87).

However, information behavior is not always intentional. People often find information when they are not deliberately seeking it. Information encountering can happen when we least expect it. It can be serendipitous and unsystematic. Sometimes it can happen when we are browsing casually or having a conversation or listening recreationally. It can happen almost anywhere or any time. It can also happen that we "stumble upon interesting and useful information without performing an active search or while searching for a different topic entirely. In these situations, information is discovered unintentionally, fortuitously and unexpectedly, often resulting in a valuable outcome" (Erdelez and Makri, 2011, p. 1). Opportunistic discovery of information may provide the individual with useful and applicable information that is welcome. When this occurs it is unplanned and therefore more difficult to study. A method of studying this type of serendipitous information encounter is through asking library patrons to keep reflective diaries to gain an understanding of the nature of serendipity. Other studies depend on participants to recall and reflect on accidental information discoveries.

Information behavior involves users' observable actions, their thoughts and feelings. A sample of both students and library employees were asked through surveys and interviews for their recollections of specific accidental information encountering experiences and their perceptions of those experiences, as well as what their activities immediately before and after the information encounter were. Respondents' thoughts and feelings were analyzed and compared to immediately before and after the information encounter. The study found that there was a change in the type of thoughts experienced by respondents, from thoughts unrelated to information behavior to information behavior-related thoughts after the encounter. Their feelings also changed from feelings of frustration, boredom and anxiousness to feelings of excitement, happiness and interest. Information encountering brought satisfaction to respondents' browsing activities and reinforced browsing habits. "Several interview respondents specifically stated that information encountering enabled them to see their information needs from a different perspective" (Erdelez, 1997, p. 416). The serendipity of opportunistic information encounters shifts users across time, parallel problem areas and different subject areas representing actual user information behavior.

An innovative technological form of using diaries to study the serendipity of peoples' information research was done using mobile diaries. The mobile phone-based technology enabled researchers the opportunity to capture serendipitous experiences as they happen. Since serendipity is unpredictable, recording the experiences as they occur simplified difficulties of recalling and recounting accurately the experiences later and minimized memory lapses. Participants selected were PhD students involved in individual research as previous research had suggested that serendipity is widely experienced among researchers. The study explored the nature of the serendipitous experience and the participants' perceptions. Some perceived these experiences as fortunate accidents or coincidences, others as unexpected finds with a positive impact or unexpected connections between information. They experienced it as impactful, productive and beneficial, or as one participant said, "It is like a spark, and certain things change when you think about it further" (Sun, Sharples, and Makri, 2011, p. 9). Participants were able to unexpectedly connect information, ideas and people when they felt relaxed, unpressured and when the encounter came at just the right

time. It happened most often in a structured environment that promoted thinking about work such as in offices, lecture and seminar rooms, the Internet, libraries and bookstores or sometimes when they were moving about in constantly changing environments. The emotional impact of serendipitous information encounters was positive and stimulating, sometimes even leading to a chain of events or a different direction to explore.

Understanding the thoughts, feelings and actions of users is insightful. Information encounterers' cognitive states change at the time of an information encounter. "The thoughts that users may have while not being able to find some information tend to be depressive and negative… After encountering some useful information relating to another problem or some otherwise interesting information, users become more self-assured" (Erdelez, 1999, p. 26). Some people tend to encounter or collect useful or interesting information serendipitously more often than others. Others stay more focused, being less distracted by opportunistic information encounters. Those who encounter information serendipitously on a regular basis consider it an important element of their information acquisition process. Their information is both problem solving and interest based, and can be related to past, present or future needs. These information seekers are referred to in the literature as "super-encounterers." Information encountering experiences move users across different problem areas, time frames and from one currently pursued problem to another parallel problem area. This lateral movement among problems and information needs may be more true to real-life information behavior as a more complex phenomenon than models of information behavior that depict a single problem or information need (Erdelez, 1999, pp. 27-28).

The skills of information literacy and the users' experience are interwoven.

Serendipity is a common way of finding information on the Internet. Information users often have different understanding on what is involved in searching, browsing, scanning or encountering information accidentally. The latter involves memorable experiences of unexpected discovery of unsought information that is useful or interesting. In a study of 121 participants using survey methodology, 12 were super-encounterers. Interviews were used as a follow-up with these participants whose browsing appeared to be reinforced by often having satisfactory experiences of information encountering. These super-encounterers explicitly preferred other environments, such as print or people, to the Internet. The majority of information encountering experience occurred in the context of intentional information seeking. Their comments were that the Internet was preferable for play and fun but barriers of several kinds made it less conducive to information encountering. Those barriers were technical barriers, information barriers (i.e. the environment is "too loaded" with pre-structured information forcing users to take paths designed by someone else), and psychological barriers (ie: Internet may be too obsessive and the fear of becoming "too exposed") (Erdelez, 1996, p.105). These barriers may be more critical for those who often experience serendipity, while many Internet users have difficulties staying focused on specific problem areas without meandering away with every interesting hyperlink encountered.

Studies draw the conclusion that the interaction between information seeking and learning and students' ways of experiencing information seeking and use are not independent of the content of the information used. The skills of information literacy and the users' experience are interwoven. Information literacy is not the accomplishment of a series of objectives alone, but the application of those skills to establish a knowledge base from which to apply problem solving to issues of social responsibility. It is a lifelong learning process by which a person navigates through life to solve intentional and interest-based information needs. The patron's perspective of this phenomenon, developed over time and experienced reality varies as does meaningful learning. It is shaped by the discursive practice of school and transcended by the combination of the information search process with genuine interest in the content of the information that is sought and encountered. Serendipitous information encountering can be an enriching addition for some information seekers, adding value to their searches. Patrons at

various stages of information seeking experience a variety of thoughts and emotions as they experience the phenomenon of researching, making the patron perspective variable at different stages of the process, yet similar at all educational levels. ✞

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