Research Award: Interactive Information Retrieval

by Diane Kelly

2014 Annual Meeting Coverage

EDITOR'S SUMMARY

Diane Kelly progressed from having no idea of information science as a field of inquiry to receiving the 2014 ASIS&T Research Award for her outstanding contributions to the field. Through an early library science course, Kelly met information science scholars and soon started her journey researching interactive information retrieval, search behavior, search interfaces and research methods. She became one of the "user study people" when few in the information retrieval community thought about the search process. Kelly appreciates starting her studies before Google's search box and blinking cursor became pervasive and realizing the wealth of ideas predating Google that are worthy of renewed investigation. She expressed concern that information seeking may become passive receipt of preformed information. In her further research, Kelly hopes to shed more light on the process of search and success metrics.

KEYWORDS

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Diane Kelly is the 2014 recipient of the ASIS&T Research Award for outstanding contributions to research in information science. She is professor at the School of Information and Library Science at the University of North Carolina at Chapel Hill. Her research and teaching interests are interactive information search and retrieval, information search behavior and research methods. She is the recipient of the 2013 British Computer Society's IRSG Karen Spärck Jones Award, the 2009 ASIS&T/Thomson Reuters Outstanding Information Science Teacher Award and the 2007 SILS Outstanding Teacher of the Year Award. She can be reached at dianek<at>email.unc.edu.

When I started the master's degree program at what was then the School of Communication, Information and Library Studies at Rutgers University in 1997, unbeknownst to me, I was joining a school that housed some of the most distinguished scholars in information science: Nick Belkin, Paul Kantor, Carol Kuhlthau and Tefko Saracevic, each of whom has received at least one ASIS&T research award. Like many students, I had no idea information science existed as a field of inquiry and practice. I was there for the library science part, which I had also only recently learned was something one could study. After a semester packed with interesting courses, including human information behavior taught by Carol Kuhlthau and online searching taught by Tefko Saracevic, I soon learned that information (and library) science was an area of inquiry with deep intellectual roots, vibrant research traditions and provocative scholars.

Following my initial semester of school, I did what any student interested in information search and human behavior would do next: I volunteered to join Nick Belkin's research team. I spent the next six years working on his team earning a master's degree and a Ph.D. and learning about things I never knew existed, including search behavior, the information search process, interface design, information retrieval, TREC (Text REtrieval Conference) and, of course, ASIS&T. I took two courses about information retrieval: one taught by Paul Kantor and the other by Nick Belkin, which solidified my interests in this area, particularly in interactive information retrieval. Through these courses and others, I gained a foundation in the history and evolution of information science. By apprenticing myself to both Nick and Paul, I gained a foundation in how to conduct research. I will always be grateful to both of them for their generosity, guidance and support.

Since graduating from Rutgers, I have spent the last 11 years at the School of Information and Library Science at the University of North Carolina, where I have received strong support from two other ASIS&T standouts: Gary Marchionini and Barbara Wildemuth, along with a cadre of excellent students, many of whom are already blazing their own ASIS&T paths. I have had an active research agenda focused on interactive information retrieval, search behavior, search interfaces and research methods. This agenda has been greatly supported by many students who have worked alongside me. Most of the studies we have conducted have been controlled, laboratory experiments and have involved a variety of data collection methods including logging, questionnaires, psychometric scales, observation, stimulated recall, structured and semi-structured interviews and most recently, physiological signals. We have studied hundreds of people, including intelligence analysts, undergraduate and graduate students, faculty and staff and members of the community at local public libraries. For those interested in a list of my publications, please visit http://ils.unc.edu/~dianek/research.html.

Our studies include a 14-week naturalistic, longitudinal study of the validity and reliability of using implicit feedback as relevance indicators and of how contextual factors, such as search task, impact this relationship [1] [2]; a monograph about methods for evaluating interactive information systems [3]; several studies describing method variance in interactive systems research [4] [5]; a systematic review of interactive information retrieval evaluation studies documenting 40 years of research [6]; studies of query suggestions [7]; an examination of the impact of threshold priming on relevance assessments [8]; a study of the effects of cognitive ability on search [9]; and most recently, a study investigating stress and workload during search[10].

"User study people," as we are called, at least in the information retrieval community, are the minority, but our numbers continue to grow. This perspective is critical, and it has been exciting to watch its importance increase during the past 18 years, in part because of all the hard work of information and library scientists, who have been paying attention to users all along.

When I first started conducting research about interactive search systems in 1998, *information search* was a foreign concept to most people. When we tested our search systems, we either recruited librarians or library science students so that we could assume our research participants understood something about search, or we developed extensive tutorials to train people to use our systems. Collecting data about participants' search and computer experiences and majors was also necessary and usually provided some insight about any differences we observed in use of the systems. And it took ages to get a stable, workable system up and running! The most exciting things about the last 18 years are how much the world has changed with respect to information search and how much easier it is to do information search research.

I am grateful that when I started studying information search it was not a common activity. Contemporary search engines like Google did not anchor my thinking about what was possible. My thinking was anchored by what were, at the time, radical ways to conceptualize information searchers (from Belkin [11]), the information search process (from Oddy [12]) and user interfaces (from Hearst [13]). The perspective I gained by watching this area grow and change has been invaluable. It allows me to see beyond Google because I saw before it. It taught me to look to the literature for inspiration instead of staring at a search box and blinking cursor. So much research today lacks spark because it is often heavily anchored by contemporary practice and trends. It lacks depth because it is disconnected from past work.

I will (almost) spare the cliché that those who do not know history are doomed to repeat it, in part because I believe some of our history is worth repeating, especially when it comes to research. Papers from the pre-Google era contain many amazing and provocative ideas, some of which were never fully investigated because of technological constraints and some of which form the basis of modern search engines. For example, Maron and Kuhns [14] proposed the idea that searchers' queries could be used as sources of index terms for documents, such that documents that had been retrieved in response to a particular searcher's query and found relevant by the searcher could then be associated more strongly with that query (sound familiar?). But the real purpose of knowing the history of a field is that it engenders a certain amount of humility, which is necessary to become a true scholar of anything.

One only has to open a book such as Walker's 1971 edited volume [15] documenting one of the first workshops about interactive information retrieval, *Interactive Bibliographic Search: The User/Computer Interface*, which contains citations to hundreds of studies, to appreciate the depth of our field and one's place in it. Many people come to this field with the ill-formed notion that information science is somehow related to the information technology boom of the 1990s and that search interfaces and retrieval systems are contemporary inventions. Today, information science means different things to different people and does many different things for many different people. As educators, we have a responsibility to make sure students at all levels, and people more generally, understand the history of information science and importantly, the central role libraries and librarians have played in its development.

When I look back on some of the earlier search interfaces I developed and tested as a student, I cringe. They were so complicated and dense compared to today's standards, but they expected more from searchers and enabled searchers to go further, to use different search tactics, to interact with the information in different ways. In the past, the research literature contained an abundance of novel and innovative search user interfaces, but one has to look hard to find examples today as we have converged on one standard model, which has been optimized for a small number of search tasks. Other types of search tasks and other aspects of the information-seeking process have been neglected. How might we design tools that support information seeking and use, rather than just information search? How might we design tools that support interaction and engagement with information across a range of tasks and sessions? How might we design tools to help people dive deeper into the search results, discover underused information and create more diverse solutions to their information problems?

Through teaching students and studying the behaviors of research participants, I have noticed that people often have an inflated sense of their own search skills and the quality and completeness of the information they find (and what they can find), and overestimate what they have learned during the search episode. Have contemporary search interfaces transformed searchers into *passive* information *receivers* rather than *active* information *seekers*? For example, searchers do not have to create their own queries anymore, and soon they may not even have to think of their own information needs. Are search systems nudging us towards a homogenization of information needs? Are we given adequate control over search systems? Does an imbalance of control foster an illusion of understanding? Does this imbalance have negative consequences for the sense-making process? Many of these questions are actually not new, as many information scientists in the 1990s, including Belkin [16], raised them when contemplating the possibilities of artificial intelligence.

Researchers document success by showing reductions in time and amount of interaction and increased user satisfaction, but do these measures really allow researchers to understand the impact of search? Can people be satisfied with things that are not necessarily good for them? How can we measure the success of an entire search session, or a search that takes place over multiple points in time? These are questions I look forward to seeing addressed during the next 20 years of information search research. ■

Resources on next page

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