Jordan Beck | Research Statement

1. Summary

I study how people produce knowledge and how their practices might be supported or constrained by interaction design. My projects involve examining different aspects of knowledge production, such as: scholarly citations, problem setting, and dialectical reasoning. I believe it is important to analyze and understand these practices so that knowledge producers can become more aware, intentional, and strategic.

I draw upon interdisciplinary training in the humanities, qualitative inquiry, and design. I use qualitative data collection techniques, such as ethnographic-inspired observation, interviews, and workshops, and analysis techniques, such as critical essays, discourse analysis, and narrative analysis to understand knowledge production practices and identify opportunities for interaction design research. My goal is to create positive impact on the practices of the people I study while also generating a broader understanding of how they create new knowledge and how technology might help or hinder their efforts. Below, I describe three threads that capture my effort to understand and facilitate knowledge production vis-à-vis citations in scholarly communication.

2. Citation Function and Knowledge Production in Design Research

This project began with an interest in how and why design researchers cite the work of Donald Schön. Schön is one of the most highly cited scholars in the design research community but less was known about the nature of these citations. Using a citation classification framework (Harwood, 2009), I performed a content analysis of Design Research Society (DRS) conference publications to understand how and why authors cited Schön. This was the first study of its kind in the design research community. I analyzed four years' worth of conference proceedings and found that most authors cited Schön to credit him for ideas or to justify their own arguments, choice of research topic, or methods. I found very few citations engaging critically or attempting to build on Schön's work, and then I speculated as to why this might be the case.

For example, a bibliometric analysis of two decades of *Design Studies* articles identified Schön as the most highly cited scholar in the journal (Chai & Xiao, 2012). The authors hypothesized that a high citation count might reflect Schön's popularity, and my findings could be seen as affirming this hypothesis. Moreover, it is possible to see the lack of engagement with Schön's work as indicative of a widely held belief that readers will understand his concepts without amplification. This belief, in combination with word and page-count constraints, could influence decisions *not* to engage with source material.

I argued that design researchers ought to adopt more fine-grained citation practices especially given that many of Schön's influential concepts are contested and open to critical engagement. I argued that such practices would not only enhance the efficacy of scholarly communication but also protect against potential misunderstanding or misattribution of his work to other scholars, both of which I encountered in my analysis. This is especially important for novice researchers who are learning how to cite to

support arguments, give credit, demonstrate competence, and build personal and professional relationships.

3. Citation Motivations and Knowledge Production in HCI Research

Authorial motivations to cite have been characterized as personal and private, and researchers have questioned whether readers can reliably reconstruct authorial intent without consulting the authors themselves. Getting at authors' citation motivations is pertinent both for generating deeper understanding of research as a social system and, specifically, for developing a theory of citing (Cronin, 1984). HCI researchers have a long tradition of examining their practices, and, recently, they have become interested in citations (Marshall & Linehan, 2017). Building on existing work, I conducted an interview study with HCI researchers in order to understand their motivations to cite.

I conducted discourse-based interviews with nine HCI researchers. They provided me with a recent publication of their choice, and we talked through each in-text citation. For each citation, I prompted interviewees to explain their decision to cite: *Why did you cite this text?* I asked additional probing questions to clarify responses or get at additional motivations. Researchers described multiple motivations for citing. However, using thematic analysis, I identified three primary motivations: affirming personal relationships, building intellectual narratives, and serving strategic objectives. These findings revealed a mix of normative and social constructivist motivations (Kaplan, 1965; Latour, 1987) to cite in HCI research. Normative citations' primary purpose is to give credit or acknowledge intellectual debt. Social constructivist citations persuade readers to accept the legitimacy of an argument or reaffirm social relationships.

This study makes three key contributions. To begin with, it is the first interview study of its kind in HCI research, and, as such, it provides novel, empirically-grounded insight into citation practices in the field. It depicts HCI researchers as keenly aware of research as a social process, which means they can be more strategic and intentional when they cite. In addition, it shows that intellectual content is not the only important factor when it comes to citations. Sources that are irrelevant to the intellectual content of a paper might still be important for the personal relationships they affirm or the strategic initiative they support. For example, two interviewees described citations as guiding a manuscript to specific editors or reviewers. Finally, this study identifies an opportunity to examine the interactive systems that influence citation practices. Taking these systems into account is crucial for developing a theory of citing.

4. Interactive Reference Management Systems Influence Citation Practices

Interaction design research is distinct from other approaches to studying citations because of its interest in how interactive systems shape and strengthen the practices they support. This means that interaction design research examines systems both in terms of their functionality and their values and seeks to iterate on them in meaningful ways. Based on my previous studies, I became curious about whether and how reference management

systems (e.g. Zotero, Mendeley) account for different citation motivations. Do these systems embody a normative or social constructivist perspective of citations?

A set of reference management systems can be construed as a discourse. This means they tell us something about what citations are and even which of their qualities matter for scholarly communication. I used discourse analysis to examine Zotero and Mendeley and found that they tend to embody a primarily normative perspective of citation practices. They prioritize the intellectual content and relevance of a citation rather than the social or political factors authors may take into account. This could be because the designers' intentional effort to cultivate particular citation practices. However, I think that this is *dis*advantageous for authors. When authors are aware of the social and political factors that influence citation decisions they can be more intentional and strategic when they write. They can take these factors into account with greater care and awareness or they can disavow these factors in favor of the scientific norms of citing.

5. Future Directions

I am excited to continue exploring the threads I have described. To develop a theory of citing in HCI research, which is important for our understanding of HCI as a social system (Merton, 1957), it is necessary to study citation motivations *and* citation classification (Garfield, 1996), as well as to explore the ways interaction design research can complement and extend both. I am a collaborative researcher, and I have developed a network of international co-authors at the University of Montreal, Aarhus University, and the University of Nottingham, all of whom remain crucial to advancing my research into knowledge production practices. My goal is to support this research through external funding, primarily from public and foundation sources.

Longitudinal citation classification. How have citation practices in HCI research changed over time? Are there patterns corresponding to each of the "three waves" that distinguish its periods of intellectual development? My collaborators and I are assembling a corpus of texts published at the ACM Conference on Human Factors in Computing Systems (1981-2018) and exploring machine learning as a means to answer these questions. We are preparing a letter of inquiry for the Alfred P. Sloan Foundation's 'Data & Computational Research' grant program to fund this work.

Authors as citers over time. What motivates decisions to cite, or *not* cite, as research projects move forward? Citations list grow iteratively before stabilizing. What informs authors' decisions *not* to cite? Interviewing authors about their citation decisions after a project has ended provides crucial insights into citation practices. However, capturing decisions *in situ*, from the beginning of a research project through the completion of a draft manuscript, can lead to stronger validity claims. To date, very few studies of this type have been conducted, which could be because of scarce resources. Interviews, observations, and surveys can all be time intensive when it comes to citation decisions. Research in preparation will develop and use an interactive citation support system to provide participants with a seamless way to capture their rationale for adding or

removing citations from a project. My collaborators and I are preparing an NSF-CHS small grant proposal to fund the design and development of the citation support system.

Iconographic references. Research through design (RtD) has become an accepted approach to inquiry for Human-Computer Interaction. It involves doing design work that draws inspiration not only from scholarship but also from images and design artifacts. Citations are text-based, and text may not adequately account for the influence derived from images and artifacts. How can authors account for these kinds of influence? I have independently assembled a team of information designers, information scientists, and interaction design researchers to imagine possible future citation and reference list formats that mix text with images. Currently, we are designing mockups that we will use to conduct workshops with RtD practitioners and pursue funding through the Sloan Foundation's 'Scholarly Communication' grant program.

My projects are relevant to researchers in information science, human-computer interaction, and design research. I will continue to pursue publishing my work in ACM conferences such as *CHI*, *DIS*, and *CSCW*, as well as design research conferences such as *DRS* and *IASDR*. *ToCHI*, *HCI*, and *Interacting With Computers* are ideal HCI journals for publishing my interaction design-based research. I will also target premier design journals, such as *Design Studies*, *CoDesign,* and *Design Issues*.

6. References

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