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Extended abstract for poster

A Method to the Madness: A survey of research methods employed in studying science communication

<u>Overview</u>

The literature on scientific communities and scholarly communication reflects a continually developing field of inquiry. There have been a growing number of empirical studies conducted on collaboration and information sharing practices in specific scientific domains, tools and technologies utilized to foster communication and sharing in the science environment, and the roles of available infrastructures (i.e. institutional repository, cyberinfrastructures) to facilitate and support the continued access to scholarly products generated. The objective of this study is to identify the types of methodologies employed in the research of scientific work practices and the communities involved specifically tied to the sharing of scientific data. Through a meta-analysis of empirical studies published since 2005, the findings provide a framework for understanding the patterns and trends in methodologies for studying scientific data sharing and reveal those gaps in methods applied to examine this phenomenon. The investigation of research methods practiced establishes a foundation for adapting existing procedures and developing new methodological techniques more conducive to studying scholarly communities of science in the digital domain.

Methods detail a set of formal procedures or processes utilized to attain a set goal. They are challenged for soundness in reasoning and whether adequate details are provided that allow a qualified researcher to replicate the approach proposed in the study (Mitroff, & Kilmann, 1978). Likewise, investigators are responsible for acknowledging alternative methods to conduct the presented study and justify why their chosen approach is the most

appropriate and valid way to address the questions at hand. The selection of research methods to be used in a study is not only driven by the research questions of interest but also influenced by intrinsic ontological (what exists) and epistemological (how we know what we know) positions that shape decisions made (Huff, 2009). These paradigms fuel the generation of research questions and influence what scholarly activities are enacted to answer these inquiries based on underlying assumptions about the world at large. For instance, an epistemological perspective on research design would consider whether knowledge is accumulated through tested hypotheses and observed patterns in the world or that knowledge is amassed only as a result of personal experience (Baronov, 2004). Given the polarities demonstrated by some of these paradigms, it is difficult to view the design of a research study from an entirely different perspective (Kuhn, 1970).

The increase of scholarly publications and technological advances in information dissemination has given rise to an emerging area of study surrounding how and to what extent research data are shared among science investigators. Mandates by government funding agencies such as the National Science Foundation (NSF) and National Institutes of Health (NIH) require that all data produced from a funded project be made available as a means of accountability to the scholarly community and the general public (NSF, 2008; NIH, 2003). These policies also represent an increased expectation of transparency of research practices from the investigators of science. Scientific communication does not just span the formal dissemination of findings through journal publications but is also inevitably tied with the datasets and protocols used to produce such results. The integration of these data sharing policies in the scientific research context introduces a new facet to how these criteria are realized in the work activities and communication amongst scientists.

Methods

A focus on contemporary studies (2005-present) provides a current perspective for examining emergent trends and shifts in methodological practices employed for studying scientific communities and communication practices while serving to contrast those studies previously conducted which have become part of the scholarly canon for this area of research. These studies traditionally consist of ethnographies conducted on site within the laboratory setting (Beaulieu, Scharnhorst & Wouters, 2007). Adopting Meyer & Schroeder's (2009) technique for measuring impact of e-Research in the literature, a bibliometric sample is obtained from Web of Science using a search string that encompasses the breadth of research on sharing scientific data. This platform was selected based on its comprehensive coverage of journal publications in the sciences, social sciences and humanities; the Scopus database was also considered for this study but the additional resources retrieved such as conference presentations, patents, and links to topical websites were considered out of range for this endeavor.

Based on the preliminary retrieval of journal articles, this list was narrowed down further to only include studies that directly involve interaction with scientists as a primary source for data and information. Theses articles from the specified time period were analyzed using the following criteria:

- Methods and approaches used to study scientific work and communication (i.e. single or multiple methods implemented)
- Justification given for methodological approach selected
- Data source and sampling technique
- Discussion of methods' drawbacks (i.e. issues when executing specific procedures for data collection and analysis, fit with research questions)

Preliminary methods and approaches identified are ethnography, case study, semi-structured interviews, focus groups, log-analysis, survey, and citation analysis. Descriptive statistics will be generated to illustrate characteristics of the data on studying research methods.

Concluding Remarks

In the pursuit of scholarly knowledge, so much emphasis is placed on the findings and results rather than how these outcomes came to be. It is critical to understand the process and steps taken to bridge the gap between research questions asked and conclusions drawn. While the journal articles harvested on the sharing scientific of research data may not form the most complete list on the topic, the preliminary analysis of research methods used to study this activity contributes insight for methods research and the approaches to pursue or avoid. As the digital domain becomes the primary venue for information access and exchange in the sciences, the study of scientific communication and work must be flexible in its methods and cognizant of the dynamic environment.

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