

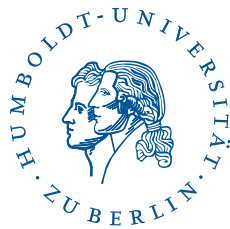
HUMBOLDT UNIVERSITY OF BERLIN

INSTITUTE FOR LIBRARY AND INFORMATION SCIENCE

**Seeking Research Software. A Qualitative Study of Humanities
Scholars' Information Practices.**

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September 9, 2020



Zusammenfassung

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Abstract

Abstract

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1. Introduction

Today, software is a central component of science. Throughout the entire research life cycle, researchers use software tools for data collection, transformation, analysis and presentation as well as for generating hypotheses, managing literature and writing scientific papers (Kethers et al., 2017; Pan et al., 2016; Wolski et al., 2017). Software has changed the way we actually do science. The complexity of the analyses carried out by researchers has increased, as has the amount of data that researchers can process. Software supports the documentation of the research process and enables reproducibility (Dallmeier-Tiessen, 2016; Waltemath and Wolkenhauer, 2016) and accuracy of results.

Due to the increased importance of research software for research (Katz, 2017) and the increase in the sheer number of software, it is all the more important for researchers to identify suitable software and select the one which best fits the research problem, the actual step in the research process, or the research data which has to be processed, and, in consequence, which satisfies the researchers information need (Wilson, 1994). In addition to increased efforts, difficulties in seeking software can also endanger the scientific reproducibility of studies or even lead to multiple developments of software with identical functions instead of reusing existing software (Hucka and Graham, 2018).

Information seeking of researchers is generally of great interest within the field of information, be it information behavior (Ahmadianyazdi and Chandrashekara, 2018; Barrett, 2005; Campbell, 2017; Catalano, 2013; Ellis, 1993; Hemminger et al., 2007; Korobili et al., 2011; Liyana and Noorhidawati, 2017; Rimmer et al., 2006; Rupp-Serrano and Robbins, 2013; Wang et al., 2008, e.g.) or information practices (Bøyum and Aabø, 2015; Bulger et al., 2011; Fry, 2006; Given and Willson, 2018; Roos, 2015, e.g.). However, seeking software is still rather challenging for researchers (Howison and Bullard, 2015). In a recent study, Hucka and Graham (2018) surveyed scientists and engineers from several fields to better understand their approaches and selection criteria for seeking software. They found out that "*finding software suitable for a given purpose remains surprisingly difficult*". Even in the domain of software development, the main challenge for software reuse are difficulties in finding software artifacts as Bauer et al. (2014) revealed in a study on code reuse at Google. Grossman et al. (2009) identified users unawareness of specific software tools. These results are all the more surprising because the participants in the cited studies come from a group with a greater affinity for software (software developers, engineers).

The lack of awareness of specific software tools among researchers has been addressed by several technical solutions. Code aggregators, specialized search engines, programming language package repositories, code and application repositories, research repositories (e.g. Zenodo or Figshare), and curated web lists and catalogues aid users in discovering software (Struck, 2018). Standards and tools for citing software enable re-

searchers to identify, cite and reuse software (Niemeyer et al., 2016; Smith et al., 2016; Soito and Hwang, 2017, e.g.). Research funding agencies and research organizations (Haupt et al., 2018; Katerbow and Feulner, 2018; Scheliga et al., 2019, e.g.) adopt guidelines for the development and use of research software with the aim of increasing the reusability and quality of the software artifacts developed. In turn, the technical solutions presented are also aimed more at a technically experienced audience, often even at software developers directly. For researchers with less experience in the use of software, e.g. from the humanities (Rimmer et al., 2006), seeking software remains a difficult undertaking.

The information-seeking behavior of humanities scholars in general has been addressed widely (Barrett, 2005; Bronstein, 2007; Bronstein and Baruchson-Arbib, 2007; Catalano, 2013; Ellis, 1993; Given and Willson, 2018; Korobili et al., 2011; Liew and Ng, 2006; Rimmer et al., 2006, e.g.). In his pioneering work on Grounded Theory in information-seeking, Ellis (1993) identified patterns of information-seeking of social sciences, sciences, and humanities scholars. In 2005, Barrett (2005) analyzed information-seeking habits of graduate student researchers in the humanities. Korobili2011 examined factors influencing information-seeking behavior at the philosophy faculties. While studies in information behavior draw on the cognitive viewpoint, information practice studies are guided by the ideas of social constructionism and collectivism (Savolainen, 2007; Talja et al., 2005; Talja and McKenzie, 2007). Humanities scholars information-seeking practices have also been addressed in several studies (Benardou et al., 2013; Bulger et al., 2011; Given and Willson, 2018; Palmer and Cragin, 2009). In previous studies, however, the classic research process of humanities scholars has been examined, which is mainly based on literature research. Although the information-seeking in the humanities is also based on software tools, e.g. databases, web-based editions, search engines, or online journals (Barrett, 2005; Rimmer et al., 2006), the search for software itself is rarely discussed. One of these rare examples, however a non-humanities one, is Hepworths et al. (2017) study of journalism professors' information-seeking behavior. While seeking new online tools, journalism professors rely on other journalism professors, followed closely by media-related foundations, media professionals, and conferences.

2. Theory

2.1. Information Seeking

- Information Science briefly described
 - Seeking, Searching, Retrieval
 - Information Seeking Research (Ingwersen2005) – Concepts: Strategies – Collaborative IS: Shah2013
 - Distinction between behaviour and practices:
 - the concepts of information behavior and information practice emerge from different discourses that open alternative viewpoints on information seeking. Savolainen2007
 - Bates2010 - information behaviour, Case2007 - information behaviour
 - behaviour: wilson, ellis, kuhltau, Niedzwiedzka2003 – different conceptualizations: intra/inter/extrapersonal (Feinman – transgender ib: pohjanen2016
 - practices: McKenzie and Talja

2.2. Information Practices

- Introduction: Savolainen2007, Talja2007
 - The social constructionist paradigm puts emphasis on social practices, “the concrete and situated activities of interacting people, reproduced in routine social contexts across time and space” (Rosenbaum, 1993, p. 239). A focus on practices rather than on behaviour shifts the analysis from cognitive to social and is consistent with the study of information seekers within their social context (for examples, see Rothbauer (2002), McKenzie and Davies (2002)).
 - Starting with McKenzie McKenzie2003, 2003a
 - and Talja
 - further examples of Information Practices: Savolainen 2007 - LitReview

2.3. Research Software

- definition - examples - importance for research, in the research process

2.3.1. Information Practices towards research software

- examples of studies, what has been studied yet

2.4. Domain Analysis: Humanities/Philology

- short: humanities, long: philology - definition - characteristics: subjects, work procedures, tools, ...

2.4.1. Information Practices of Humanists

- examples of studies, what has been studied yet - bisher nicht viel gefunden, practices of other scholars, but humanists seldom

3. Research Design

Since "[u]nderstanding the nature of information practices and their relation to the production of scholarship is important for both theoretical and applied work in library and information science (LIS)" (Palmer and Cragin, 2009, p. 165) this thesis sets out to study information practices of humanities scholars and their seeking for research software to better understand humanists needs and future LIS services (Case, 2008; Cunningham, 2010). With information practices we mean practices of seeking, managing, giving, and using information in context (Palmer and Cragin, 2009). The aim of this work is to investigate the information-seeking practices of early-career philologists when seeking research software. This research focuses on information needs of philologists, their information sources, problems, contradictions and barriers in finding information and their information sharing about research software. Special emphasis will be placed on the respondents' recourse to their own research process and the knowledge and practice structures in their field (Hjørland and Albrechtsen, 1995) which are socially constructed.

- RQ1:** What information seeking practices humanities scholars engage in when looking for software to use with research data?
- RQ2:** How do domain specific structures shape the information practices of humanists?

I chose an exploratory study design (Rinsdorf, 2013) where the personal realm of experience of each interviewee lies in the center of the analysis. Interviews are the main data gathering technique which are applied in a semi-structured manner, guided by interview guidelines, and implemented in a face-to-face manner (Bryman, 2004) in German language. With the interviews I obtain emotions, thoughts, and intentions of the participants and discover their perspective of the social world (Patton, 2002). I will conduct 4-6 interviews of about 60-90 minutes length. The interview data will be anonymized with amnesia¹ and analyzed with a qualitative content analysis to explore qualified hypotheses (Kohlbacher, 2006; Krippendorff, 2012; Mayring, 2000, 2014). It enables the researcher to include textual information and to identify its properties systematically. I will make all data generated during the concept, survey, analysis, and writing phases publicly available on GitHub², as long as it meets research ethics standards (e.g. interview audio records and unanonymized interview transcripts will be excluded).

¹<https://amnesia.openaire.eu>

²https://github.com/geyslein/Masters_Thesis

3.1. Data Gathering

Interviews - zweistufig - every interviewee interviewed twice - due to corona - no experience with videoconferencing: schneller erfahrungen sammeln, mehr interviews/längere dauer profitieren davon - aufmerksamkeitsspanne geht schnell nach unten - meine Präferenz aber auch die ersten beiden angefragten Personen fanden es in ordnung - flexibilität: möglichkeit der analyse des ersten interviews und dann anpassungen möglich (grounded theory anteile) - rekursion auf letztes interview möglich bei den interviewees, reflektion in der zwischenzeit -

3.2. Data Processing

- transcription [Edwards \(2003\)](#)

3.3. Data Analysis

- qual. content analysis ([Mayring, 2014](#)). - The model/findings are derived from accounts of information practices and not from observation of information practices as it happened.

4. Findings

5. Discussion

- classical philologists do not reflect much on the research process - which is why they do not regard software use either as a matter of fact, the analysis focus is on information practices in the widest sense

- tool selection is very much trust based (recommendations/consulting from colleagues and friends/family)

- negative experiences in digital humanities projects induce skepticism towards digital tools

- van Zundert (2012) large scale digital infrastructures as dead end

- difficulties in formulating the right search terms (what they describe as well as what I could listen to during the interviews)

- Constant et al. (1996) - kindness of strangers Edmond (2005) - role of professional intermediaries Gunning (1978) - librarian should participate in research process Monroe-Gulick et al. (2013) - librarians as partners

6. Conclusion

7. Zusammenfassung (German Conclusion)

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Appendices

A. Validation of Interview Questions

B. Interview Guide

The contents...



Name: Vorname:

Matr.Nr.:

Eidesstattliche Erklärung zur

- ☐ **Hausarbeit ***
- ☐ **Bachelorarbeit ***
- ☐ **Masterarbeit ***
- ☐ **Abschlussarbeit im Bibliotheksreferendariat ***

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Unterschrift