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Information behavior in educational information systems. Teachers searching for lesson preparation

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Report from Dagstuhl Seminar 17092

Search as Learning

Edited by

Kevyn Collins-Thompson[1], Preben Hansen[2], and Claudia Hauff[3]

1 **University of Michigan – Ann Arbor, US, kevynct@umich.edu**
2 **Stockholm University, SE, preben@dsv.su.se**
3 **TU Delft, NL, c.hauff@tudelft.nl**

Abstract

This report describes the program and the results of Dagstuhl Seminar 17092 "Search as Learning", which brought together 26 researchers from diverse research backgrounds. The motivation for the seminar stems from the fact that modern Web search engines are largely engineered and optimized to fulfill lookup tasks instead of complex search tasks. The latter though are an essential component of information discovery and learning. The 3-day seminar started with four perspective talks, providing four different views on the topic of search as learning: interactive information retrieval (IR), psychology, education and system-oriented IR. The remainder of the seminar centered around breakout groups leading to new views on the challenges and issues in search as learning, interspersed with research spotlight talks.

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1 Executive Summary

Claudia Hauff
Kevyn Collins-Thompson
Preben Hansen

Search is everywhere – it penetrates every aspect of our daily lives and most of us can hardly manage a few hours without resorting to a search engine for one task or another. Despite the success of existing (Web) search technology, there are still many challenges and problems that need to be addressed. Today's Web search engines (often also powering domain-specific and site-specific search) are engineered and optimized to fulfil individual users' lookup tasks. This efficiency, however, also means that we largely view search systems as tools to satisfy immediate information needs, instead of rich environments in which humans heavily interact with information content, and search engines act as intelligent dialogue systems, facilitating the communication between users and content. Web search engines are not designed for complex search tasks that require exploration and learning, user collaborations and involve different information seeking stages and search strategies, despite the fact that more than a quarter of Web searches are complex. In recent years, there has been a growing recognition of the importance of studying and designing search systems to foster discovery and enhance the

learning experience during the search process outside of formal educational settings. Searches that lead to learning, are naturally complex. Research progress in this area, however, is slow, with many more open questions than answers. Several critical bottlenecks and major impediments to advancements in the search as learning area exist, including (i) the reliance on small-scale lab studies to evaluate novel approaches which severely limit the diversity of investigable factors as well as the ecological validity and generalizability of the findings; (ii) the lack of awareness among researchers' initiatives in this very multidisciplinary area of work; and (iii) the lack of a shared research infrastructure. The 3-day seminar gathered 26 prominent researchers from the fields of information retrieval, psychology and the learning sciences in order to address the critical bottlenecks around search as learning. The seminar sessions alternated between tutorial-style presentations to learn from each other's disciplines and interactive breakout sessions to find a common ground and address the most pressing issues related to the four big research themes of (i) understanding search as a human learning process; (ii) the measurement of learning performance and learning outcomes during search; (iii) the relationship between the learning process and the search context; and (iv) the design of functionalities and search system interventions to promote learning.

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3.8 Information behavior in educational information systems – Teachers searching for lesson preparation

Marc Rittberger (DIPF – Frankfurt am Main, DE)

Searching is one of the main competences with respect to the digitalization of education. In Germany the "Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK)" states in her strategy "education in the digital world" that searching, processing and curating are main competences needed in education. We think, that one of the consequences for learning may be, that education, e.g. in schools, will change from knowing about things to also know where and HOW to find things. In this context of digitalization the organization of learning environments is changing, e.g. by using open educational resources. In our research we observed teachers searching for lesson preparation and we analyzed several data resources, where teachers are searching for learning materials. Results show, that teachers in German speaking countries demand quite concrete questions in the fields of content, method, or aims of lessons. Questions are less concrete, if teachers have information needs with respect to control, sanctions, or organization of the lesson.

3.9 Search as Learning or Learning by Search

Marcus Specht (Open University – Heerlen, NL)

Searching information is a key component of nearly all human learning processes. Recently the discussion about information literacy has become very popular especially when using web search engines and digital information repositories in educational settings. At the Welten Institute we have been exploring different directions for supporting teachers and learners in search activities. Desktop research is a major search activity being used from primary school to university level. The major elements of search activities include the development