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Library research as collaborative information seeking

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ABSTRACT

Today's students are accustomed to collaborative information behavior, with group work being a common requirement in educational settings. This research focuses on the collaborative information seeking behavior of college students through a library-based study of individuals and pairs conducting exploratory research for a class assignment. Participants used a collaborative search system when completing the study tasks. Findings showed that students working collaboratively found more useful sources and achieved greater information coverage, while individuals showed better results for query effectiveness and number of relevant sources. Challenges that students face when conducting library research were identified. The findings offer librarians, instructors, and learning technologists suggestions as to how to support group work, and how collaborative search systems can address the challenges faced by students doing group work using library resources.

1. Introduction

Many students today collaborate in producing and sharing information in participatory online environments. These students expect to work in groups, sharing knowledge and interacting socially with peers (Flanagin & Metzger, 2008). Networked social computing adds interactivity elements that students value, such as collaboration and peer-based learning (Head & Eisenberg, 2010; Manuel, 2002). Social interactions in online learning environments allow youth to participate in conversations with others and to become involved in the process of knowledge creation (Lankes, 2008). The connection-forming, just-in-time, reflective, and learner-centered characteristics of these networked tools facilitate active involvement in the learning process, which is critical to effectively educating today's students (Halse & Mallinson, 2009). These learners are accustomed to a familiar socio-technical environment of social media tools such as blogs, chat, discussion forums, collaborative online editing, digital media creation, and social networking (Halse & Mallinson, 2009). While these peer-to-peer distributed systems of collaborative work are characteristic of the Internet age (Davidson & Goldberg, 2009), understanding the impact of these systems on student learning is developing as an area of research.

2. Problem statement

While students often use the library for collaborative group projects, there has been little research on the information seeking behavior of college students collaboratively using library resources. Group work is a common requirement in educational settings but collaborative information seeking behavior is still not well understood (Todd & Dadlani, 2013; Toze & Toms, 2010). While there has been significant research into how students conduct academic research (e.g., Head, 2013; Head & Eisenberg, 2010; Rowlands et al., 2008), there is little research on students' collaborative information seeking processes in higher education (Hyldegård, 2009), specifically in the area of students working on group projects (O'Farrell & Bates, 2009; Sormunen, Tanni, Alamettälä, & Heinström, 2014). In addition, little research has been conducted on identifying the challenges that students face when working on group projects involving library research, that is, information seeking in an academic context using library databases and resources. To address this gap, a library-based research study was conducted that investigated the collaborative information seeking behavior of students working on a group assignment. This study addresses the following research questions

RQ1: How do students conduct collaborative library research, as compared to individuals?

RQ2: What challenges do students face when conducting library research, and how can they be addressed through an online collaborative search system?

A better understanding of how students seek information collaboratively using library resources will help librarians, instructors, and information technologists provide support and assistance to students conducting group projects. The findings contribute to the design of assignments and instruction to help students conduct effective library research, as well as contributing to the development of tools to support collaboration.

3. Literature review

Individual information-seeking behavior has been the subject of much research in information science (Poltrock et al., 2003; Reddy &

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Jansen, 2008; Shah, 2010). Many information-seeking models and theories have focused on how individuals interact with complex information spaces (Paul & Morris, 2011; Saleh & Large, 2011). However, information seeking is often a social process involving groups of people who engage in multiple activities to achieve goals that would be difficult to achieve individually (González-Ibáñez, Haseki, & Shah, 2013; Morris, 2008; Reddy & Dourish, 2002). Users often have a strong social inclination throughout the search process (Evans & Chi, 2010). Despite the extensive study of information seeking by individuals, less is known about how users seek information during collaborative search (Paul & Morris, 2011; Shah & González-Ibáñez, 2011). Collaborative search is also referred to as collaborative information behavior (CIB) (Talja & Hansen, 2006) and collaborative information seeking (CIS) (Shah & González-Ibáñez, 2011). CIB has been defined as people's process of activities to resolve their information needs (Paul & Reddy, 2010), the activities that a group or a team of people undertakes to identify and resolve a shared information need (Poltrock et al., 2003), and as an activity of two or more actors to identify information to accomplish a task or solve a problem (Talja & Hansen, 2006). CIS has been defined as "an information-seeking process that takes place in a collaborative project (possibly a complex task) among a small group of participants (potentially with different set of skills and/or roles), which is intentional, interactive, and mutually beneficial" (Shah, 2014, p. 219). Some core processes of both CIB and CIS include: communication, discussion, and exchange (Hyldegård, 2009); giving and receiving feedback or help, sharing knowledge, and exchanging resources and information (Curtis & Lawson, 2001); and information sharing, coordination, and awareness (González-Ibáñez et al., 2013; Shah & Marchionini, 2010). Shah notes that CIB is "not only an information-seeking activity involving collaboration, but also a collaborative activity with the goal of information seeking" (2014, p. 24). Collaborative information-related activities are dynamic and dependent on the assigned task and its complexity (Saleh & Large, 2011), and can be synchronous or asynchronous, and co-located or remote (Paul & Morris, 2011; Shah, 2014; Twidale, Nichols, & Place, 1997).

While many CIS studies have focused on professionals such as engineers (Bruce et al., 2003; Fidel, Pejtersen, Cleal, & Bruce, 2004; Hertzum & Pejtersen, 2000), military personnel (Prekop, 2002; Sonnenwald & Pierce, 2000), information technology workers (Morris, 2008), software designers (Poltrock et al., 2003), scientists (Sonnenwald, 2007), and health care workers (Reddy & Jansen, 2008), there is little CIB literature about the information behavior of students working on collaborative group projects (Hyldegård, 2006, 2009; O'Farrell & Bates, 2009; Sormunen et al., 2014). Studies that focus on students' information seeking behavior (e.g., George et al., 2006; Kuhlthau, 1991, 1993; Limberg, 1999) have often treated student's learning and information seeking as individual activities, not as collaborative or group work. One of the most influential models of student information seeking behavior is Kuhlthau's Information Search Process (ISP) model (Kuhlthau, 2004), which has been fundamental to research in information behavior (Limberg, 2007). Based on a study of high school students, the ISP model follows an individual user's experience in the process of information seeking through a series of thoughts, feelings, and actions (Kuhlthau, 2004). This model was developed from the individual constructivist perspective, in which information searching is seen as a component of a process of constructing knowledge (Sormunen, et al., 2014). Kuhlthau's model also identified the teacher-librarian as the primary intermediary in the search for information, rather than other students (Meyers, 2007). Given the importance of Kuhlthau's ISP model, researchers have explored how to extend its individualistic approach to the social, contextual, and collaborative dimensions of information seeking (Saleh & Large, 2011). In an education setting, Hyldegård (2009) found that student group members' behavior followed the general stages of the ISP model, although factors such as work-task characteristics and social interactions played important roles in the outcomes, and the problem-solving process shifted between the group and the individual perspective (Hyldegård, 2009). In a laboratory study, Shah and González-Ibáñez (2010) showed that while some stages of the ISP model apply to collaborative information seeking, it does not cover the social dimension of group search and that students do not always follow the defined order of the ISP stages (Shah & González-Ibáñez, 2010). Lee (2013) also found that group members' general information seeking behavior followed Kuhlthau's ISP model, although some students did not follow in one direction but cycled between stages.

Studies in educational settings have demonstrated the benefits of collaborative learning. Johnson and Johnson (1986) found that learners in collaborative groups achieve higher levels of attention and remember information longer than individual learners. Gokhale (1995) found that collaborative learning increases critical thinking among students. Limberg (1999) suggested that students' active collaboration in a group assignment often leads to more successful searching, more advanced information use, and better learning outcomes. Mills (2003) found that group projects offer students the potential to foster deep learning and develop a wider range of skills. Schellens and Valcke (2006) suggest that collaboration can promote learners' knowledge construction. Students have positive perceptions of group projects and believe that they develop useful skills, such as teamwork skills and sharing information resources, from collaborative work (O'Farrell & Bates, 2009). Todd and Dalani (2013) suggest that collaborative learning can improve teamwork and increase altruistic behaviors. Collaborative group work also helps students explore different viewpoints on an issue, evaluate usefulness of information, and extract main ideas from sources (Kiili, Laurinen, Marttunen, & Leu, 2012). González-Ibáñez, Haseki & Shah (2013) found that collaborative search has the potential to yield better results than individual efforts due to shared effort.

Along with the benefits of collaborative group work, there are challenges as well. Kuhlthau's ISP model identified negative feelings that individual information seekers experience, such as uncertainty, confusion, frustration, and disappointment (Kuhlthau, 2004). Collaborative work can introduce additional challenges to the process. Some of the challenges of working collaboratively that have been identified by researchers include:

- developing focus, feeling overwhelmed by the amount of information found (Van Aalst, Hing, May, & Yan, 2007);
- making sense of information found by other group members, managing constant interaction with others, struggles with group dynamics (Paul & Morris, 2011);
- differing levels of motivation and contribution (Mills, 2003);
- communicating with group members, scoping and focusing the topic, sharing information (Lee, 2013);
- defining project scope, setting and meeting deadlines, managing group dynamics, ensuring accountability among group members (Leeder, Lonn, & Knox, 2013);
- negotiating tasks, cooperating, teamwork, self-organization (Reynolds, Baik, & Li, 2013); and
- narrowing down search results, focusing their topic, selecting relevant information, synthesizing information, clarifying expectations with other team members (Kim & Lee, 2014) .

These challenges could potentially present serious obstacles to students successfully engaging in productive group work and collaborative information seeking activities. Since students may not necessarily possess effective collaboration skills, educators may need to understand and adjust student perceptions of group work prior to engaging them in collaborative work (Todd & Dadlani, 2013). Collaborative work undertaken by student groups can benefit from explicit focus on the dynamics of collaborative inquiry by classroom instructors (Kuiper, Volman, & Terwel, 2009).

Students also face challenges when attempting to use library resources during their academic research. Research in library and