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Eighth graders' web searching strategies and outcomes: The role of task types, web experiences and epistemological beliefs

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Abstract

This study reported an investigation of eighth graders' (14-year-olds) web searching strategies and outcomes, and then analyzed their correlations with students' web experiences, epistemological beliefs, and the nature of searching tasks. Eighty-seven eighth graders were asked to fill out a questionnaire for probing epistemological beliefs (from positivist to constructivist-oriented views) and finished three different types of searching tasks. Their searching process was recorded by screen capture software and answers were reviewed by two expert teachers based on their accuracy, richness and soundness. Five quantitative indicators were used to assess students' searching strategies: number of keywords, visited pages, maximum depth of exploration, refinement of keyword, and number of words used in the first keyword. The main findings derived from this study suggested that, students with richer web experiences could find more correct answers in "close-ended" search tasks. In addition, students with better metacognitive skills such as keyword refinement tended to achieve more successful searching outcomes in such tasks. However, in "open-ended" tasks, where questions were less certain and answers were more elaborated, students who had more advanced epistemological beliefs, concurring with a constructivist view, had better searching outcomes in terms of their soundness and richness. This study has concluded that epistemological beliefs play an influential role in open-ended Internet learning environments.

Keywords: Web search; Epistemological beliefs; Web experiences; Searching strategy; Constructivism

1. Introduction

Currently, people's daily lives are greatly influenced by information technologies like computers and the web. According to Gulli and Signorini's (2005) estimation, in the mid-2005, there were more than 11.5 billion pages on indexable web. New webpages appear at the rate of 8% per week (Ntoulas, Cho, & Olston, 2004). However, the increasing number of webpage has also brought problems such as information overload,

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disorientation, and decreased information quality (Ahuja & Webster, 2001; Rockland, 2000). Although plentiful information can be accessed on the web, there is no guarantee to its validity and reliability in any way (Tsai, 2001). Therefore, in order to successfully find useful information on the web, users need to consider the usages of their searching strategies to generate better outcomes.

Web searching is a complicated cognitive skill. Therefore, the outcomes of web searching are influenced by a variety of factors. Rouet (2003) found that users' personal characteristics and the nature of the searching task were two main factors related to their searching strategies and outcomes. Users' practical experience on web searching also influenced their searching outcomes (Beaufils, 2000; Bilal, 2000; Fenichel, 1981; Guthrie, 1988; Kim, 2001; Navarro-Prieto, Scaife, & Rogers, 1999). Palmquist and Kim (2000) concluded that students' practical experiences on web searching played a more important role in their searching outcomes than their general experiences on using computer and the Internet. Users with less training on web searching needed more time to find information, tended to make more mistakes during the searching process, and had less ability to conduct successful searching on the web. Furthermore, because novices on web searching did not know how to employ searching strategies like experienced web searching users, they tended to browse the information and navigate the Internet or hypertext in a linear way (Hölscher & Strube, 2000; Qiu, 1993a).

The nature of searching task was another influential factor on users' web searching strategies and outcomes (Navarro-Prieto et al., 1999). Qiu (1993b) found that users had more analytical searching in "specific" "closed" tasks, while they conducted more browsing in tasks with "general" "open" answers. In addition, Bilal's (2000, 2001) and Kim and Allen's (2002) studies with students from different age groups all found that comparing to research-based ("open") tasks, students have higher percentage of success in fact-finding ("closed") tasks. However, still not much research explored how different factors, other than searching strategies, might contribute to searching outcomes of different tasks.

Recently, educators highlight the role of users' epistemological beliefs in web searching and web-based cognitive activities (Hofer, 2004; Tsai, 2004a). People's epistemological beliefs reflect their views about the nature of knowledge and knowing, and these views are found to be related to ways of learning or approaches to processing learning tasks (Hofer & Pintrich, 1997). Hofer (2004) and Tsai (2004a) have asserted that students' epistemological beliefs guide their cognitive as well as metacognitive activities in web environments. Learners with more constructivist-oriented epistemological beliefs tended to express more preferences to engage in metacognitive thinking in web environments (Tsai & Chuang, 2005). In addition, Whitmire (2003) found that students' epistemological beliefs had great influence on their decision-making process when they searched the web. Recent research revealed that college students who held less sophisticated epistemological beliefs were less likely to engage in the web-based discussion and communication activities (Braten & Stromso, 2006). Therefore, learners' epistemological beliefs should be considered as an important factor when studying their activities on the web.

Derived from existing studies as discussed above, a model about relevant factors on web searching outcomes is presented in Fig. 1. Because web searching is a series of cognitive activities, users' prior web experi-

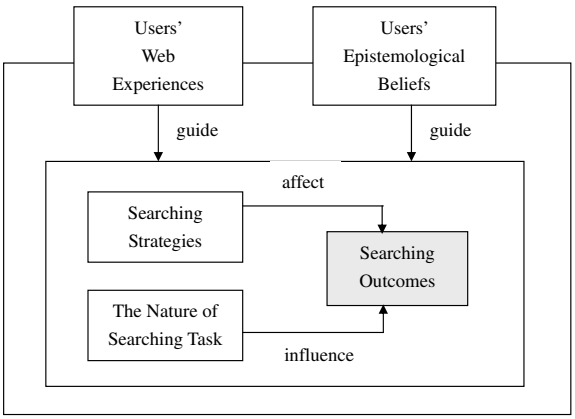

Fig. 1. A model of relevant factors on web searching outcomes.