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Laypersons Searching for medical information on the Web: The Role of Metacognition

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Introduction

Today, the WWW is a very prominent resource of health-related information, both, for medical experts and laypersons (e.g. Fox, 2003). The latter often retrieve these information to make an informed decision. However, one cannot expect laypersons to deal with these information effectively offhand. We rather assume that to succeed, laypersons need to actively guide their search process on a metacognitive level, since metacognitive strategies are known to play an important role in the comprehension of complex documents (e.g. Hill & Hannafin, 1997). However, it is yet unclear whether laypersons spontaneously guide their web search on a metacognitive level and - in case they do so - whether the use of metacognitive strategies is related to search success.

Method

To answer this question we carried out a study in which 20 university students with little medical knowledge participated. Their task was to search the WWW for information on cholesterol in order to help a fictitious friend make a knowledge based decision: "Is a medical treatment of my high level of cholesterol necessary?". Participants were provided with 11 pre-selected websites containing controversial information on the topic. Search time was limited to 35 minutes. Knowledge acquisition, decision conflict and detailedness of written credibility assessments functioned as measures of search success. Cognitive processes were ascertained using a think-aloud procedure. Verbal protocols were analyzed using a category system which comprises the categories *Planning*, *Monitoring*, *Evaluation* and *Elaboration*. Inter-rater reliability was 82% across all categories.

Results

Results show that participants differ considerably in their metacognitive activity (see Table 1). Participants' metacognitive activity is rather consistent across the four categories (Cronbach's $\alpha = .78$). Interestingly, metacognitive activity is positively related to knowledge acquisition. Correlation coefficients range from $r = .45, p < .05$ (Monitoring), to $r = .57, p < .01$ (Evaluation). No significant correlation could be obtained for the relationship of Planning and knowledge acquisition ($r = -.18, ns.$).

Results concerning subjectively experienced decision conflict reveal a negative but nonsignificant correlation with metacognitive activity ($r = -.23, ns.$). The assumption that

Table 1: Mean number of metacognitive statements and standard deviations for each category.

Category	<i>M</i>	<i>SD</i>
Planning	10.90	6.61
Monitoring	13.95	6.86
Evaluation	19.00	12.60
Elaboration	11.65	9.48

better knowledge of the topic cholesterol is related to subjectively experienced decision conflict could be confirmed only partially. While factual knowledge did not correlate significantly ($r = -.13, ns.$), comprehension of the subject matter was significantly correlated with scores on the Decision Conflict Scale ($r = -.49, p < .05$).

Finally, analysis of participants' written credibility assessments show that the more participants evaluate information during the search process, the better they are able to report on the credibility of information after their search ($r = .46, p < .05$).

To summarize, in the present study the importance of metacognitive strategies for a successful web search could be demonstrated. The results point to the need for metacognitive interventions which support laypersons in dealing with complex technical information on the WWW. Therefore, we have developed the computer based tool *met.a.ware*. The tool enables laypersons to systematically store the information they have found on the web. For this, laypersons have to assign the information gathered to different tabs, which are labeled with aspects of the topic cholesterol. Furthermore, laypersons are prompted to engage in metacognitive activities each time they add information to the system. In ongoing experiments, different types of metacognitive prompts (i.e. evaluating information and monitoring ongoing comprehension) are tested against each other. Thereby, we seek to separately examine the contributions of different metacognitive activities to a successful web search. First results from our current experiments point to the supportive character of *met.a.ware*.

References

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