

*Evidence Summary***Mental Model Construction in MedlinePlus Information Searching Involves Changes and Developments in Cognition, Emotion, and Behaviour****A Review of:**

Zhang, Y. (2013). The development of users' mental models of MedlinePlus in information searching. *Library & Information Science Research*, 35(2), 159-170.
doi:<http://dx.doi.org/10.1016/j.lisr.2012.11.004>

Reviewed by:

Antonio DeRosa
Reference Librarian
Memorial Sloan-Kettering Cancer Center
New York, New York, United States of America
Email: derosaa1@mskcc.org

Received: 6 Aug. 2013

Accepted: 11 Oct. 2013

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Abstract

Objectives – To explore the construction of mental models as a dynamic process and how users understand a consumer health information system, MedlinePlus, during a search session.

Design – Face-to-face interview.

Setting – Large university.

Subjects – A total of 38 undergraduate students participated in the study. All majoring in non-medical fields, such as art history, psychology, business, and communication studies.

Methods – Participants were randomized into two groups: the simple task group and the complex task group. Simple task group members were asked to perform 12 simple tasks while the complex group members performed three more-involved tasks. Simple tasks were defined as succinct questions with finite answers while complex tasks were open-ended and required more cognitive activity and synthesizing on the part of the individual. Participants in both groups were then given four simple tasks and two complex tasks to perform. Data was derived by video recording search sessions with individuals and interview-like questions for the tasks performed. Participants were given a brief introduction to the search session design and sessions took place in a private lab. Since the

aim of the study was to track participants' mental modeling processes over time, coding of data was caught at three different times throughout the search sessions: T1 (MM₁) after five minutes of free exploration, T2 (MM₂) after the first search session, and T3 (MM₃) after the second search session.

Main Results – The author discusses the demographic specifics of the population participating in the study. Although participants were split into two groups, the results were combined to be more meaningful. Out of the 38 participants, 20 were female and 18 were male with ages ranging from 18 to 22. They had, on average, 10 years of computer experience and their average spatial ability score was 12.71. Also on average, they spent about 20 minutes completing the first search session and 12 minutes completing the second search session. The results show that participant-developed mental models of the MedlinePlus web space can be clustered into the following five theoretical components (this information is quantified in tables throughout the paper): system, content, information organization, interface, and procedural knowledge.

Conclusion – The study allowed participants to articulate their mental models and representations while conducting predefined searches during private sessions using MedlinePlus. The study also illustrates how users' mental models of a system developed during interactions with an online system, on a theoretical level. Little is actually known about how mental models are developed when users interact with an information system. The study serves to explore this arena and reveals that the mental model construction involves changes and developments in three parallel dimensions: cognition, emotion, and behaviour. Also, these dimensions are accompanied by three mental activities: assimilating new concepts, phasing out previously perceived concepts, and modifying existing concepts. The mental model construction process could be a useful tool to build user models and make better design decisions for information systems.

Commentary

The aim of the study was to better understand how a set of users establish mental models while searching an online information resource, namely MedlinePlus. Participants were randomly assigned into two groups and asked to perform a series of tasks (different task-types for each group). Although results were recorded in a regimented manner, it is difficult to tell whether or not the population chosen is free of bias. Also, there is no discussion of inclusion/exclusion of participants or individual session results in the paper, if any.

The author does not clarify exactly how the face-to-face interviews were conducted. For instance, were there other observers in the room while the sessions were taking place? If so, the author must ensure that the possibility of observer bias was reduced. Perhaps one of the most important omissions is that the author does not supply the questionnaire or instrument used to review and capture the responses during the task-performing sessions in the study.

The author clearly defines her step-by-step process for conducting the study. The methodology is well laid out and has potential to be reproduced by other investigators, even without the actual questions asked during the sessions. The results of the study are effectively outlined as they pertain to the design and data collection processes. From beginning to end, there is a clear path that the investigator has taken to perform the study.

This research shows the need for information professionals to better understand mental models: what they are, how users create them, and how they are used to more fluidly navigate a database or other online information system. Further consideration of mental models can help database and web developers make more informed decisions about the designs of their interfaces and hierarchy of their content, which can aide in producing more intuitive databases for their users (Hvovrecký, 2010).

Finally, the author gives some advice for further research in the field of user-developed mental models. Since most users create mental models based on a database from previous, similar resources they have used, it would behoove researchers to look into providing users with familiar metaphors or systems to help them learn a new system. This cognitive familiarity already exists in the literature and would strengthen the argument of this paper (Johnson-Laird, 2013).

The appraisal of this mental model development study was conducted using the Evidence-Based Library and Information Practice (EBLIP) Critical Appraisal Checklist from Memorial University of Newfoundland (Glynn, 2006).

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