

The Construction of Mental Models of Information-rich Web Spaces: The Development Process and the Impact of Task Complexity

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This study investigated the dynamic process of people constructing mental models of an information-rich web space during their interactions with the system and the impact of task complexity on model construction. In the study, subjects' mental models of MedlinePlus were measured at three time points: after subjects freely explored the system for 5 minutes, after the first search session, and after the second search session. During the first search session, the 39 subjects were randomly divided into two groups; one group completed 12 simple search tasks and the other group completed 3 complex search tasks. During the second search session, all subjects completed a set of 4 simple tasks and 2 complex tasks. Measures of the subjects' mental models included a concept listing protocol, a semi-structured interview, and a drawing task.

The analysis revealed that subjects' mental models were a rich representation of the cognitive and emotional processes involved in their interaction with information systems. The mental models consisted of three dimensions (structure, evaluation and emotion, and (expected) behaviors); the structure and evaluation/emotion dimensions consisted of four components each: system, content, information organization, and interface. The construction of mental models was a process coordinated by people's internal cognitive structure and the external sources (the system, system feedback, and tasks) and a process distributed through time, in the sense that earlier mental models impacted later ones. Task complexity also impacted the construction of mental models by influencing what objects in the system were perceived and represented by the user, the specificity of the representations, and the user's feelings about the objects.

Based on the study results, recommendations for employing mental models as a tool to assist designers in constructing user models, eliciting user requirements, and performing usability evaluations are put forward.
