

Conceptual Approach to Model the Effects of Feedback on Mental Model Activation

Oliver W. Klaproth (oliver.klaproth@airbus.com)

Department of Cognitive Modeling in Dynamic Human-Machine Systems
Technische Universität Berlin

Nele Russwinkel (nele.russwinkel@tu-berlin.de)

Department of Cognitive Modeling in Dynamic Human-Machine Systems
Technische Universität Berlin

Abstract

A concept of a cognitive model is presented that allows for examining effects of negative feedback on changing mental models of a user interface. We hypothesize that users who are given more evidence against their mental model are less likely to change it, depending on the type of feedback they are provided with. Assumptions about the effects of feedback are explained from a theoretical account of mental model activation based on mental set and fixation. We propose an experimental keypad task that requires users to switch from a mental model of a calculator keypad to a telephone mental model based on two types of feedback. A scheme for an ACT-R cognitive model is provided, showing how predictions on user behavior can be made using spreading activation and utility learning mechanisms.

Keywords: Mental models; keypad; mental fixation; redistribution theory; mental set; ACT-R; partial matching; utility learning.