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The Cognitive Impact and Function of Metaphors Used in Human/Computer

Interaction: Why and How Should it be Assessed?

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Introduction

In our everyday lives, we use metaphors to systematically organize our experiences of the world. These metaphors structure our conceptual understandings and expectations concerning symbols and actions we encounter (Lakoff and Johnson, 1980). User interface designers have commonly drawn on various metaphors for the layout of screen content and for navigation tools (Erickson, 1990). We suggest that for a metaphor to be most useful in the interface it should coincide with user expectations for the metaphor. Additionally, a designer should provide different metaphors to accommodate different user strategies for accomplishing a task (e.g., a user who expects a map in order to navigate an interface should find one, but a user who doesn't want a map shouldn't be forced to use one).

Metaphors in the user interface

Research into the use of metaphors in human/computer interaction is far from complete. In this paper we describe preliminary results from two on-going investigations into the use of metaphors in the interface. One study examines user expectations concerning metaphors in use on the web side Total New York. The second study considers the effects of two different navigation tools, each of which draws on different metaphors, on user strategies in a hypermedia environment. These studies support the notion that users bring expectations to encounters with the user interface, which are based on the metaphors used there, which either facilitate or hinder the human/computer interaction. Additionally, the studies support the more general notion that research into user interfaces that are systematically designed in accordance with a theory of how the information will be cognitively processed will be easier for users to work with and afford greater interaction benefits.

Generative function of metaphors

Metaphors are embedded in several elements of design: the layout of the screen, the manipulatable objects available to a user on the interface (buttons, scroll bars), the icons, tracking mechanisms and navigation tools. In the Total New York study, we hypothesized and found support for the claim that the generative nature of metaphor prototypes would be evident in the user's expectations and reactions, inclining users to expect metaphors to behave consistently with the metaphor prototype and inclining users to look for coherent clusters of metaphors and to tend to overlook and/or be surprised by those metaphors which didn't fit. For example, the subjects expected and found a "home" icon on TNY pages which they anticipated would return them to the initial page of the site. However, the designers of the TNY site provided *different* pictures on the initial page of the site, when a user returned to it a second time. This made subjects feel "unsettled" and "uneasy." One subject described this as "weird." The second study is a follow-up of an earlier study in which undergraduate students were assigned to one of two hypermedia system conditions: a map-like navigation tool or a menu-like navigation tool. It was found that the ability to take advantage of a hypermedia navigation tool was related to the ability to represent the hypermedia environment spatially (Diehl & Ranney, 1996). In the present study, the navigation systems are being examined to determine what type of influence is typical of each navigation method.

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