Abstract

This dissertation demonstrates an iterative *Observe->Analyze->Intervene,* design research methodology to incrementally improve the understanding and the support of information handling in the conceptual design process. It reports on two observational studies, based on the verbal protocol method, and an information management service.

The first observational study is a detailed analysis of the questioning behavior of designers to understand information needs during a redesign task. This resulted in the design information framework, which classifies information that should be captured during a design process for effective reuse at a later date. This framework was used to develop an information management service called Dedal, a tool for indexing, modeling and retrieving design information. Observations from deployment and usage of Dedal lead to the second observational study. This was a study of the information handling behavior of individual designers doing short conceptual design tasks. This study resulted in the Information Handling Framework (IHF).

The IHF is a framework for understanding information handling behavior during conceptual design. Some key observations from the use of this framework are:

- designers move frequently between different types of information (on an average every 13 seconds),
- they handle information about upto 40 concepts in one minute,
- their ability to work fluidly and with ease while handling all types of information is essential during the conceptual design process, and
- the points of transition between different information types are critical from the viewpoint of computational support.

Deeper understanding of the information handling behavior is explained by means of detailed qualitative and quantitative results. The implications of these results towards the improvement in the understanding of the conceptual design process and the recommendations on the development of intuitive and integral information handling services are discussed.